A

5-a-Dihydrotestosterone

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                    Laboratory  Commercial Mail-out Laboratory
                    Order Code  DHTST
                      CPT Code  82651
               Collection Medium  <table>
                                  <tr>
                                  <td align=center></td></tr>
                                  <tr>
                                  <td width="110" valign="top" align="center">Red top tube</td>
                                  </tr>
                                  </table>

                       Minimum  <pre>
                                  Preferred Minimum:  1 mL
                                  Absolute Minimum: 0.6 mL</pre>
            Rejection Criteria:  Hemolyzed or lipemic specimens.
                Reference Range  <pre>
                                  Females
                                    Premature: 20.0-130.0  pg/mL
                                    Full Term: 20.0-150.0 pg/mL
                                    1 week-9 years: 0.0-49.9 pg/mL
                                    10-19 years: 50.0-170.0 pg/mL
                                    20 and older: 24.0-208.0 pg/mL

                                  Males
                                    Premature: 100.0-530.0 pg/mL
                                    Full Term: 50.0-600.0 pg/mL
                                    1 week-6 months: 120.0-850.0 pg/mL
                                    7 months-9 years: 0.0-49.9 pg/mL
                                    10-19 years: 0.0-533.0 pg/mL
                                    20 years and older: 106.0-719.0 pg/mL</pre>
                  Order Form:  A-1a Miscellaneous Request or Epic Req
                  Methodology  Quantitative High Performance Liquid Chromatography-Tandem Mass
                                  Spectrometry
                Analytic Time  1-4 days upon receipt at reference laboratory
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A1C

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                         See:  <br />Hemoglobin A1C, Whole Blood
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AAT

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                         See:  <br />Alpha-1-Antitrypsin Phenotyping, Serum
                               <br />Alpha-1-Antitrypsin Quantitation, Plasma
                               <br />Alpha-1-Antitrypsin, Blood and 24 hr stool
                               <br />Alpha-1-Antitrypsin, Feces
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ABL1 Gene Analysis Kinase Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	BCRSQ
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	5 mL whole blood (ONE pink top tube) or 3 mL bone marrow (ONE lavender top tube)
Rejection Criteria:	Serum or plasma. Frozen or clotted specimens. Specimens collected in anticoagulants other than EDTA. Severely hemolyzed specimens.
Reference Range	By report.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Assay detects more than 90 percent of the mutations that may lead to imatinib resistance.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Polymerase Chain Reaction/Sequencing
Analytic Time	10-12 days upon receipt at reference laboratory

ABL1 Gene Analysis T315I Variant

Laboratory	Commercial Mail-out Laboratory
Order Code	T315
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Preferred Minimum: 5 mL whole blood in (ONE pink top tube) or 3 mL bone marrow (ONE lavender top tube) Absolute Minimum: 1 mL whole blood or bone marrow
Rejection Criteria:	Serum or plasma. Specimens collected in anticoagulants other than EDTA. Frozen specimens. Clotted or severely hemolyzed specimens.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Order this test only for patients known to have a BCR-ABL1 translocation. NOTE: This assay will only detect the BCR-ABL1 T315I mutation. For a more comprehensive ABL1 mutation detection test, please order BCR-ABL Drug Resistance Analysis (see link below).
See:	 ABL1 Gene Analysis Kinase Variants, Whole Blood or Bone Marrow
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Reverse Transcription Polymerase Chain Reaction/Pyrosequencing
Analytic Time	10-12 days upon receipt at reference laboratory

ABORH-Type Cord Blood

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	CORD
CPT Code	ABO 86900, Rh 86901
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Rejection Criteria:	Specimen must be labeled with mother's first and last name and medical number. 'Cord blood' must be written on specimen label. Specimens will be rejected if information is not on the specimen label when received.
Order Form:	DeGowin Blood Center Requisition
Comments	Cord blood samples only have a forward type performed. No routine testing is performed when mothers are Rh positive and not alloimmunized. A blood type will be performed when mothers are Rh negative or mother's blood type is unknown.
Methodology	Tube
Analytic Time	1 hour (upon receipt in laboratory)

Abs at 450

See:	 Amniotic Fluid Bilirubin (Delta Abs 450)

Absolute CD4 Cell Count

See:	 CD4 Lymphocytes, Peripheral blood

ACE

See:	 Angiotensin-1 Converting Enzyme, Plasma

Acetaminophen

Laboratory	Chemistry
Order Code	APAP
CPT Code	82003
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL; light green top tube or ONE microtainer.
Reference Range	<pre> Acetaminophen concentrations greater than 150 mcg/mL at four hours after ingestion or greater than 40 mcg/mL at 12 hours after ingestion are often associated with toxicity. Critical value: >40 mcg/mL </pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Acetylcholine Esterase

Laboratory	Histopathology
Order Code	SSACHE
CPT Code	88314
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	<pre> Place correctly oriented biopsies on filter paper and cover with saline soaked gauze and deliver as soon as possible to the Surgical Pathology Laboratory receiving window adjacent to 5804 JPP. Tissue must be delivered before 1700, Mon-Fri.</pre>
Methodology	Light microscopy
Analytic Time	2 days

Acetylcholine Receptor Binding Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	ACHBI
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 2 mL serum Absolute Minimum: 0.5 mL serum</pre>
Rejection Criteria:	Severely lipemic, or hemolyzed specimens.
Reference Range	< or = 0.02 nmol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Myasthenia gravis (MG) is characterized by weakness and easy fatigability that are relieved by rest and anticholinesterase drugs. The weakness in most cases results from an autoantibody-mediated loss of functional acetylcholine receptors in the postsynaptic membrane of skeletal muscle. Demonstration of muscle AChR autoantibodies in a patient’s serum supports the diagnosis of acquired (autoimmune) MG, and quantitation provides a baseline for future comparisons. Muscle AChR antibodies are not found in congenital forms of MG and are uncommon in neurologic conditions other than acquired MG, with the exception of patients with paraneoplastic autoimmune neurological disorders, and Lambert-Eaton myasthenic syndrome (LES) with or without cancer (13% of LES patients have positive results for muscle AChR binding or striational antibodies). Patients with autoimmune liver disease are also frequently seropositive. The assay for muscle AChR binding antibodies is considered a first-order test for the laboratory diagnosis of MG, and for detecting "subclinical MG" in recipients of D-penicillamine, in patients with thymoma without clinical evidence of MG, and in patients with graft-versus-host disease.
Methodology	Radioimmunoassay (RIA)
Analytic Time	6 days upon receipt at reference laboratory

Acid Fast Culture

See:	 Mycobacterial Culture

Acid Fast Stain (Auramine-Rhodamine)

Laboratory	Microbiology
Order Code	C AFS
CPT Code	87206
Collection Medium	Sterile container
Minimum	TB culture specimen
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> Automatically added to requests for TB culture from oral specimens. Not recommended as a screen for TB. (Inadequate to rule out TB).</pre>
See:	 Bacterial Culture
Methodology	Fluorescent stain
Analytic Time	Test usually completed within 24-72 hours.
Testing Schedule	0700-1530 Monday through Saturday. For additional services, contact the Microbiology person on-call at pager #4903.

Acid Hemolysin

See:	 Paroxysmal Nocturnal Hemoglobinuria (PNH) Screen, Peripheral Blood

ACT

See:	 Activated Clotting Time, Blood

ACTH

See:	 Adrenocorticotropic Hormone, Plasma

Actin Antibodies IgG

Laboratory	Immunopathology
Order Code	ACTIN
CPT Code	83516
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL; red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	<pre> Negative <u><</u> 20.0 units Weak Positive 20 - 30 units Moderate to Strong Positive <u>></u> 30 units</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	Anti Actin Antibodies are found in 52-85% of patients with auto immune hepatitis or chronic active hepatitis and in 22% of patients with primary biliary cirrhosis. The results will be obtained with the INOVA QUANTA Lite™ ELISA. Assay values obtained with different manufacturers’ methods may not be used interchangeably. The magnitude of the reported IgG levels can not be correlated to an endpoint titer.
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	1 week
Testing Schedule	Weekly - Batch analysis performed weekly excluding university holidays.

Activated Clotting Time

Laboratory	Critical Care Laboratory
Order Code	ACT
CPT Code	85347
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lt_blue_2.7ml.png" c <tr> <td width="110" valign="top" align="center">Light Blue top tube 1.8 mL (N <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; Na Citrate blue top tube. Tube must be at least 90% full.
Reference Range	113-132 seconds
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Electromechanical Clot Detection
Analytic Time	15 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Activated Partial Thromboplastin Time (aPTT)

Laboratory	Hemostasis/Thrombosis
Order Code	PTT
CPT Code	85730
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 1.8 mL (N </tr> </table>
Minimum	Full draw; 1.8 mL light blue top (mix well) must be at least 90% full.
Reference Range	<pre> 23-31 seconds Critical value: <u>></u>50 seconds (on outpatients only) Results called for inpatients only: >87 seconds</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Blood from this test cannot be drawn through the IV line in which the heparin is being administered to the patient. A separate venipuncture is required at a different site. Must be drawn swiftly with a clean venipuncture (no hematoma). Time drawn must be indicated on requisition. Obtain special tube from lab if patient's hematocrit is over 55%. If patient is on heparin therapy, samples must be in the lab within one hour after draw. All other samples must be tested within four hours. Activated Partial Thromboplastin time (aPTT) may be performed on the same collection tube as Prothrombin Time and Fibrinogen. The current lot of aPTT reagent is consistent with previous lots. The mean of the reference range with this reagent is 27 seconds; the reference range is 23-31 seconds. The mean of the published therapeutic range for heparinization of 1.5-2.5 times the mean of the reference range (27) yields values of 40-67 seconds with this reagent. Based on our studies of heparin responsiveness, this is a reasonable target range to use with this reagent when treating uncomplicated venous thromboembolism.
See:	 Prothrombin Time, Plasma
See Appendix	See Additional Information: Hematology Critical Lab Values Heparin Therapy Phlebotomy Tubes and Order of Draw Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Acute Leukemia

Laboratory	Flow Cytometry Service
CPT Code	Technical: 88184(x1), 88185(x18); Professional: 88189
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Alternate Collection Media:	Green top tube 4 mL (Na Heparin), Lavender top tube 3 mL (EDTA)
Minimum	<pre> Adult - Peripheral Blood: 10 mL; Bone Marrow: 2-4 mL Pediatric - Peripheral Blood: 2-5 mL; Bone Marrow: 2-5 mL CSF - Volume required is cell count dependent. Provide as much CSF specimen as possible in the original CSF collection tube(s).</pre>
Reference Range	<pre> Antibodies routinely included are: CD2, CD3, CD7, CD10, CD13, CD14, CD19, CD33, CD34, CD38, CD45, CD46, CD56, CD64, CD117, HLA-DR, Kappa, Lambda, Glycophorin A, and Tdt as needed. Additional antibodies are added as necessary for diagnosis after morphologic examination. The pathologist will provide an interpretative report.</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	<pre> Specimens accepted from Monday 0800 until Friday 1630. Include pertinent clinical information on the requisition. Additional antibodies may be necessary for diagnosis.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow Cytometry-Whole Blood Lysis
Analytic Time	2 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Acylcarnitine Profile

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                  Laboratory  Commercial Mail-out Laboratory
                  Order Code  ACYLC
                    CPT Code  82017
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar
                               </tr>
                               </table>

                     Minimum  <pre>
                               Preferred Minimum:  4 mL sodium heparin whole blood
                                                   to yield 0.5 mL plasma

                               Absolute Minimum:  1 mL sodium heparin whole blood
                                                  to yield 0.1 mL plasma</pre>
              Reference Range  <pre>
                               Acetylcarnitine, C:2
                               1-7 days         2.14-15.89 nmol/mL
                               8 days-7 years   2.00-27.57 nmol/mL
                               > or = 8 years   2.00-17.83 nmol/mL

                               Propionylcarnitine, C3
                               1-7 days         < 0.55 nmol/mL
                               8 days-7 years   < 1.78 nmol/mL
                               > or = 8 years   < 0.88 nmol/mL

                               Iso-/Butyrylcarnitine, C4
                               1-7 days   < 0.46 nmol/mL
                               8 days-7 years   < 1.06 nmol/mL
                               > or = 8 years   < 0.83 nmol/mL

                               Isovaleryl-/2-Methylbutyrylcarnitine, C5
                               1-7 days         < 0.38 nmol/mL
                               8 days-7 years   < 0.63 nmol/mL
                               > or = 8 years   < 0.51 nmol/mL

                               Hexanoylcarnitine, C6
                               1-7 days         < 0.14 nmol/mL
                               8 days-7 years   < 0.23 nmol/mL
                               > or = 8 years   < 0.17 nmol/mL

                               3-OH-Hexanoylcarnitine, C6-OH
                               1-7 days         < 0.08 nmol/mL
                               8 days-7 years   < 0.19 nmol/mL
                               > or = 8 years   < 0.09 nmol/mL

                               Octenoylcarnitine, C8:1
                               1-7 days         < 0.48 nmol/mL
                               8 days-7 years   < 0.91 nmol/mL
                               > or = 8 years   < 0.88 nmol/mL

                               Octanoylcarnitine, C8
                               1-7 days         < 0.19 nmol/mL
                               8 days-7 years   < 0.45 nmol/mL
                               > or = 8 years   < 0.78 nmol/mL

                               Decenoylcarnitine, C10:1
                               1-7 days         < 0.25 nmol/mL
                               8 days-7 years   < 0.46 nmol/mL
                               > or = 8 years   < 0.47 nmol/mL

                               Decanoylcarnitine, C10
                               1-7 days         < 0.27 nmol/mL
                               8 days-7 years   < 0.91 nmol/mL
                               > or = 8 years   < 0.88 nmol/mL

                               Glutarylcarnitine, C5-DC
                               1-7 days         < 0.06 nmol/mL
                               8 days-7 years   < 0.10 nmol/mL
                               > or = 8 years   < 0.11 nmol/mL
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Dodecenoylcarnitine, C12:1
1-7 days < 0.19 nmol/mL
8 days-7 years < 0.37 nmol/mL
> or = 8 years < 0.35 nmol/mL

Dodecanoylcarnitine, C12
1-7 days < 0.18 nmol/mL
8 days-7 years < 0.35 nmol/mL
> or = 8 years < 0.26 nmol/mL

3-OH-Dodecanoylcarnitine, C12-OH
1-7 days < 0.06 nmol/mL
8 days-7 years < 0.09 nmol/mL
> or = 8 years < 0.08 nmol/mL

Tetradecadienoylcarnitine, C14:2
1-7 days < 0.09 nmol/mL
8 days-7 years < 0.13 nmol/mL
> or = 8 years < 0.18 nmol/mL

Tetradecenoylcarnitine, C14:1
1-7 days < 0.16 nmol/mL
8 days-7 years < 0.35 nmol/mL
> or = 8 years < 0.24 nmol/mL

Tetradecanoylcarnitine, C14
1-7 days < 0.11 nmol/mL
8 days-7 years < 0.15 nmol/mL
> or = 8 years < 0.12 nmol/mL

3-OH-Tetradecenoylcarnitine, C14:1-OH
1-7 days < 0.06 nmol/mL
8 days-7 years < 0.18 nmol/mL
> or = 8 years < 0.13 nmol/mL

3-OH-Tetradecanolycarnitine, C14-OH
1-7 days < 0.04 nmol/mL
8 days-7 years < 0.05 nmol/mL
> or = 8 years < 0.08 nmol/mL

Hexadecenoylcarnitine, C16:1
1-7 days < 0.15 nmol/mL
8 days-7 years < 0.21 nmol/mL
> or = 8 years < 0.10 nmol/mL

Hexadecanoylcarnitine, C16
1-7 days < 0.36 nmol/mL
8 days-7 years < 0.52 nmol/mL
> or = 8 years < 0.23 nmol/mL

3-OH-Hexadecenoylcarnitine, C16:1-OH
1-7 days < 0.78 nmol/mL
8 days-7 years < 0.36 nmol/mL
> or = 8 years < 0.06 nmol/mL

3-OH-Hexadecanoylcarnitine, C16-OH
1-7 days < 0.10 nmol/mL
8 days-7 years < 0.07 nmol/mL

	> or = 8 years < 0.06 nmol/mL
	Linoleylcarnitine, C18:2
	1-7 days < 0.12 nmol/mL
	8 days-7 years < 0.31 nmol/mL
	> or = 8 years < 0.24 nmol/mL
	Oleylcarnitine, C18:1
	1-7 days < 0.25 nmol/mL
	8 days-7 years < 0.45 nmol/mL
	> or = 8 years < 0.39 nmol/mL
	Stearoylcarnitine, C18
	1-7 days < 0.10 nmol/mL
	8 days-7 years < 0.12 nmol/mL
	> or = 8 years < 0.14 nmol/mL
	3-OH-Linoleylcarnitine, C18:2-OH
	1-7 days < 0.04 nmol/mL
	8 days-7 years < 0.06 nmol/mL
	> or = 8 years < 0.06 nmol/mL
	3-OH-Oleylcarnitine, C18:1-OH
	1-7 days < 0.03 nmol/mL
	8 days-7 years < 0.04 nmol/mL
	> or = 8 years < 0.06 nmol/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient’s age is required on the request form for pr
Methodology	Electrospray Tandem Mass Spectrometry (MS/MS)
Analytic Time	4 days upon receipt at reference laboratory

Acylglycines, Quantitative, Urine

Laboratory	Commercial Mail-out Laboratory
Order Code	ACYLG
CPT Code	82544
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 10 mL random urine Absolute Minimum: 4 mL random urine
Reference Range	<pre> Control Values Results Expressed as mg/g Creatinine Range Ethylmalonic Acid 0.5-20.2 2-Methylsuccinic Acid 0.4-13.8 Glutaric Acid 0.6-15.2 Isobutyrylglycine 0.0-11.0 n-Butyrylglycine 0.1- 2.1 2-Methylbutyrylglycine 0.3- 7.5 Isovalerylglycine 0.3-14.3 n-Hexanoylglycine 0.2- 1.9 n-Octanoylglycine 0.1- 2.1 3-Phenylpropionylglycine 0.0- 1.1 Suberylglycine 0.0-11.0 trans-Cinnamoylglycine 0.2-14.7 Dodecanedioic Acid (12 DCA) 0.0- 1.1 Tetradecanedioic Acid (14 DCA) 0.0- 1.0 Hexadecanedioic Acid (16 DCA) 0.0- 1.0</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Freeze urine as soon as possible; this task is performed by Specimen Control in Pathology. Avoid dilute urine when possible. Clinical information is needed for appropriate interpretation. Additional required information includes age, gender, diet (e.g., TPN therapy), drug therapy, and family history.
Methodology	Gas Chromatography-Mass Spectrometry (GC-MS) Stable Isotope Dilution Analysis
Analytic Time	5 days upon receipt at reference laboratory (not reported on Saturday or Sunday)

ADAMTS13 Activity

Laboratory	Commercial Mail-out Laboratory
Order Code	ADAMTS13
CPT Code	85397, 85335 (if inhibitor is performed), 83520 (if antibody is performed)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	<pre> Preferred Minimum: THREE aliquots (0.5 mL each) Absolute Adult/Pediatric Minimum: TWO aliquots (0.4 mL each)</pre>
Reference Range	ADAMTS13 Activity <u></u> 67% ADAMTS13 Inhibitor <u><</u> 0.4 Inhibitor Units ADAMTS13 Antibody <u><</u> 18 Arbitrary Units
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	ADAMTS13 Evaluation is a reflexive testing algorithm. Activity is always performed. If activity result is <= 30%, the inhibitor assay will be performed. If inhibitor result is <= 0.7 Inhibitor Units, the antibody assay will be performed. Please print, complete and submit the <a href="http://www.bcw.edu/cs/grou to the lab, with the specimen and the Epic Requisition.
Methodology	Fluorescence Resonance Energy Transfer (FRET)-Based Kinetic Assay
Analytic Time	ADAMTS13 activity and inhibitor assays are run daily, Monday - Friday. Turnaround time is 2-4 days upon receipt at reference laboratory. ADAMTS13 antibody assay is run weekly. Turnaround time is 7-10 days upon receipt at reference laboratory.

Adenosine Deaminase

Laboratory	Commercial Mail-out Laboratory
Order Code	ADAPLEURA
CPT Code	84311
Collection Medium	Miscellaneous container; contact laboratory
Minimum	<pre> Preferred minimum: 0.3 mL body fluid Absolute minimum: 0.1 mL body fluid</pre>
Rejection Criteria:	Whole blood. Bronchoalveolar lavage (BAL) specimens. Turbid specimens.
Reference Range	0.0 - 9.4 U/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Spectrophotometry
Analytic Time	1-4 days upon receipt at reference laboratory.

Adenosine Deaminase

Laboratory	Commercial Mail-out Laboratory
Order Code	ADACSF
CPT Code	84311
Collection Medium	Miscellaneous container; contact laboratory
Minimum	<pre> Preferred minimum: 0.3 mL body fluid Absolute minimum: 0.1 mL body fluid</pre>
Rejection Criteria:	Bronchoalveolar Lavage (BAL) specimens or whole blood. Turbid specimens that cannot be clarified by centrifugation.
Reference Range	0-1.5 U/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Spectrophotometry
Analytic Time	1-4 days upon receipt at reference laboratory.

Adenosine Deaminase

Laboratory	Commercial Mail-out Laboratory
Order Code	ADAPERIT
CPT Code	84311
Collection Medium	Miscellaneous container; contact laboratory
Minimum	<pre> Preferred minimum: 0.3 mL body fluid Absolute minimum: 0.1 mL body fluid</pre>
Rejection Criteria:	Whole blood. Bronchoalveolar Lavage (BAL) specimens. Turbid specimens.
Reference Range	0.0-7.3 U/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Spectrophotometry
Analytic Time	1-4 days upon receipt at reference laboratory.

Adenosine Deaminase, RBC

Laboratory	Commercial Mail-out Laboratory
Order Code	ADA
CPT Code	84311
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Preferred minimum: 3 mL whole blood in a lavender top tube Absolute minimum: 1 mL whole blood in a lavender top tube</pre>
Rejection Criteria:	Hemolyzed specimens
Reference Range	Effective: August 20, 2012 400-900 mU/g Hb
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Spectrophotometry
Analytic Time	5 days upon receipt at reference laboratory

Adenovirus 40-41 Antigens by EIA

Laboratory	Commercial Mail-out Laboratory
Order Code	ADENOAG
CPT Code	87301
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Feces specimen, stool contain </tr> </table>
Minimum	<pre> Preferred Minimum: 5 g aliquot of stool in a clean unpreserved stool transport vial Absolute Minimum: 1 g of stool</pre>
Rejection Criteria:	Specimens in formalin, other preservatives, or diapers.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Enzyme Immunoassay (EIA)
Analytic Time	24 hours upon receipt at reference laboratory

Adenovirus Antibodies, IgG + IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	ADENOPAN
CPT Code	86603(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Minimum: 1.0 mL serum Absolute Adult/Pediatric Minimum: 0.1 mL serum</pre>
Rejection Criteria:	Lipemic, hemolyzed, icteric, turbid, bacterially contaminated, or heat-inactivated specimens. Plasma specimens.
Reference Range	<pre> Adenovirus Antibody, IgG Negative: 0.89 IV or less No significant level of adenovirus IgG antibody detected. Equivocal: 0.90 - 1.10 IV Questionable presence of adenovirus IgG antibody detected. Repeat testing in 10-14 days may be helpful. Positive: 1.11 IV or greater IgG antibodies to adenovirus detected, which may suggest current or past infection. Adenovirus Antibody, IgM Negative: 0.89 IV or less No significant level of adenovirus IgM antibody detected. Equivocal: 0.90 - 1.10 IV Questionable presence of adenovirus IgM antibody detected. Repeat testing in 10-14 days may be helpful. Positive: 1.11 IV or greater IgM antibodies to adenovirus detected, which may suggest current or recent infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	1 week upon receipt at reference laboratory

Adenovirus DNA, Quantitative, PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	ADENOPCR
CPT Code	87799
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Preferred Minimum: 1 mL of plasma Absolute Minimum: 0.35 mL of plasma
Reference Range	<500 copies/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Real-Time PCR
Analytic Time	5 days upon receipt at reference laboratory

ADH

See:	 Arginine Vasopressin (ADH), Plasma

Adrenal Cortex Antibody Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	ADRAB
CPT Code	86255, 86256 If the Adrenal Antibody Screen is positive, Adrenal Antibody Titer with pattern will be performed at an additional charge.
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Red top tube</td></tr></table>
Minimum	Preferred Minimum: 2 mL serum in red top tube Absolute Minimum: 0.5 mL serum in red top tube
Reference Range	Negative in normal individuals
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Immunofluorescence Assay (IFA)

Adrenaline

See:	 Catecholamines, Fractionated, Plasma

Adrenocorticotropic Hormone

Laboratory	Chemistry
Order Code	ACTH
CPT Code	82024
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	3 mL whole blood in pink tube or TWO microtainers.
Rejection Criteria:	Due to limited stability, add-on orders for ACTH are not accepted. Samples that have gone through a freeze-thaw cycle are also not acceptable.
Reference Range	<u>Serum/Plasma Normal Range</u> <pre>1 week - 9 years: 5-46 pg/mL 10-18 years: 6-55 pg/mL 19 years and older: 7-63 pg/mL</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Adrenocorticotropic hormone (ACTH) or corticotropin is a peptide hormone consisting of 39 amino acids. It is produced in the anterior pituitary of the brain as part of the precursor molecule pro-opiomelanocortin (POMC). Tissue-specific cleavage results in ACTH and a range of related peptides.^{2,3} ACTH stimulates formation and secretion of glucocorticoids (especially cortisol) by the adrenal cortex. The glucocorticoid production is regulated by various factors.⁴ After stimulation (e.g. by physical effort or by the internal body clock), the hypothalamus secretes CRH (corticotropin releasing hormone). CRH acts on the pituitary, which in turn synthesizes and secretes ACTH. Finally, ACTH stimulates secretion of the glucocorticoids by the adrenals. High concentrations of glucocorticoids in the blood inhibit secretion of CRH and ACTH via a negative feedback mechanism. ACTH concentrations show a diurnal variation with high levels in the morning and low levels in the evening. Therefore, as with cortisol, it is important to know the collection time of the plasma sample for interpretation of the results. Plasma ACTH measurements are useful in the differential diagnosis of pituitary Cushing’s disease (ACTH hypersecretion), autonomous ACTH-producing pituitary tumors, hypopituitarism with ACTH deficiency and ectopic ACTH syndrome.^{5,6} In addition to cortisol measurements, ACTH determinations can be used together with functional or stimulation tests to diagnose the origin of glucocorticoid overproduction. Similarly, ACTH measurements can be employed to facilitate differential diagnosis of adrenocortical insufficiency (Addison’s disease). ACTH not produced by the pituitary gland is known as ectopic ACTH. This is often associated with small cell carcinoma of the lung. In rare cases ectopic ACTH can be caused by thymic tumors, pancreatic adenocarcinomas, or bronchial carcinoids. The Roche Diagnostics Elecsys ACTH assay employs two monoclonal antibodies specific for ACTH (9-12) and for the C-terminal region (ACTH 36-39). Due to common antigenic structure, the antibodies recognize intact biologically active ACTH 1-39 and the ACTH precursors POMC and pro-ACTH.³ <pre><u>References</u>: 1. Reisch N, Reincke M, Bindlingmaier M. Preanalytical stability of adrenocorticotropic hormone depends on time centrifugation rather than temperature. Clin Chem 2007;53:358-359. 2. Cone RD. Anatomy and regulation of the central melanocortin system. Nature Neurosci 2005;8:571-578. 3. Talbot JA, Kane JW, White A. Analytical and clinical aspects of adrenocorticotrophin determination. Ann Clin Biochem 2003;40:453-471. 4. Jacobson L. Hypothalamic-pituitary-adrenocortical axis regulation. Endocrinol Metab Clin North Am 2005;34:271-292.

5. Beauregard C, Dickstein G, Lacroix A. Classic and
of Cushing's syndrome: diagnosis and therapy. Treat
2002;1:79-94.

6. Lindsay JR, Nieman LK. Differential diagnosis and
Cushing's syndrome. Endocrinol Metab Clin North Am 2
421.</pre>

See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Chemiluminescent Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Advil

See:
Ibuprofen Drug Level, Serum

AFB (Acid Fast Bacilli)

See:
Acid Fast Stain (Auramine-Rhodamine)

AFP

See:
Alpha Fetoprotein, Plasma

AGBM

See:
Glomerular Basement Membrane Antibodies, IgG, Serum

ALA & DALA

See:
Aminolevulinic Acid, Urine (24 hour or random)

Alanine

See:
Amino Acids, Quantitative, Plasma

Alanine Aminotransferase (ALT)

Laboratory	Chemistry
Order Code	ALT
CPT Code	84460
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL; light green top or 1 microtainer
Reference Range	<pre> Males 0-35 u/l; females 0-20 u/l Pediatric Normal Ranges: Age Male UI/L Female IU/L 1-30 days 1-25 2-25 31-365 days 4-35 3-30 1-3 years 5-30 5-30 4-6 years 5-20 5-25 7-9 years 5-25 5-25 10-18 years 5-30 5-20</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Alanine Aminotransferase-Other, Body Fluid
Methodology	UV Testing
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Alanine Aminotransferase-Other

Laboratory	Chemistry
Order Code	ALTO
CPT Code	84460
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Alanine Aminotransferase (ALT), Plasma
Methodology	UV testing
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Albumin-Other

Laboratory	Chemistry
Order Code	ALBO
CPT Code	82040
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Albumin, Plasma
Methodology	Colorimetric assay with endpoint
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Albumin

Laboratory	Chemistry
Order Code	ALB
CPT Code	82040
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL; light green top or ONE microtainer
Reference Range	<pre> Adult Reference Range: 3.4 - 4.8 g/dL Pediatric Reference Ranges: 0 - 4 days = 2.8 - 4.4 g/dL 4 days - 14 years = 3.8 - 5.4 g/dL 14 years - 18 years = 3.2 - 4.5 g/dL</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Albumin-Other, Body Fluid Protein Electrophoresis, Serum
See Appendix	See Additional Information: Chemistry Pediatric Reference Ranges
Methodology	Colorimetric assay with endpoint method
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Alcohol

Laboratory	Chemistry
Order Code	ALCH
CPT Code	84600
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers
Rejection Criteria:	Medico-legal specimens are not accepted.
Reference Range	Ethanol intoxication begins in the 50-100 mg/dL range. Clinical toxicity for methanol and isopropanol can occur at concentrations of 10 mg/dL or greater. Critical Values: Methanol 10 mg/dL or greater Isopropanol 10 mg/dL or greater Ethanol 300 mg/dL or greater
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	May be ordered after ethanol/volatiles screen (EVS) with an unexplained osmolar gap >15. This procedure individually quantitates methanol, ethanol, isopropanol and acetone. Availability: As needed. Profile result codes: methanol, ethanol, acetone, isopropanol. This test requires approval of Clinical Pathology Resident on-call (pager #3404). May be ordered after ethanol/volatiles screen (EVS) with an unexplained osmolar gap >15. This procedure individually quantitates methanol, ethanol, isopropanol and acetone. Availability: As needed. Profile result codes: methanol, ethanol, acetone, isopropanol.
See:	 Ethanol/Volatiles Screen (EVS), Plasma Ethylene Glycol, Plasma Glycols (Ethylene and Propylene), Plasma
See Appendix	See Additional Information: Autopsy Service Chemistry Critical Lab Values Osmolality Gap - Calculation and Interpretation Osmolality Gap Calculator
Methodology	Gas Chromatography
Analytic Time	4 hours (upon receipt in laboratory)
Testing Schedule	0700-1530 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Aldolase

Laboratory	Commercial Mail-out Laboratory
Order Code	ALSE
CPT Code	82085
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult mimimum: 1.0 mL serum from red top Absolute Adult minimum: 0.5 mL serum from red top Pediatric minimum: TWO microtubes or 0.2 mL serum (not whole blood)</pre>
Rejection Criteria:	Serum is only acceptable sample type. Hemolyzed specimen is not acceptable.
Reference Range	<pre> 0-30 days: 6.0 - 32.0 U/L 1-5 months: 3.0-12.0 U/L 6-35 months: 3.5-10.0 U/L 3-6 years: 2.7-8.8 U/L 7-17 years: 3.3 - 9.7 U/L 18 years and older: 1.5 - 8.1 U/L</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Patients will be screened, looking for an elevated CK value within the last 24 hrs. If this CK value was normal, this test will be sent to a commercial lab; if this CK value is elevated this test will be canceled.</pre>
Methodology	Enzymatic
Analytic Time	Result available within 24 hours of receipt at reference laboratory.

Aldosterone

Laboratory	Commercial Mail-out Laboratory
Order Code	ALDU
CPT Code	82088
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed urine g </tr> </table>
Minimum	Adult Preferred Minimum: 4 mL Absolute Minimum: 0.5 mL
Reference Range	<pre> Components — Reference Intervals Aldosterone, Urine Normal diet: 6-25 ug/24 hrs Low salt diet: 17-44 ug/24 hrs High salt diet: 0-6 ug/24 hrs Normal urine values of aldosterone are dependent on sodium intake. Normal sodium intake: 100-200 mEq Low sodium intake: <25 mEq High sodium intake: >200 mEq Creatinine (24-hour) Male 3-8 years: 140-700 mg/d 9-12 years: 300-1300 mg/d 13-17 years: 500-2300 mg/d 18-50 years: 1000-2500 mg/d 51-80 years: 800-2100 mg/d 81 years and older: 600-2000 mg/d Female 3-8 years: 140-700 mg/d 9-12 years: 300-1300 mg/d 13-17 years: 400-1600 mg/d 18-50 years: 700-1600 mg/d 51-80 years: 500-1400 mg/d 81 years and older: 400-1300 mg/d</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	24 hr collection. Use boric acid HCL container from Pharmacy. Refrigerate during collection storage and submission to Pathology. PH will be adjusted in Specimen Control once urine is submitted to Core Laboratory. Submit collection dates and time on requisition.
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Quantitative Radioimmunoassay
Analytic Time	5 days upon receipt at reference laboratory

Aldosterone

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                  Laboratory  Commercial Mail-out Laboratory
                  Order Code  ALDS
                    CPT Code  82088
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Red top tube</td>
                               </tr>
                               </table>

                     Minimum  Preferred Minimum: 1.0 mL serum from red top tube<br />
                               Absolute Minimum:  0.75 mL serum from red top tube
          Rejection Criteria:  EDTA plasma
              Reference Range  <pre>
                               Age          Posture Unspecified
                               0-6 days       5.0-102.0 ng/dL
                               1-3 weeks      6.0-179.0 ng/dL
                               1-11 months    7.0-99.0 ng/dL
                               1-2 years      7.0-93.0 ng/dL
                               3-10 years     4.0-44.0 ng/dL
                               11-14 years    4.0-31.0 ng/dL

                               15 years and older
                                 Posture Unspecified: <u><</u> 31.0 ng/dL
                                 Supine:              <u><</u> 16.0 ng/dL
                                 Upright:             4.0-31.0 ng/dL</pre>
                 Order Form:  A-1a Miscellaneous Request or Epic Req
                    Comments  If an upright sample is collected, patient should be upright (seated or
                               standing) for at least two hours.

               See Appendix  See Additional Information: <br />
                               Specimens Requiring Immediate Delivery
                 Methodology  Radioimmunoassay
              Analytic Time  4 working days upon receipt at reference laboratory
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Alkaline Phosphatase

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                        See:  <br />Phosphatase, Alkaline, Plasma
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Alkaline Phosphatase Isoenzyme

Laboratory: Commercial Mail-out Laboratory
Order Code: ALPI
CPT Code: 84075, 84080
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>

Minimum: 1 mL of serum divided into TWO tubes each containing 0.5 mL
Reference Range:

<pre>
ALKALINE PHOSPHATASE

Males	Females
4 years: 149-369 U/L	4 years: 169-372 U/L
5 years: 179-416 U/L	5 years: 162-355 U/L
6 years: 179-417 U/L	6 years: 169-370 U/L
7 years: 172-405 U/L	7 years: 183-402 U/L
8 years: 169-401 U/L	8 years: 199-440 U/L
9 years: 175-411 U/L	9 years: 212-468 U/L
10 years: 191-435 U/L	10 years: 215-476 U/L
11 years: 185-507 U/L	11 years: 178-526 U/L
12 years: 185-562 U/L	12 years: 133-485 U/L
13 years: 182-587 U/L	13 years: 120-449 U/L
14 years: 166-571 U/L	14 years: 153-362 U/L
15 years: 138-511 U/L	15 years: 75-274 U/L
16 years: 102-417 U/L	16 years: 61-264 U/L
17 years: 69-311 U/L	17-23 years: 52-144 U/L
18 years: 52-222 U/L	24-45 years: 37-98 U/L
> or =19 years: 45-115 U/L	46-50 years: 39-100 U/L
	51-55 years: 41-108 U/L
	56-60 years: 46-118 U/L
	61-65 years: 50-130 U/L
	> or =66 years: 55-142 U/L

Reference values have not been established for patients that are <4 years of age.

ALKALINE PHOSPHATASE ISOENZYMES

Liver 1%	Liver 1
0-6 years: 5.1-49.0%	0-6 years: 7.0-112.7 IU/L
7-9 years: 3.0-45.0%	7-9 years: 7.4-109.1 IU/L
10-13 years: 2.9-46.3%	10-13 years: 7.8-87.6 IU/L
14-15 years: 7.8-48.9%	14-15 years: 10.3-75.6 IU/L
16-18 years: 14.9-50.5%	16-18 years: 13.7-78.5 IU/L
> or =19 years: 27.8-76.3%	> or =19 years: 16.2-70.2 IU/L

Liver 2%	Liver 2
0-6 years: 2.9-13.7%	0-6 years: 3.0-41.5 IU/L
7-9 years: 3.7-12.5%	7-9 years: 4.0-35.6 IU/L
10-13 years: 2.9-22.3%	10-13 years: 3.3-37.8 IU/L
14-15 years: 2.2-19.8%	14-15 years: 2.2-32.1 IU/L
16-18 years: 1.9-12.5%	16-18 years: 1.4-19.7 IU/L
> or =19 years: 0.0-8.0%	> or =19 years: 0.0-5.8 IU/L

Bone %	Bone
0-6 years: 41.5-82.7%	0-6 years: 43.5-208.1 IU/L
7-9 years: 39.9-85.8%	7-9 years: 41.0-258.3 IU/L
10-13 years: 31.8-91.1%	10-13 years: 39.4-346.1 IU/L
14-15 years: 30.6-85.4%	14-15 years: 36.4-320.5 IU/L
16-18 years: 38.9-72.6%	16-18 years: 32.7-214.6 IU/L
> or =19 years: 19.1-67.7%	> or =19 years: 12.1-42.7 IU/L

Intestine %	Intestine
0-6 years: 0.0-18.4%	0-6 years: 0.0-37.7 IU/L
7-9 years: 0.0-18.3%	7-9 years: 0.0-45.6 IU/L
10-13 years: 0.0-11.8%	10-13 years: 0.0-40.0 IU/L
14-15 years: 0.0-8.2%	14-15 years: 0.0-26.4 IU/L
16-18 years: 0.0-8.7%	16-18 years: 0.0-12.7 IU/L
> or =19 years: 0.0-20.6%	> or =19 years: 0.0-11.0 IU/L

Placental
Not present</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre>Useful for: Diagnosis and treatment of liver, bone, intestinal diseases Determining the tissue source of increased alkalin activity in serum Differentiating between liver and bone sources of Alkaline phosphatase (ALP) is present in a number of liver, bone, intestine, and placenta. The activity o serum is a composite of isoenzymes from those sites circumstances, placental or Regan isoenzymes. Serum in the diagnosis of 2 main groups of conditions-hepa and bone disease associated with increased osteoblas A rise in ALP activity occurs with all forms of chol particularly with obstructive jaundice. The response any form of biliary tree obstruction is to synthesiz main site of new enzyme synthesis is the hepatocytes biliary canaliculi. ALP also is elevated in disorders of the skeletal sy osteoblast hyperactivity and bone remodeling, such a rickets and osteomalacia, fractures, and malignant t Moderate elevation of ALP may be seen in other disor Hodgkin’s disease, congestive heart failure, ulcerat regional enteritis, and intra-abdominal bacterial in
Methodology	Total Alkaline Phosphatase (ALP)<br ALP cleaves p-nitrophenyl phosphate in the presence yield phosphate and p-nitrophenol. The rate of p-nit is directly proportional to the ALP activity and is photometrically at 450 nm. ALP Isoenzymes Serum samples are electrophoresed through alkaline b agarose gels. Almost all ALP isoenzymes can be separ electrophoresis according to their charge difference the electrophoretic mobilities of the liver and bone quite similar, a modification is required for separa system utilizes differences between liver and bone i in order to achieve separation. Each sample is appli gel in duplicate. One sample is passed through wheat germ agglutin [WGA]) and is deposited anodally from application. The bone isoenzyme, which is rich in si with WGA and precipitates adjacent to the lectin app separated isoenzymes are visualized using a specific substrate, 5-bromo-4-chloro-3-indolyl phosphate/nitr in aminomethyl propanol (AMP) buffer, pH 10.0. The d on a densitometer for the quantification of tissue i
Analytic Time	4 days upon receipt at reference laboratory
Testing Schedule	Alkaline Phosphatase: Monday through Sunday; Continu Alkaline Phosphatase Isoenzymes: Monday through Frid

Alkaline Phosphatase-Other

Laboratory	Chemistry
Order Code	ALPO
CPT Code	84075
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Phosphatase, Alkaline, Plasma
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Allergen, (IgE) ImmunoCAP(R)

Laboratory	Commercial Mail-out Laboratory
CPT Code	86003
Minimum	<pre> Preferred Minimum: 0.3 mL per allergen Absolute Minimum: 0.15 mL per allergen</pre>
Reference Range	<pre> Specific Level of Allergen IgE Class kU/L Specific IgE Antibody 0 <0.35 Absent/Undetectable 1 0.35-0.70 Low Level 2 0.71-3.50 Moderate Level 3 3.51-17.5 High Level 4 17.6-50 Very High Level 5 51-100 Very High Level 6 >100 Very High Level</pre>
Comments	Please print, complete, and submit the IMCAP Allergen Checklist with the specimen and A-1a Miscellaneous Request.
Methodology	Immunoassay
Analytic Time	2 working days upon receipt at reference laboratory

Allergic Bronchopulmonary Aspergillosis

Laboratory	Commercial Mail-out Laboratory
Order Code	ABPA
CPT Code	82785(x1), 86003(x1), 86606(x1), 86331(x12)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	2.0 mL serum
Reference Range	<pre> Total Serum IgE 0-6 yrs: 0-55 IU/mL 7-13 yrs: 0-90 IU/mL >13 yrs: 0-120 IU/mL Aspergillus Specific IgE: <0.35 IU/mL Aspergillus IgG: <51% Ref Std/Class Aspergillus Precipitins: 0/Negative</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Profile includes total serum IgE, Aspergillus specific IgE, Total Aspergillus Antibody along with a panel of precipitins against twelve Aspergillus Antigens.
Analytic Time	within 10 days upon receipt at reference laboratory

Allopurinol and Metabolite Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	ALPUR
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> Preferred Minimum: 2 mL serum or EDTA plasma Absolute Minimum: 0.7 mL serum or EDTA plasma</pre>
Rejection Criteria:	Gel separator tubes
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	High Performance Liquid Chromatography
Analytic Time	within 10 days upon receipt at reference laboratory

Alpha Fetoprotein

Laboratory	Chemistry
Order Code	AFP
CPT Code	82105
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers for pediatric patients.
Reference Range	<pre>

All units in ng/mL

Age	Male	Female
0-13 days	5,000 - 105,000	5,000 - 105,000
14-30 days	300 - 60,000	300 - 60,000
1 month	100 - 10,000	100 - 10,000
2 months	40 - 1,000	40 - 1,000
3 months	11 - 300	11 - 300
4 months	5 - 200	5 - 200
5 months	0 - 90	0 - 90
6-11 months	0 - 60	0 - 97
1 year	0 - 17	0 - 41
2 years	0 - 12	0 - 12
3+ years	0 - 9	0 - 9

Reference ranges updated 6/30/2011 by addition of pediatric reference ranges below 3 years old.</pre>

Order Form:	A-1a General Lab or Epic Req
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Alpha Fetoprotein Quad Marker Screen

Laboratory	State Hygienic Laboratory
Comments	Please refer to the State Hygienic Laboratory at the University of Iowa.

17-Alpha Hydroxyprogesterone

Laboratory	Commercial Mail-out Laboratory
Order Code	17PRGE
CPT Code	83498
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.3 mL serum</pre>
Reference Range	<u>Females</u> Premature (26-28 weeks): 124 to 841 ng/dL Premature (29-35 weeks): 26 to 568 ng/dL Full term day 3: 7 to 77 ng/dL 4 days-30 days: 7-106 ng/dL 1-5 months: 13 to 106 ng/dL 6 months-1 year: 148 ng/dL or less 2-3 years: 256 ng/dL or less 4-6 years: 299 ng/dL or less 7-9 years: Less than or equal to 71 ng/dL 10-12 years: Less than or equal to 129 ng/dL 13-15 years: 9 to 208 ng/dL 16-17 years: Less than or equal to 178 ng/dL 18 years and older: Less than 207 ng/dL Follicular: 15 to 70 ng/dL Luteal: 35 to 290 ng/dL Tanner Stage I: Less than or equal to 74 ng/dL Tanner Stage II: Less than or equal to 164 ng/dL Tanner Stage III: 13-209 ng/dL Tanner Stage IV-V: 7-170 ng/dL <u>Males</u> Premature (26-28 weeks): 124 to 841 ng/dL Premature (29-35 weeks): 26 to 568 ng/dL Full term day 3: 7 to 77 ng/dL 4 days-2 months: Less than 200 ng/dL 3-5 months: Less than or equal to 90 ng/dL 6 months-1 year: 148 ng/dL or less 2-3 years: 228 ng/dL or less 4-6 years: 208 ng/dL or less 7-9 years: Less than or equal to 63 ng/dL 10-12 years: Less than or equal to 79 ng/dL 13-15 years: 9 to 140 ng/dL 16-17 years: 24 to 192 ng/dL 18 years and older: Less than 139 ng/dL Tanner Stage I: Less than or equal to 62 ng/dL Tanner Stage II: Less than or equal to 104 ng/dL Tanner Stage III: Less than or equal to 151 ng/dL Tanner Stage IV-V: 20-173 ng/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Radioimmunoassay
Analytic Time	3 working days upon receipt at reference laboratory

Alpha PGH

See:	 Alpha Subunit, Serum

Alpha Subunit

Laboratory	Commercial Mail-out Laboratory
Order Code	APGH
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum in red top tube
Reference Range	PEDIATRIC < or =5 days: < or =50 ng/mL 6 days-12 weeks: < or =10 ng/mL 3 months-17 years: < or =1.2 ng/mL Tanner II-IV*: < or =1.2 ng/mL ADULTS Males: < or =0.5 ng/mL Premenopausal females: < or =1.2 ng/mL Postmenopausal females: < or =1.8 ng/mL *Puberty onset (transition from Tanner stage I to Tanner stage II) occurs for boys at a median age of 11.5 (+/-2) years and for girls at a median age of 10.5 (+/-2) years. There is evidence that it may occur up to 1 year earlier in obese girls and in African American girls. For boys, there is no proven relationship between puberty onset and body weight or ethnic origin. Progression through Tanner stages is variable. Tanner stage V (adult) should be reached by age 18.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful For</u>: Adjunct in the diagnosis of pituitary tumors As part of the follow-up of treated pituitary tumor patients Differential diagnosis of thyrotropin-secreting pituitary tumor versus thyroid hormone resistance Differential diagnosis of constitutional delay of puberty versus hypogonadotrophic hypogonadism <u>Cautions</u>: False-positive elevations in serum free alpha-subunit levels may be seen in some women if blood specimens are drawn within 24 hours of ovulation. Patients with end-stage renal failure may have serum free alpha-subunit concentrations of up to 6-times the upper limit of reference range. Elevated alpha-subunit results on patients with elevated thyrotropin (TSH) should be interpreted with caution due to TSH cross-reactivity with the assay. Assisted reproduction involving ovarian hyperstimulation or in vitro fertilization may be associated with the elevation in serum free alpha-subunit levels. Pregnancy is associated with very substantial, physiological elevations in serum free alpha-subunit levels, paralleling chorionic gonadotropin (hCG) secretion. This test should not be ordered on pregnant patients. Thyrotropin-releasing hormone (TRH) and gonadotropin releasing hormone (GnRH) testing are not performed in the laboratory, but in specialized clinical testing units under the supervision of a physician. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.

```
                Methodology  Immunochemiluminescent Assay
              Analytic Time  7 working days upon receipt at reference laboratory
```

Alpha Subunit, Free

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                       See:  <br />Alpha Subunit, Serum
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Alpha Thalassemia (DNA probe)

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                       See:  <br />HBA1/HBA2 Gene Analysis Common Variants, Whole Blood
```

Alpha-1-Antitrypsin Phenotyping

```
                Laboratory  Commercial Mail-out Laboratory
                Order Code  A1AP
                  CPT Code  82103 Alpha-1-Antitrypsin, Total; 82104 Alpha-1-Antitrypsin, Phenotype
          Collection Medium  <table>
                             <tr>
                             <td align=center></td></tr>
                             <tr>
                             <td width="110" valign="top" align="center">Red top tube</td>
                             </tr>
                             </table>

                   Minimum  <pre>
                             Adult Minimum:  1 mL serum required
                             Absolute Minimum:  0.3 mL
                             Pediatric Minimum:  0.3 mL</pre>
        Rejection Criteria:  Hemolyzed specimens
            Reference Range  <pre>
                             Components              Reference Interval
                             Alpha-1-Antitrypsin     100-200 mg/dL
                             Phenotype               by report</pre>
               Order Form:  A-1a Miscellaneous Request or Epic Req
                  Comments  Alpha-1-Antitripysin total will also be performed.

                Methodology  Isoelectric Focusing/Immunoturbidimetric
              Analytic Time  4 working days upon receipt at reference laboratory
```

Alpha-1-Antitrypsin Quantitation

```
                Laboratory  Chemistry
                Order Code  A1AT
                  CPT Code  82103
          Collection Medium  <table>
                             <tr>
                             <td align=center></td></tr>
                             <tr>
                             <td width="110" valign="top" align="center">Plasma Separator Tube</td>
                             </tr>
                             </table>

 Alternate Collection Media:  Call laboratory for additional acceptable specimen collection containers.
                   Minimum  3 mL whole blood in light green top tube or ONE microtainer
            Reference Range  <pre>
                             100-200 mg/dL
                             A1AT is an acute phase reactant, therefore any inflammatory process may
                             result in transient elevations of the patient’s A-1-AT level.</pre>
               Order Form:  A-1a General Lab or Epic Req
                Methodology  Immunoturbidimetric
              Analytic Time  1 hour (upon receipt in laboratory)
          Testing Schedule  24 hrs/day, 7 days a week, including holidays.
```

Alpha-1-Antitrypsin

Laboratory	Commercial Mail-out Laboratory
Order Code	A1A
CPT Code	82103
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Feces specimen, stool contain </tr> </table>
Minimum	<pre> 5 g stool Absolute minimum: 1 g stool</pre>
Reference Range	0.00 - 0.62 mg/g stool
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Alpha-1-Antitrypsin, Blood and 24 hr stool
Methodology	Radial Immunodiffusion
Analytic Time	6 days upon receipt at reference laboratory

Alpha-1-Antitrypsin

Laboratory	Commercial Mail-out Laboratory
Order Code	A1AC
CPT Code	82103(x2)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Sterile container</td> </tr> </table>
Minimum	24 hr fecal collection and 1.0 mL serum
Rejection Criteria:	Specimens other than stool plus serum. No gel top tubes for serum collection.
Reference Range	<pre> Clearance: < or = 27 mL/24 hours Fecal alpha-1-antitrypsin concentration: < or = 54 mg/dL Serum alpha-1-antitrypsin concentration: 100 - 190 mg/dL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Fecal specimen must be collected in special containers available from Specimen Control, 6240 RCP. Draw serum sample during stool collection period. If no fecal specimen obtained in 24 hours, extend collection to 48-72 hours and note time frame on requisition.
Methodology	Nephelometry
Analytic Time	2 working days upon receipt at reference laboratory

Alpha-2-Antiplasmin Assay

Laboratory	Commercial Mail-out Laboratory
Order Code	ALPHA2A
CPT Code	85410
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	1 mL platelet poor plasma from light blue top tube
Rejection Criteria:	Serum specimens. Hemolyzed specimens.
Reference Range	1-4 days: 55-115% 5-29 days: 70-130% 30-89 days: 76-124% 90-179 days: 76-140% 180-364 days: 83-139% 1-5 years: 93-117% 6 years: 89-110% 7-9 years: 88-147% 10-11 years: 90-144% 12-13 years:87-142 % 14-15 years: 83-136% 16-17 years: 77-134% 18 years and older: 82-133%
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Chromogenic Assay
Analytic Time	8 working days upon receipt at reference laboratory

Alpha-Fetoprotein-Other

Laboratory	Chemistry
Order Code	AFPO
CPT Code	82105
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Alpha Fetoprotein, Plasma
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Alpha-Fetoprotein

Laboratory	Commercial Mail-out Laboratory
Order Code	AFPCSF
CPT Code	86316
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	<pre> Required Sample: 1.5 mL CSF Absolute Minimum: 0.5 mL CSF</pre>
Reference Range	<pre> <1.5 ng/mL Reference range for newborns is not available.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Two-Site Immunoenzymatic (Sandwich) Assay
Analytic Time	3 working days upon receipt at reference laboratory

Alpha-Hydroxyproline

See:	 Amino Acids, Quantitative, Random Urine

ALPL Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	HYPOPHOS
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> 5-6 mL whole blood from pink top(EDTA) tube. Alternate collection media: fibroblasts, amniocytes, or CVS: 4 confluent T-25 flasks; extracted DNA.</pre>
Rejection Criteria:	Specimen may be obtained Monday through Thursday only, no weekends, or holidays.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Analytic Time	8 working days upon receipt at reference laboratory

ALPS

See:	 Immunodeficiency Evaluations; Adult and Pediatric, Peripheral Blood

ALT

See:	 Alanine Aminotransferase (ALT), Plasma

Aluminum

Laboratory	Commercial Mail-out Laboratory
Order Code	ALS
CPT Code	82108
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	2 mL plasma minimum from royal blue K2 EDTA available from Specimen Control, 6240 RCP.
Rejection Criteria:	Separator tubes. Specimens that are not separated from the red cells or clot within 6 hours.
Reference Range	0 - 15 μg/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Elevated results from noncertified trace element-free tubes may be due to contamination. Elevated concentrations of trace elements in serum should be confirmed with a second specimen collected in a trace element- free tube, such as royal blue sterile tube (no additive).
Methodology	Quantitative Inductively Coupled Plasma-Mass Spectrometry
Analytic Time	1-4 days upon receipt at reference laboratory.
Testing Schedule	Testing performed Monday-Friday.

AMA

See:	 Primary Biliary Cirrhosis Screen (PBC Antibody Screen), Serum

Amikacin Drug Level

Laboratory	Chemistry
Order Code	AMIK
CPT Code	80150
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top or ONE microtainer for pediatric patients.
Reference Range	<pre> Peak 20-25 mcg/mL, trough 5-10 mcg/mL. Peak levels: 45-75 Min after I.M. Dose; 15-30 min. After I.V. Dose. Trough levels: Not more than 30 min before next dose. Critical value: >35 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	Kanamycin interferes with measurement of amikacin, giving falsely elevated results.
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Kinetic Interaction of Microparticles in Solution (KIMS)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Amino Acid Analysis

See:	 Amino Acids, Quantitative, Plasma

Amino Acids, Quantitative

Laboratory	Commercial Mail-out Laboratory
Order Code	AAQTU
CPT Code	82139
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	2 mL aliquot from random urine
Reference Range	<pre>

			Age Groups			
Urine Amino Acid Reference Values (nmol/mg creatine)	< or = 12 Mo (n=515)	13-35 Mo (n=210)	3-6 Y (n=197)	7-8 Y (n=74)	9-17 Y (n=214)	> or = 18 Y (n=835)
Phosphoserine	<1	<1	<1	<1	<1	<1
Phosphoethanolamine	15-341	33-342	19-164	12-118	<88	<48
Taurine	37-8300	64-3255	76-3519	50-2051	57-2235	24-1531
Asparagine	25-1000	62-884	28-412	38-396	22-283	25-238
Serine	18-4483	284-1959	179-1285	153-765	105-846	97-540
Hydroxyproline	<2536	<89	<46	<19	<22	<15
Glycine	362-18614	627-6914	412-5705	449-4492	316-4249	229-2989
Glutamine	139-2985	263-2979	152-1325	164-1125	188-1365	93-686
Aspartic Acid	<64	<56	<30	<9	<11	<10
Ethanolamine	282-3782	256-947	193-643	137-564	158-596	95-471
Histidine	145-3833	427-3398	230-2635	268-2147	134-1983	81-1128
Threonine	25-1217	55-763	30-554	25-456	37-418	31-278
Citrulline	<72	<57	<14	<9	<14	<12
Sarcosine	<75	<12	<9	<2	<3	<3
Beta-Alanine	<219	<92	<25	<25	<49	<52
Alanine	93-3007	101-1500	64-1299	44-814	51-696	56-518
Glutamic Acid	<243	12-128	<76	<39	<62	<34
1-Methylhistidine	17-419	18-1629	10-1476	19-1435	12-1549	23-1339
3-Methylhistidine	88-350	86-330	56-316	77-260	47-262	70-246
Argininosuccinic Acid	<77	<48	<37	<24	<69	<15
Carnosine	27-1021	16-616	18-319	<161	<109	<35
Anserine	<277	<820	<398	<141	<369	<38
Homocitrulline	<295	11-158	<71	<62	<33	<30
Arginine	10-560	20-395	14-240	<134	<153	<114
Alpha-aminoadipic Acid	10-275	15-324	10-135	<84	<76	<47
Gamma Amino-n-butyric Acid	<25	<13	<11	<6	<5	<5
Beta-aminoisobutyric Acid	18-3137	<980	15-1039	24-511	11-286	<301
Alpha-amino-n-butyric Acid	<63	<56	<38	<30	<31	<19
Hydroxylysine	<150	<57	<34	<26	<31	<12
Proline	28-2029	<119	<78	<20	<28	<26
Ornithine	<265	<70	<44	<17	<18	<25
Cystathionine	<302	<56	<26	<18	<44	<30
Cystine	12-504	11-133	<130	<56	<104	10-98
Lysine	19-1988	25-743	14-307	17-276	10-240	15-271
Methionine	<41	<41	<25	<23	<20	<16
Valine	11-211	11-211	<139	16-91	<75	11-61
Tyrosine	39-685	38-479	23-254	22-245	12-208	15-115
Isoleucine	<86	<78	<62	<34	<28	<22
Leucine	<200	15-167	12-100	13-73	<62	<51
Phenylalanine	14-280	34-254	20-150	21-106	11-111	13-70
Tryptophan	14-315	14-315	10-303	10-303	15-229	18-114
Allo-isoleucine	<29	<10	<8	<8	<8	<7

	</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery Urine Te Preservatives
Methodology	Liquid Chromatography-Tandem Mass Spectrometry (LC-M Quantitative Includes quantitation of the following amino acids: serine, asparagine, glutamic acid, glutamine, prolin alanine, citrulline, a-aminoadipic acid, a-amino-n-b valine, cystine, cystathionine, methionine, isoleuci tyrosine, phenylalanine, b-alanine, b-aminoisobutyri lysine, 1-methylhistidine, histidine, 3-methylhistid argininosuccinic acid, allo-isoleucine, homocitrulli
Analytic Time	3 days upon receipt at reference laboratory (not rep or Sunday)
Testing Schedule	Tests performed Monday through Friday only.

Amino Acids, Quantitative

Laboratory: Commercial Mail-out Laboratory
Order Code: AAQTP
CPT Code: 82139
Collection Medium: <table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar
</tr>
</table>

Minimum: Preferred Minimum: 4 mL heparinized plasma in a green-top (heparin) tube from a fasting patient (4 hours or more in infants).
Absolute Miniumum: 0.5 mL heparinized plasma

Rejection Criteria: Thrombin-activated tube is not acceptable.

Reference Range: <pre>

Plasma Amino Acid Reference Values (nmol/mL)		Age Groups < 24 m (n=191)	2y - 17 y (n=441)	> or =18 y (n=148)
Phosphoserine	PSer	< 109	< 95	< 18
Phosphoethanolamine	PEtN	< 6	< 5	< 12
Taurine	Tau	37 - 177	38 - 153	42 - 156
Asparagine	Asn	25 - 91	29 - 87	37 - 92
Serine	Ser	69 - 271	71 - 208	63 - 187
Hydroxyproline	Hyp	8 - 61	7 - 35	4 - 29
Glycine	Gly	111 - 426	149 - 417	126 - 490
Glutamine	Gln	316 - 1020	329 - 976	371 - 957
Aspartic Acid	Asp	2 - 20	< 11	< 7
Ethanolamine	EtN	< 70	< 64	< 67
Histidine	His	10 - 116	12 - 132	39 - 123
Threonine	Thr	47 - 237	58 - 195	85 - 231
Citrulline	Cit	9 - 38	11 - 45	17 - 46
Sarcosine	Sar	< 5	< 5	< 5
Beta-Alanine	bAla	< 28	< 27	< 29
Alanine	Ala	139 - 474	144 - 557	200 - 579
Glutamic Acid	Glu	31 - 202	22 - 131	13 - 113
1-Methylhistidine	1MHis	< 11	< 20	< 28
3-Methylhistidine	3MHis	< 1	< 1	2 - 9
Argininosuccinic Acid	Asa	< 2	< 2	< 2
Carnosine	Car	< 13	< 1	< 1
Anserine	Ans	< 1	< 1	< 1
Homocitruline	Hcit	< 5	< 2	< 2
Arginine	Arg	29 - 134	31 - 132	32 - 120
Alpha-Aminoadipic Acid	Aad	< 4	< 3	< 3
Gamma-Amino-n-butyric Acid	GABA	< 4	< 3	< 2
Beta-Aminoisobutyric Acid	bAib	< 9	< 5	< 5
Alpha-Amino-n-Butyric Acid	Abu	7 - 28	7 - 31	9 - 37
Hydroxylysine	Hyl	< 4	< 3	< 2
Proline	Pro	85 - 303	80 - 357	97 - 368
Ornithine	Orn	20 - 130	22 - 97	38 - 130
Cystathionine	Cth	< 2	< 2	< 5
Cystine	Cys	2 - 32	2 - 36	3 - 95
Lysine	Lys	49 - 204	59 - 240	103 - 255
Methionine	Met	11 - 35	11 - 37	4 - 44
Valine	Val	83 - 300	106 - 320	136 - 309
Tyrosine	Tyr	26 - 115	31 - 106	31 - 90
Homocystine	Hcy	NA	NA	< 5
Isoleucine	Ile	31 - 105	30 - 111	36 - 107
Leucine	Leu	48 - 175	51 - 196	68 - 183
Phenylalanine	Phe	28 - 80	30 - 95	35 - 80
Tryptophan	Trp	17 - 75	23 - 80	29 - 77
Allo-isoleucine	AlloIle	< 2	< 3	< 5

Reference values are for fasting patients.</pre>

Order Form: A-1a Miscellaneous Request or Epic Req

Comments: <u>Useful for</u>:
Evaluating patients with possible inborn errors of metabolism.

	  May aid in evaluation of endocrine disorders, liver diseases, neoplastic diseases, neurological disorder disturbances, renal failure, and burns.
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Quantitative Analysis by Liquid Chromatography-Tande (LC-MS/MS) Includes quantitation of the following amino acids: serine, asparagine, glutamic acid, glutamine, prolin citrulline, alpha-amino-n-butyric acid, valine, cyst isoleucine, leucine, tyrosine, phenylalanine, beta-a lysine, histidine, argininosuccinic acid, allo-isole phosphoserine, phosphoethanolamine, hydroxyproline, acid, ethanolamine, sarcosine, 1-methylhistidine, 3- carnosine, anserine, homocitruline, alpha-aminoadipi gamma-amino- n-butyric acid, beta-aminoisobutyric acid, hydroxyly cystathionine, and tryptophan.
Analytic Time	3 days upon receipt at reference laboratory (not rep or Sunday)
Testing Schedule	Monday through Friday

Amino Acids, Quantitative

Laboratory: Commercial Mail-out Laboratory
Order Code: AMINOC
CPT Code: 82139
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">CSF container</td>
</tr>
</table>

Minimum: 0.2 mL of spinal fluid from second collection vial.
Rejection Criteria: Specimens other than CSF.
Reference Range:

<pre>

CSF Amino Acid Referece Values (nmol/mL)	Age Groups < or = 31 D (n=73)	1-23 M (n=88)	2-18 Y (n=189)	> 19 Years (n=32)
Phosphoserine (PSer)	<1	<1	<1	<1
Phosphoethanolamine (PEtN)	<15	<10	<8	<7
Taurine (Tau)	8-48	<28	<13	<20
Asparagine (Asn)	8-34	5-16	<10	5-20
Serine (Ser)	44-136	26-71	21-51	19-40
Hydroxyproline (Hyp)	<7	<3	<1	<2
Glycine (Gly)	5-115	<33	<11	<35
Glutamine (Gln)	467-1832	301-1128	326-1092	380-1348
Aspartic Acid (Asp)	<1	<1	<1	<2
Ethanolamine (EtN)	11-193	7-155	7-153	7-153
Histidine (His)	11-70	9-28	9-21	9-28
Threonine (Thr)	32-143	11-77	14-38	23-57
Citrulline (Cit)	<11	<6	<3	<9
Sarcosine (Sar)	<1	<1	<1	<1
Beta-alanine (bAla)	<26	<25	<25	<25
Alanine (Ala)	24-124	16-53	12-34	19-60
Glutamic Acid (Glu)	<12	<3	<1	<4
1-Methylhistidine (1MHis)	<3	<1	<2	<3
3-Methylhistidine (3MHis)	<4	<1	<1	<2
Argininosuccinic Acid (Asa)	<1	<2	<1	<1
Carnosine (Car)	<1	<1	<1	<1
Anserine (Ans)	<9	<9	<7	<3
Homocitrulline (Hcit)	<3	<1	<1	<1
Arginine (Arg)	5-39	11-35	11-27	11-32
Alpha-aminoadipic Acid (Aad)	<1	<1	<1	<1
Gamma-amino-n-butyric Acid (GABA)	<1	<1	<1	<1
Beta-aminoisobutyric Acid (bAib)	<1	<1	<1	<1
Alpha-amino-n-butyric Acid (Abu)	<15	<6	<5	<14
Hydroxylysine (Hyl)	<1	<1	<1	<1
Proline (Pro)	<17	<6	<2	<6
Ornithine (Orn)	<24	<12	<6	<11
Cystathionine (Cth)	<1	<2	<1	<1
Cystine (Cys)	<2	<2	<1	<1
Lysine (Lys)	11-63	9-33	10-25	13-42
Methionine (Met)	<43	<9	<6	<10
Valine (Val)	14-61	9-28	8-20	11-40
Tyrosine (Tyr)	8-83	5-24	<17	5-17
Homocystine (Hcy)	<1	<1	<1	<1
Isoleucine (Ile)	<27	<13	<8	<17
Leucine (Leu)	12-41	6-21	7-16	7-29
Phenylalanine (Phe)	7-40	5-18	<12	7-21
Tryptophan (Trp)	<12	<6	<4	<4
Allo-isoleucine (AlloIle)	<3	<2	<2	<2

</pre>

Order Form: A-1a Miscellaneous Request or Epic Req
Comments: Evaluating patients with possible inborn errors of amino acid metabolism, in particular nonketotic hyperglycemia and serine biosynthesis defects, especially when used in conjunction with

concomitantly drawn plasma specimens.

Methodology <pre>
Liquid Chromatography-Tandem Mass Spectrometry (LC-MS

Includes quantitation of the following amino acids:
serine, asparagine, glutamic acid, glutamine, prolin
alanine, citrulline, a-amino-n-butyric acid, valine,
methionine, isoleucine, leucine, tyrosine, phenylala
lysine, histidine, and arginine.</pre>

Analytic Time 3 days upon receipt at reference laboratory (not rep
or Sunday)

Aminoglycoside

See:
Amikacin Drug Level, Plasma

Gentamicin, Plasma

Tobramycin, Plasma

Aminolevulinic Acid

Laboratory Commercial Mail-out Laboratory
Order Code ALA
CPT Code 82135
Collection Medium <table>
<tr>
<td align=center></td></tr
<tr>
<td width="110" valign="top" align="center">Urine - 24 hour/timed dark pl
</tr>
</table>

Minimum Collect 4 mL from a 24 hr or random urine.
Rejection Criteria: Body fluids other than urine or specimen not protected from light.
Reference Range <pre>
Aminolevulinic Acid, Urine 0-35 μmol/L
Aminolevulinic Acid, Urine 0-60 μmol/d

Creatinine, 24-Hour Urine
Male
3-8 years: 140-700 mg/d
9-12 years: 300-1300 mg/d
13-17 years: 500-2300 mg/d
18-50 years: 1000-2500 mg/d
51-80 years: 800-2100 mg/d
81 years and older: 600-2000 mg/d

Female
3-8 years: 140-700 mg/d
9-12 years: 300-1300 mg/d
13-17 years: 400-1600 mg/d
18-50 years: 700-1600 mg/d
51-80 years: 500-1400 mg/d
81 years and older: 400-1300 mg/d

Order Form: A-1a Miscellaneous Request or Epic Req
Comments Increased ALA concentration is associated with exposure to alcohol, lead, and a variety of other agents. Massive elevation of ALA occurs in the acute porphyrias and hereditary tyrosinemia.

Specimen preservation with acid or base is discouraged and may cause assay interference. When collecting urine for additional tests that require acid or base preservation, the ALA aliquot should be removed prior to the addition of the acid or base.

See Appendix See Additional Information:
Collection and Preservation of 24-Hour Urine Specimens
Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Urine Tests Requiring no Preservatives
Methodology Quantitative Ion Exchange Chromatography/Spectrophotometry
Analytic Time 4 days upon receipt at reference laboratory

Aminophylline

See:	 Theophylline, Plasma

Amiodarone & Metabolite Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	AMIO
CPT Code	82491 (x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Therapeutic Range-Total (amiodarone and metabolite): 0.5-2.0 μg/mL Toxic Level: Greater than 3.0 μg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Includes Desethylamiodarone.
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-4 days upon receipt at reference laboratory

Ammonia

Laboratory	Chemistry
Order Code	PNH3
CPT Code	82140
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	Full 3 mL lavender top (EDTA) tube or ONE lavender top (EDTA) microtube for pediatric patients.
Rejection Criteria:	Syringe is not acceptable.
Reference Range	7-42 mcmol/l
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Amniotic Fluid Bilirubin (Delta Abs 450)

Laboratory	Chemistry
Order Code	OD
CPT Code	82143
Collection Medium	Dark plastic bottle
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	2 mL; amniotic fluid obtained by amniocentesis.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	If gestational age in weeks is given, a Liley Zone interpretation is reported.
Methodology	Spectrophotometric
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	0700-2200 Monday through Friday, including holidays. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Amoebic Antibodies

See:	 Entamoeba Histolytica Antibody, IgG, Serum

Amphetamines, Urine Confirmation

Laboratory	Commercial Mail-out Laboratory
Order Code	AMPH
CPT Code	82145
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 5 mL urine Adult/Pediatric Absolute Minimum: 2.0 mL urine</pre>
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles.
Reference Range	Positive cutoff: 200 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Bath Salts Panel, Urine
Methodology	Gas Chromatography-Mass Spectrometry and/or Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	5 days upon receipt at reference laboratory

Amphetamines-Urine Screen

Laboratory	Chemistry
Order Code	AMPU
CPT Code	80101
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Urine (Random)-BD Vacutainer, no additive yellow top
Minimum	5 mL random urine
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre>Screen includes amphetamines only. For full drug of abuse-urine panel, see "Drug of Abuse Screen".

If confirmation is needed for amphetamines, call the Laboratory at 319-356-3527. Allow up to seven days for confirmatory results. Confirmation is at an additional charge.

Approximate cut-off concentrations (ng/mL)

d-Amphetamine	981
d-Methamphetamine	1,000
d-Pseudoephedrine*	261,000
Ephedrine*	308,000
MBDB	1,175
MDA	771
MDEA	1,553
MDMA ("Ecstasy")	509
Phendimetrazine*	138,000
Phentermine*	239,000

Abbreviations for the "designer" amphetamine and methamphetamine derivatives:

- MBDB - methylbenzodioxolylbutanamine ("Eden")
- MDA - 3,4-methylenedioxyamphetamine
- MDEA - 3,4-methylenedioxy-N-ethylamphetamine ("Eve")
- MDMA - 3,4-methylenedioxymethamphetamine ("Ecstasy")

* The concentrations of these compounds needed to trigger a positive amphetamines screen are very high and likely only achievable in large overdose.

New amphetamines assay instituted 7/7/10. Unlike the assay used prior to 7/7/10, the new assay has very good cross-reactivity for MDMA (Ecstasy) and other designer amphetamines (MDA, MBDB, MDEA). The older assay did not cross-react well with amphetamines other than amphetamine and methamphetamine. The new assay has low cross-reactivity with non-amphetamine drugs (ephedrine, pseudoephedrine, phentermine, etc.).

Patients on labetalol can have a false positive amphetamines screen due to a metabolite of labetalol structurally resembling amphetamine. In these cases, confirmatory testing will be negative.

References:

Belson MG, Simon HK, Sullivan K, Geller RJ. The Utility of Toxicologic Analysis in Children with Suspected Ingestion. Pediatr Emerg Care 1999;15:383-387.

Bast RP, Helmer SD, Henderson SR, Rogers MA, Shapiro WM, Smith RS. Limited Utility of Routine Drug Screening in Trauma Patients. South Med J 2000;93:397-399.

Hammett-Stabler CA, Pesce AJ, Cannon DJ. Urine Drug Screening in the Medical Setting. Clinica Chimica Acta 2002;315:125-135.

Schiller MJ, Shumway M, Batki SL. Utility of Routine Drug Screening in a Psychiatric Emergency Setting. Psychiatric Services 2000;51:474-478.

	Sugarman JM, Rodgers GC, Paul RI. Utility of Toxico Pediatric Emergency Department. Pediatric Emergency Emergency Care 1997;13(3):194-197. Gilbert RB, Peng PI, Wong D. A labetalol metabolite characteristics resembling amphetamines. J Anal Tox 86.</pre>
See:	 Drugs of Abuse-Urine + Confirm, Urine Drugs of Abuse-Urine, Urine
See Appendix	See Additional Information: Cross Reacting Drugs
Methodology	Assay is based on the kinetic interaction of micropa solution (KIMS) as measured by changes in light trans
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Amphiphysin Antibody

See:	 Paraneoplastic Autoantibody, CSF

Amylase

Laboratory	Chemistry
Order Code	UAMY
CPT Code	82150
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	24 hr collection; no preservative. Do not collect in acid.
Reference Range	Up to 350 u/24 hr.
Order Form:	A-1a General Lab or Epic Req
Comments	Collections other than 24 hr will not be calculated for u/24 hr.
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Colorimetric
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Amylase-Urine, Random

Laboratory	Chemistry
Order Code	URAM
CPT Code	82150
Collection Medium	<table> <tr> <td align=center></td></</br><tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL urine, random sample; no preservative. Do not collect in acid.
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Colorimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Amylase

Laboratory	Chemistry
Order Code	AMY
CPT Code	82150
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer for pediatric patients.
Reference Range	<100 u/l
Order Form:	A-1a General Lab or Epic Req
See:	 Amylase-Other, Body Fluid
Methodology	Colorimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Amylase-Other

Laboratory	Chemistry
Order Code	AMYO
CPT Code	82150
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Amylase, Plasma
Methodology	Colorimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

ANA

See:	 Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum

Anabolic Steroid Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	ASTERU
CPT Code	82570, 80100
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine</td> </tr> </table>
Minimum	8 mL urine in a plastic container (preservative-free)
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Colorimetry (C) High Performance Liquid Chromatography/Tandem Mass Spectrometry (LC-MS/MS)

Anaerobic Bacteria

See:	 Anaerobic Culture, Sterile Specimen

Anaerobic Culture

Laboratory	Microbiology
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> Tissue or aspirates are preferred rather than swabs. Fluid collections should be aspirated through disinfected tissue or skin. For superficial ulcers, collect material from below the surface (after surface debridement or use a needle and syringe). Submit specimens using anaerobic transport media: a. Anaerobic transport vial (fluid specimen, 59546): Cleanse rubber stopper with alcohol; allow to dry 1 min before inoculation; push needle through septum and inject specimen on top of agar. b. Anaerobic jar (tissue specimen, 59547). Place sample on top of agar. Keep jar upright to maintain atmosphere in jar. c. A sterile container (37778) may be used for tissue if transported to the microbiology lab immediately (add drops of sterile saline to keep small pieces of tissue moist). d. Copan Liquid Amies Elution Swab (ESwab) (74541) - swab specimens are suboptimal, aspirate preferred but will be accepted if no other sample can be obtained. e. Deliver all specimens to the laboratory immediately after collection. f. Anaerobic flora is prevalent on mucosal surfaces of the oral cavity, upper respiratory, gastrointestinal, and genital tracts; specimens collected from these sites should not ordinarily be cultured for anaerobic bacteria. The following is a list of specimens that are likely to be contaminated with anaerobic normal flora and are NOT routinely accepted for anaerobic culture. -Throat or nasopharyngeal swabs -Gingival or other intraoral surface swabs -Expectorated sputum -Sputum obtained by nasotracheal or endotracheal suction -Bronchial washings -Voided or catheterized urine -Vaginal or cervical swabs -Gastric and small bowel contents (except for "blind loop" or bacterial overgrowth syndrome) -Feces (except for specific etiologic agents such as C. difficile and C. botulinum) -Rectal swabs -Surface swabs from ulcers and wounds (collect material from below the surface) -Material adjacent to a mucous membrane that has not been adequately decontaminated Questions regarding the proper collection of material for anaerobic cultures should be directed to the Microbiology Laboratory at 356-2591.</pre>
See:	 Bacterial Culture
See Appendix	See Additional Information: Normal (Indigenous) Flora of Human Body Specimens Requiring Immediate Delivery

Anafranil

See:	 Clomipramine & Metabolite Drug Level, Serum

Anal Cytology

See:	 Pap Smear, Cervical/Vaginal Smear Pap Test-Liquid Based Collection, Cervical/Endocervical/Vaginal Cells in Fluid Collection Media

Analgesics

See:	 Acetaminophen, Plasma Salicylate, Plasma

Anaplasma Phagocytophilum Ab, IgG

See:	 Ehrlichia Antibody Panel, Serum

Androgens

See:	 Androstenedione, Serum Testosterone, Free and Total, Adult, Plasma Testosterone, Total, Pediatric, Serum

Androstenedione

Laboratory	Commercial Mail-out Laboratory
Order Code	ANDRO1
CPT Code	82157
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.6 mL serum </pre>
Rejection Criteria:	Samples collected in SST tubes
Reference Range	Androstenedione, LC/MS/MS (UOM ng/dL) Adult Male Reference Ranges for Androstenedione, Serum: 18-30 years: 50-220 ng/dL 31-50 years: 40-190 ng/dL 51-60 years: 50-220 ng/dL Adult Female Reference Ranges for Androstenedione, Serum: Follicular Phase: 35-250 ng/dL Luteal Phase: 30-235 ng/dL Postmenopausal Phase: 20-75 ng/dL Pediatric Reference Ranges for Androstenedione, Serum: 1-12 months**: 6-78 ng/dL 1-4 years**: 5-51 ng/dL 5-9 years: 6-115 ng/dL 10-13 years: 12-221 ng/dL 14-17 years: 22-225 ng/dL Premature infants**: < or = 480 ng/dL (31-35 weeks) Term infants**: < or = 290 ng/dL Tanner Stages** II-III Males: 17-82 ng/dL II-III Females: 43-180 ng/dL IV-V Males: 57-150 ng/dL IV-V Females: 73-220 ng/dL **Pediatric data from J Clin Endocrinol Metab. 1991;73:674-686 and J Clin Endocrinol Metab. 1989;69;113-1136. NOTE: Please understand the adult female reference range changes, effective 1/24/2011.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Androstenedione may be useful in evaluating patients with androgen excess and managing patients with congenital adrenal hyperplasia (CAH).
Methodology	Liquid Chromatography Tandem Mass Spectrometry
Analytic Time	5 days upon receipt at reference laboratory

Angiotensin Converting Enzyme

Laboratory	Commercial Mail-out Laboratory
Order Code	ACECSF
CPT Code	82164
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL CSF Absolute Minimum: 0.3 mL CSF</pre>
Rejection Criteria:	Hemolyzed or xanthochromic specimens.
Reference Range	0.0-2.5 U/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Spectrophotometry
Analytic Time	5 days upon receipt at reference laboratory

Angiotensin Converting Enzyme (ACE) for Gaucher Clinical Drug Monitoring

Laboratory	Commercial Mail-out Laboratory
Order Code	GENACE
CPT Code	82164
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult minimum: 2.0 mL serum Pediatric minimum: 1.0 mL serum</pre>
Rejection Criteria:	Specimens not received at reference laboratory within 4 days of specimen collection; do not collect on Fridays, holidays, day before a holiday, or weekends. Hemolyzed Specimens.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> The Angiotensin converting enzyme assay uses tripeptide (hippuryl-his-leu) as subtrate and o-phthaldialdehyde for fluroescent derivatization. Testing used for patients on Cerezyme (part of Gaucher Disease clinical drug monitoring including ACE, TRAP and CHITO).</pre>
See:	 Chitotriosidase (CHITO) for Gaucher clinical drug monitoring, Serum Tartrate Resistant Acid Phosphatase (TRAP) for Gaucher clinical drug monitoring, Serum
Methodology	Fluorometric Enzyme assay
Analytic Time	7-14 days

Angiotensin-1 Convert Enzyme-Other

Laboratory	Chemistry
Order Code	ANCEO
CPT Code	82164
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Angiotensin-1 Converting Enzyme, Plasma
Methodology	Kinetic determination
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Angiotensin-1 Converting Enzyme

Laboratory	Chemistry
Order Code	ANCE
CPT Code	82164
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer for pediatric patients
Reference Range	Adults 8-52 u/l. Expected values are reported as higher in children and young adults under the age of 19 years than in older adults.
Order Form:	A-1a General Lab or Epic Req
See:	 Angiotensin-1 Convert Enzyme-Other, Body Fluid
Methodology	Kinetic Determination
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Anser IFX (Infliximab) Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	ANSERIFX
CPT Code	84999
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Minimum: 2 mL serum Pediatric Minimum: 0.50 mL serum</pre>
Reference Range	Serum infliximab (IFX) concentration: <1.0 μg/mL Antibodies to infliximab (ATI) concentration: <3.1 U/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Anser™ IFX is a novel assay with patented technology that can measure both IFX and ATI levels from one serum sample. Advantages •Anser™ IFX can detect low levels of ATI even in the presence of high levels of circulating drug (60μg/mL of IFX in serum) •Anser™ IFX can be performed at any time during therapy with IFX, with no trough level sampling limitation •High assay sensitivity, specificity, and accuracy •Use Anser™ IFX to help determine personalized solutions for managing loss of response to IFX</pre> Please print, complete and submit the <a href="http://anserifx.com/PDF/An Requisition to the lab, with the specimen and the A-1a Miscellaneous Request.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	3 business days upon receipt at reference laboratory

Anti Dnase B (Streptococcal Antibody)

See:	 Dnase B Antibody, Serum

Anti-Cardiolipin Antibody

See:	 Cardiolipin Antibody, IgG and IgM, Serum

Anti-Cyclic Citrullinated Peptide

Laboratory	Chemistry
Order Code	CCP
CPT Code	86200
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Red top tube
Minimum	3 mL light green top (PST) tube or TWO microtainers
Reference Range	<17.0 U/mL
Order Form:	A-1a General Lab or Epic Req
Comments	The measured anti-CCP value of a patient's sample can vary depending on the testing procedure used. The laboratory finding must therefore always contain a statement on the anti-CCP assay method used. Anti-CCP values determined on patient samples by different testing procedures cannot be directly compared with one another and could be the cause of erroneous medical interpretations. Therefore, the results reported by the laboratory to the physician should include: "The following results were obtained with the Elecsys Anti-CCP assay. Results from assays of other manufacturers cannot be used interchangeably." The performance characteristics for this assay have not been established for pediatric specimens. The diagnostic value of anti-CCP antibodies has not been determined for juvenile arthritis.
Methodology	Electrochemiluminescence Immunoassay (ECL)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Anti-Cyclic Citrullinated Peptide Antibody

See:	 Anti-Cyclic Citrullinated Peptide, Plasma

Anti-DNase B

See:	 Dnase B Antibody, Serum

Anti-Ganglioside Assay, Combined

See:	 GM1 Ganglioside Antibodies IgG/M, Serum GM1 Ganglioside Antibodies IgG/M, Serum

Anti-Gm1 Ganglioside Assay

See:	 GM1 Ganglioside Antibodies IgG/M, Serum

Anti-Hemophilic Factor

See:	 Factor II Assay, Plasma

Anti-Hu

See:	 Paraneoplastic Autoantibody, CSF

Anti-La

See:	 SS-B Antibody, Plasma

Anti-La Antibody

See:	 SS-B Antibody, Plasma

Anti-Microsomal Antibody

See:	 Thyroid Peroxidase Antibody, Plasma

Anti-Mullerian Hormone

Laboratory	Commercial Mail-out Laboratory
Order Code	AMH
CPT Code	83516
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.2 mL serum
Rejection Criteria:	Lipemic, hemolyzed, or ambient specimens.
Reference Range	<pre> Female 0-16 years: 0.0-7.1 ng/mL 17-29 years: 0.85-14.24 ng/mL 30-39 years: 0.51-7.27 ng/mL 40-49 years: 0.00-6.21 ng/mL 50 years and older: 0.00-0.82 ng/mL Male 0-13 days: 15.50-48.10 ng/mL 14 days-11 months: 39.10-91.10 ng/mL 12 months-6 years: 48.00-83.20 ng/mL 7-8 years: 33.80-60.20 ng/mL 9-12 years: 6.1-60.7 ng/mL 13-16 years: 2.3-33.1 ng/mL Adult males (17 and older): 1.50-18.35 ng/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	Within 4 days upon receipt at reference laboratory.

Anti-neuronal Nuclear Antibody - Type 1 (ANNA-1), Type 2 (ANNA-2) and Type 3 (ANNA-3)

See:	 Paraneoplastic Autoantibody, CSF

Anti-Nuclear Antibody Screen and Reflex Titer by IFA

Laboratory	Immunopathology
Order Code	ANAS
CPT Code	<pre> 86038 ANA screen 86039 ANA titer</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Adult and pediatric - 2 mL; red top tube
Reference Range	<1:80 for screen and titer
Order Form:	A-1a Immunopathology or Epic Req
Comments	<pre>If the screen is positive at 1:80, ANA titer will be performed. Sera positive at 1:80 or greater will be stored in serum bank for one year if additional ENA testing is necessary. ANA screen will detect centromere and most other specificities, but may not detect Anti-SS-A-(Ro) Antibody.</pre>
Methodology	Indirect Immunofluorescence on Hep 2 cells
Analytic Time	3 days
Testing Schedule	Daily - Batch analysis performed daily excluding weekends and university holidays.

Anti-Optic Antibodies by Western Blot

Laboratory	Commercial Mail-out Laboratory
Order Code	OPTICWB
CPT Code	84182
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: Submit TWO red top tubes to yield 5 mL serum. Absolute Minimum: 3 mL in a red top tube
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the OHSU Test Requisition to the lab, with the specimen and the A-1a Miscellaneous Request.
Analytic Time	3-5 weeks upon receipt at reference laboratory

Anti-Parietal Cell Antibody

See:	 Parietal Cell Antibody and Reflex Titer, Serum

Anti-Phospholipid Antibody

See:	 Beta 2 Glycoprotein I Antibodies, IgG and IgM, Serum Cardiolipin Antibody, IgG and IgM, Serum Lupus Anticoagulant, Citrated Whole Blood
See Appendix	See Additional Information: Antiphospholipid Syndrome (APS): Laboratory Evaluation

Anti-Phospholipid Syndrome

See:	 Beta 2 Glycoprotein I Antibodies, IgG and IgM, Serum Cardiolipin Antibody, IgG and IgM, Serum Lupus Anticoagulant, Citrated Whole Blood
See Appendix	See Additional Information: Antiphospholipid Syndrome (APS): Laboratory Evaluation

Anti-Platelet Antibodies

See:	 Platelet Antibody Screen, Blood

Anti-Retinal Antibodies by Immunohistochem

Laboratory	Commercial Mail-out Laboratory
Order Code	RETIHC
CPT Code	88342
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: Submit TWO red top tubes to yield 5 mL serum. Absolute Minimum: 3 mL in a red top tube
Reference Range	An interpretive report will be faxed or mailed under separate cover.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the OHSU Test Requisition to the lab, with the specimen and the A-1a Miscellaneous Request.
Methodology	Immunohistochemistry (IHC)
Analytic Time	7-9 weeks upon receipt at reference laboratory

Anti-Retinal Antibodies by Western Blot

Laboratory	Commercial Mail-out Laboratory
Order Code	RETWB
CPT Code	84182
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: Submit TWO red top tubes to yield 5 mL serum. Absolute Minimum: 3 mL in a red top tube
Reference Range	An interpretive report will be faxed or mailed under separate cover.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the OHSU Test Requisition to the lab, with the specimen and the A-1a Miscellaneous Request.
Methodology	Western Blot (WB)
Analytic Time	7-9 weeks upon receipt at reference laboratory

Anti-Ri

See:	 Paraneoplastic Autoantibody, CSF

Anti-Ro

See:	 SS-A Antibody, Plasma

Anti-Saccharomyces Cerevisiae Antibodies, IgA and IgG

Laboratory	Immunopathology
Order Code	ASCA
CPT Code	83520 ASCIGG; 83520 ASCIGA
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL; red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	<pre> Negative: <20 units Equivocal: 20-24 units Positive: >25 units</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	<pre> The results will be obtained with the INOVA QUANTA Lite™ ELISA. Assay values obtained with different manufacturers' methods may not be used interchangeably. The magnitude of the reported antibody levels can not be correlated to an endpoint titer. ASCA testing may be clinically useful in the evaluation of suspected inflammatory bowel disease, including Crohn's disease and ulcerative colitis (UC). ASCA is significantly more prevalent in Crohn's disease than in UC or in healthy individuals. Published studies of Crohn's disease have reported IgG ASCA test sensitivity for CD is about 74% while IgA ASCA is about 49% sensitive. About 25% of CD patients are repeatably negative for ASCA, therefore a negative result does not rule out CD. The best specificity for CD is obtained when both IgG and IgA ASCA's are positive. There are published reports of 95-100% specificity with dual IgG and IgA positivity. Our own disease control testing (patients with a variety of GI and liver diseases) revealed 85% specificity with false positives in 1 patient with Mycobacterial granulomatous hepatitis, 1 patient with alcoholic hepatitis and 1 patient with acute colitis, probably UC.</pre>
Methodology	Enzyme-Linked Immunosorbent Assay Test (ELISA)
Analytic Time	1 week
Testing Schedule	Weekly

Anti-streptolysin O

See:	 Antistreptolysin O, Serum

Anti-Yo

See:	 Paraneoplastic Autoantibody, CSF

Antibiogram

Comments	Refer to the <a href= "http://www.healthcare.uiowa.edu/Pharmacy/formulary Therapy "Antibiogram"

Antibody Identification

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	PANL
CPT Code	86870
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults: 6 mL tube Pediatrics: 3 mL tube Neonate Patients (0 - <4 months): 0.5 cc (FULL) in an EDTA lavender microtainer Patients 4 months - 1 year: 1 cc in a 3 cc EDTA tube</pre>
Rejection Criteria:	Specimen must be labeled with patient's first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Order Form:	DeGowin Blood Center Requisition
Comments	This test is ordered automatically on a sample that is positive for the RBC antibody screen, unless the ordering physician specifically prohibits reflex testing. May include a professional consultation.
See:	 Type and Screen (T&S), Epic Order Code LAB7602
Methodology	Tube or solid phase red cell adherence
Analytic Time	Average Turnaround time is 1-4 hrs, depending on the complexity of the antibody(ies).
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Antibody Identification, Class I, Single Antigen (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	86832
Minimum	One 10 mL red top (no additive) tube.
Comments	Recommended for fine specificity on high PRA patients or patients suspected of antibody mediated rejection. Unacceptable antigens are updated in UNOS for active patients listed in UNOS. Available STAT. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Luminex, Solid Phase
Analytic Time	Test performed weekly. Resulted in Epic 7 working days. STAT results verbal within 5 hours. Resulted in Epic by 24 hr.

Antibody Identification, Class II, Single Antigen (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	86833
Minimum	One 10 mL red top (no additive) tube.
Comments	Recommended for fine specificity on high PRA patients or patients suspected of antibody mediated rejection. Unacceptable antigens are updated in UNOS for active patients listed in UNOS. Available STAT. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Luminex, Solid Phase
Analytic Time	Test performed weekly. Resulted in Epic 7 working days. STAT results verbal within 5 hours. Resulted in Epic by 24 hr.

Antibody Identification, MICA, Single Antigen (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	83516, 86021, 86255(x13)
Minimum	One 10 mL red top (no additive) tube.
Comments	Recommended for fine specificity on high PRA patients or patients suspected of antibody mediated rejection. Unacceptable antigens are updated in UNOS for active patients listed in UNOS. Available STAT. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Luminex, Solid Phase
Analytic Time	Test performed weekly. Resulted in Epic 7 working days. STAT results verbal within 5 hours. Resulted in Epic by 24 hr.

Antibody Screen

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	RIC
CPT Code	86850
Collection Medium	<table><tr><td align=center></td><td rowspan=2 width=20 align=center>or</td><td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl<tr><td width="110" valign="top" align="center">Pink top tube</td><td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA)</tr></table>
Minimum	<pre>Adults: A filled 6 mL tube Pediatrics: A filled 3 mL tube 4 months-1 year: 1 mL in a 3 mL lavender top tube Neonates: 0.5 mL (full) lavender microtainer for patients 0-4 months.</pre>
Rejection Criteria:	Specimen must be labeled with patient’s first and last name and medical record number. <u>Specimen must be scanned in IPR</u>. Specimens will be rejected if information is not on the label when received, <u>and not scanned in IPR</u>.
Reference Range	<pre>A negative result means that antiglobulin technique revealed no red cell allo-antibodies using a broad selection of screening antigens.</pre>
Order Form:	DeGowin Blood Center Requisition
Comments	An antibody identification will be done automatically if the antibody screen is positive, unless the ordering physician specifically prohibits reflex testing.
See:	 Antibody Identification, Plasma
Methodology	tube or solid phase red cell adherence assay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Antibody Titration (IgG with Marsh Score)

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	ICTM
CPT Code	86886
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	A filled 6 mL tube
Reference Range	Not applicable
Order Form:	DeGowin Blood Center Requisition
Comments	Titers ordered from the Obstetrics Department will be provided a Marsh score. Marsh scores greater than 50 may be clinically significant.
See:	 Antibody Titration (IgM + IgG), Plasma
Methodology	Serial dilution tube test
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0700-1400 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Antibody Titration (IgM + IgG)

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	ICT
CPT Code	Rh 86901, 86886
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	A filled 6 mL tube
Reference Range	Not applicable
Order Form:	DeGowin Blood Center Requisition
Comments	If ABO titers are ordered, then a blood type will be performed.
See:	 Antibody Titration (IgG with Marsh Score), Plasma
Methodology	Serial dilution tube test
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0700-1400 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Anticonvulsant Drugs

See:	 Carbamazepine, Plasma Ethosuximide Drug Level, Serum Phenobarbital, Plasma Phenytoin, Plasma Primidone And Metabolite Drug Level, Plasma Valproic Acid, Plasma

Antideoxyribonuclease-B Antibodies

See:	 Dnase B Antibody, Serum

Antiepileptic Drugs

See:	 Carbamazepine, Plasma Ethosuximide Drug Level, Serum Phenobarbital, Plasma Phenytoin, Plasma Primidone And Metabolite Drug Level, Plasma Valproic Acid, Plasma

1433 Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	P1433
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	1.0 mL spinal fluid from collection vial #2.
Reference Range	Normal: <1.5 ng/mL Elevated: > or =1.5 ng/mL; compatible with, but not diagnostic of, Creutzfeldt-Jakob disease
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The 14-3-3 proteins are a group of highly conserved proteins composed of several isoforms that are involved in the regulation of protein phosphorylation and mitogen-activated protein kinase pathways. They exist in vivo as dimers of the various isoforms with apparent molecular mass of 30 kDa on sodium dodecyl sulfate polyacrylamide gel electrophoresis and 60 kDa on gel chromatography. Sequence homology among the various isoforms ranges from 22% to100%. The beta, gamma, and theta isoforms are found in tissues of the nervous system. Detectable 14-3-3 protein in the cerebrospinal fluid (CSF) is indicative of substantial, relatively rapid neuronal destruction. Increased CSF concentrations of 14-3-3 proteins have been described in patients with various forms of Creutzfeldt-Jakob disease (CJD), some other rapidly progressive dementias, and a large range of other vascular, inflammatory, neoplastic, and metabolic central nervous system (CNS) disorders, which can be associated with significant and rapid neuronal destruction. The main clinical use of 14-3-3 measurements is in the differential diagnosis of dementia, in particular to distinguish CJD and its variants from other dementias. The most common forms of dementia (progressive multiinfarct dementia and Alzheimer disease) are uncommonly associated with elevated CSF levels of 14-3-3, presumably because of their slow pace of progression. CJD is an incurable neurodegenerative disease caused by accumulation of self-catalytically malfolded endogenous prion proteins in the CNS. Its cause is most commonly sporadic, but it can be inherited (mutations that predispose to malfolding) or acquired (iatrogenic transmission by infected human tissues or tissue extracts or surgical procedures, or by ingestion of some animal products that contain malfolded prion proteins). The diagnosis of CJD is highly complex and involves clinical history and neurologic examination, electroencephalographs (EEG), magnetic resonance imaging (MRI), and exclusion of other possible causes of dementia, in addition to CSF examination. Several, slightly different scoring systems are in use to integrate these parameters into a final diagnosis of possible, probable, or definite CJD. The most widely accepted of these scoring systems is the WHO set of diagnostic criteria for sporadic CJD from 1998. Hemolyzed specimens will be rejected. Hemolysis causes falsely-elevated 14-3-3 results. The 14-3-3 concentrations in 82 visibly blood-tinged cerebrospinal fluid (CSF) specimens were up to 281 ng/mL, with 74 specimens (90.2%) showing levels above the cutoff. In addition, specimens may be determined to be unsuitable for testing if any of the following conditions are observed:(1,2) -Macroscopically hemorrhagi -Xanthochromic -RBC counts >500 cells per mcL -WBC counts >10 cells per mcL Regardless of the method used, measurement of 14-3-3 protein in CSF should not be relied upon exclusively to establish the diagnosis of

	Creutzfeldt-Jakob disease (CJD). Increased concentra protein in CSF have been described in a variety of c system (CNS) diseases other than CJD that are associa rapid (days to months, rather than months to years) significant amounts of CNS neuronal tissue. Publishe infectious encephalitides, transverse myelitis, stro and subarachnoid hemorrhage, rapidly progressive vas various metabolic and anoxic encephalopathies, sever episodes of multiple sclerosis, cerebral vasculitide mitochondrial encephalomyelopathies, CNS storage dis or rapidly growing primary or secondary CNS and lept and, rarely, Alzheimer disease and other primary dem
Methodology	Immunochemiluminometric Assay (ICMA)
Analytic Time	4 working days upon receipt at reference laboratory

Antigen Type

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	OAGPT
CPT Code	86905 will be billed per antigen.
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	0.5 mL
Rejection Criteria:	Specimen must be labeled with patient’s first and last name and medical record number. Source of sample (e.g. fetus). Specimens will be rejected if information is not on the label when received.
Reference Range	Red cell antigens are tested with antisera to determine phenotype.
Order Form:	DeGowin Blood Center Requisition
Methodology	Tube test, direct or antiglobulin
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0700-1400 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Antimicrobial Susceptibility Profile MIC

Laboratory	Microbiology
CPT Code	87181, 87184, 87186, 87187, 87190, or 87192
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	This test is performed on isolates according to laboratory protocol or with lab director approval.
Methodology	Several methods are used; disk diffusion (Kirby-Bauer), strip diffusion (E-Test), manual and automated micro dilution trays.
Testing Schedule	0700-2200, 7 days a week, including holidays.

Antineuronal Nuclear Antibody - Type 1 (ANNA-1), Type 2 (ANNA-2) and Type 3 (ANNA-3)

See:	 Paraneoplastic Autoantibody, CSF

Antipsychotic Drug Levels

Comments	Must have detailed test information. Call Specimen Control (6-3527) for specific list of potential drugs which can be analyzed on urine or serum.

Antistreptolysin O

Laboratory	Commercial Mail-out Laboratory
Order Code	ASO
CPT Code	86060
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum in a red tube tube Absolute Minimum: 0.4 mL serum in a red tube tube
Rejection Criteria:	Heparinized plasma. Hemolyzed specimens.
Reference Range	<pre> 0-1 year: 0-200 IU/mL 2-12 years: 0-240 IU/mL 13 years and older: 0-330 IU/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Nephelometry
Analytic Time	Within 24 hours upon receipt at reference laboratory

Antithrombin III

Laboratory	Hemostasis/Thrombosis
Order Code	AT3
CPT Code	85300
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top.
Reference Range	83-118%
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw Thrombotic Evaluation
Methodology	Inhibition of thrombin activity, residual thrombin plasmin detected with chromogenic substrate.

Apolipoprotein B/A Ratio

Laboratory	Commercial Mail-out Laboratory
Order Code	APOBAR
CPT Code	Apo B 82172, Apo A-1 82172
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Adult preferred minimum: 1 mL serum from fasting collection Adult/Pediatric absolute minimum: 0.5 mL serum from fasting collection
Rejection Criteria:	Plasma, severely lipemic or hemolyzed specimens
Reference Range	<pre> Components Reference Interval Apolipoprotein, A-1 Male: 94-178 mg/dL Female: 101-199 ng/dL Apolipoprotein, B Male: 55-140 mg/dL Female: 55-125 ng/dL Apolipoprotein B/A Ratio No reference interval</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> The ratio of Apolipoprotein B-100/Apolipoprotein A-1 can provide relative risk factors for a reasonable approximation of coronary atherosclerotic risk. Apolipoprotein B/A Male Female 1/2 Average Risk 0.4 0.3 Twice Average Risk 1.0 0.9 Three Times Average Risk 1.6 1.5</pre>
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Nephelometry
Analytic Time	24 hours upon receipt at reference laboratory

Apt Test, Qualitative Fetal Hemoglobin

Laboratory	Hematology
Order Code	APT
CPT Code	83033
Collection Medium	Sterile container
Order Form:	A-1a General Lab or Epic Req
Comments	This is a screening test for fetal versus maternal blood. A grossly bloody stool from a newborn or a grossly bloody amniotic fluid are specimens of choice. There must be enough blood present to make a pink hemolysate. Bloody diapers may be submitted.
Methodology	Alkali denaturization of hemoglobin
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

APTT Mixing Study

See:	 Mix PTT Panel, Plasma

APTT with Platelet Lysate (Platelet Neutralization Procedure)

See:	 Lupus Anticoagulant, Citrated Whole Blood

APTT, Mixing Study-Incubated

Laboratory	Hemostasis/Thrombosis
Order Code	IMPTT
CPT Code	85732
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top (mix well)
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Scheduled through the Hematology Consult Service.
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw
Methodology	Optical clot detection.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

AR Characterization of Alleles

Laboratory	Commercial Mail-out Laboratory
Order Code	SBAT
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Yellow top tube (ACD solution A)
Minimum	2 mL whole blood
Rejection Criteria:	No specimen should be rejected. If specimen not received at appropriate temperature or in wrong anti-coagulant, please include note to lab. If questions, contact lab.
Reference Range	<pre> Normal alleles: 11-34 CAG repeats Abnormal alleles: 36-62 CAG repeats An interpretive report will be provided.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete, and submit the Molecular Genetics - Congenital Inherited Diseases Patient Information Sheet from Mayo Medical Laboratories with the A-1a Miscellaneous Request.
Methodology	A polymerase chain reaction (PCR)-based assay is utilized to detect expansion-type mutations (CAG repeats) within the androgen receptor gene.
Analytic Time	within 10 days upon receipt at reference laboratory

Arbovirus Antibodies, IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	ARBOM
CPT Code	86651 Encephalitis, California (La Crosse); 86652 Encephalitis, Eastern Equine; 86653 Encephalitis, St. Louis; 86654 Encephalitis, Western Equine; 86788 West Nile Virus
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum in red top tube Absolute Minimum: 0.15 mL serum in red top tube
Rejection Criteria:	Plasma. Heat-inactivated, severely lipemic, contaminated, or hemolyzed specimens.
Reference Range	<pre>

St. Louis Encephalitis Antibody, IgM by IFA, Serum	Less than 1:16
California Encephalitis Antibody, IgM by IFA, Serum	Less than 1:16
Eastern Equine Encephalitis Antibody, IgM by IFA, Serum	Less than 1:16
Western Equine Encephalitis Antibody, IgM by IFA, Serum	Less than 1:16
West Nile Virus Antibody, IgM by ELISA, Serum	0.89 IV or less: Negative - No significant level of West Nile virus IgM antibody detected. 0.90-1.10 IV: Equivocal - Questionable presence of West Nile virus IgM antibody detected. Repeat testing in 10-14 days may be helpful. 1.11 IV or greater: Positive - Presence of IgM antibody to West Nile virus detected, suggestive of current or recent infection.

	</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Indirect Fluorescent Antibody/Enzyme-Linked Immunosorbent Assay
Analytic Time	1-5 days upon receipt at reference laboratory.
Testing Schedule	Testing performed at reference laboratory on Tuesdays and Fridays.

Arginine

See:	 Amino Acids, Quantitative, Plasma

Arginine Vasopressin (ADH)

Laboratory	Commercial Mail-out Laboratory
Order Code	AVH
CPT Code	84588
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 6 mL plasma Absolute Minimum: 2.5 mL plasma
Rejection Criteria:	Nonfrozen specimens.
Reference Range	0.0-6.9 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative Radioimmunoassay
Analytic Time	3-11 days

Aripiprazole (Abilify)

Laboratory	Commercial Mail-out Laboratory
Order Code	ABILIFY
CPT Code	82542
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL serum in a red top tube Absolute Minimum: 0.2 mL serum in a red top tube
Rejection Criteria:	Gel tubes, Hemolysis or Lipemia.
Reference Range	Expected steady state plasma levels in patients receiving recommended daily dosages: 109.0 - 585.0 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	High Performance Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)
Analytic Time	5 days upon receipt at reference laboratory

Arsenic

Laboratory	Commercial Mail-out Laboratory
Order Code	ARS
CPT Code	82175
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	<pre> Adult minimum: 7 mL whole blood Absolute Adult minimum: 0.5 mL whole blood</pre>
Reference Range	<pre> 0.0-13.0 μg/L Potentially toxic ranges for blood arsenic: greater than or equal to 600 μg/L. Blood arsenic is for the detection of recent exposure poisoning only. Blood arsenic levels in healthy subjects vary considerably with exposure to arsenic in the diet and the environment. A 24-hour urine arsenic is useful for the detection of chronic exposure.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	3 working days upon receipt at reference laboratory

Arsenic Speciation, Inorganic

Laboratory	Commercial Mail-out Laboratory
Order Code	ARSIU
CPT Code	82175
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	5 mL random urine
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	HPLC
Analytic Time	5 days upon receipt at reference laboratory

Arsenic

Laboratory	Commercial Mail-out Laboratory
Order Code	ARSU
CPT Code	82175; if reflexed, add 82175
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 8 mL from 24 hr urine collection Absolute Minimum: 2 mL from 24 hr urine collection
Rejection Criteria:	Urine collected within 48 hours after administration of a gadolinium (Gd) containing contrast media (may occur with MRI studies). Acid preserved urine.
Reference Range	<pre>

Reference Interval Components	Ranges Ref. Int.
Arsenic, Urine	0.0-35 ug/l
Arsenic, Urine (24 hour)	0.0-50 ug/d
Arsenic per gram creatinine	No reference interval (ug/g crt)
Creatinine(24 hour)	Male
	3-8 years: 140-700 mg/d
	9-12 years: 300-1300 mg/d
	13-17 years: 500-2300 mg/d
	18-50 years: 1000-2500 mg/d
	51-80 years: 800-2100 mg/d
	81 years and older: 600-2000 mg/d
	Female
	3-8 years: 140-700 mg/d
	9-12 years: 300-1300 mg/d
	13-17 years: 400-1600 mg/d
	18-50 years: 700-1600 mg/d
	51-80 years: 500-1400 mg/d
	81 years and older: 400-1300 mg/d</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> To differentiate between organic and the more toxic inorganic forms, an arsenic speciation test is recommended and can be performed with the existing specimen by contacting the clinical laboratory lead scientist at pager 131-7283. If urine, arsenic is abnormal, additional testing is performed by the reference laboratory. The patient will be charged for this testing when applicable.</pre>
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	5 days upon receipt at reference laboratory

Arterial Blood Gas, ECMO, Post-Oxygenator

Laboratory	Critical Care Laboratory
Order Code	BGPST
CPT Code	82803
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Lithium/Sodium Heparin syring </tr> </table>
Minimum	0.5 mL in Heparinized syringes ONLY. No air bubbles in syringe.
Reference Range	<pre> adults pediatrics pH 7.35-7.45 7.32-7.42 PCO2 35-45 30-40 pO2 100-400 100-400 BE -2 to 2 HCO3 22-26 mEq/l TCO2 24-32 mEq/l Critical Care Critical Values: pH <7.20 and >7.60 pCO2 Adults <20 and >70 Peds <20 and >55 pO2 <100 Special Care Nurseries Critical Values: pH <7.25 and >7.65 pCO2 <30 and >70</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	If patient temperature is noted on requisition, blood gas will be corrected for temperature, otherwise 37°C will be assumed. Any air drawn in with the sample must be expelled immediately. Samples than contain greater than 25% air to sample volume ratio will not be analyzed. All needles must be removed from the syringe before delivery.
See Appendix	See Additional Information: Critical Care Critical Lab Values Specimens Requiring Immediate Delivery
Methodology	Traditional Electrodes
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Arylsulfatase A, Leukocytes

Laboratory	Commercial Mail-out Laboratory
Order Code	ARSAW
CPT Code	82657
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	7 mL whole blood
Reference Range	> or =62 nmol/h/mg Note: Results from this assay may not reflect carrier status because of individual variation of arylsulfatase A enzyme levels. Low normal values may be due to the presence of pseudodeficiency gene or carrier gene. Patients with these depressed levels may be phenotypically normal.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Informed Consent for Genetic Testing from Mayo Medical Laboratories with the specimen and the A-1a Miscellaneous Request or Epic Req. <u>Cautions</u>: This test is not reliable in identifying carriers due both to analytical variation and unusual genetic variants. Due to the use of artificial substrate, this test does not reliably pick up carriers.
See:	 Leukocyte Lysosomal Enzyme Screen, Whole Blood
Methodology	Colorimetric Enzyme Assay
Analytic Time	8 days upon receipt at reference laboratory

Arylsulfatase B

Laboratory	Commercial Mail-out Laboratory
Order Code	ARYLB
CPT Code	84311
Collection Medium	Miscellaneous container; contact laboratory
Minimum	2 T-25 cm flasks of cultured cells from the patient are required. (Cultured cells are grown from skin biopsy in Cytogenetics).
Order Form:	A-1a Miscellaneous Request or Epic Req

Ascites

See:	 Cytologic Evaluation, Body Fluid

Ascorbic Acid

See:	 Vitamin C, Plasma

Aspartate Aminotransferase (AST)

Laboratory	Chemistry
Order Code	AST
CPT Code	84450
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL light green top tube or 1 light green top microtainer for pediatric patients
Reference Range	<pre> Males; 0-37 u/l Females; 0-31 u/l Pediatric Ranges: Age Male/Female U/L 1-3 years 10-50 4-6 years 10-45 7-12 years 10-40 13-18 years 10-35</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Avoid hemolysis.
See:	 Aspartate Aminotransferase-Other, Body Fluid
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Aspartate Aminotransferase Macro

Comments	Testing no longer offered at reference laboratory as of June 6, 2008.

Aspartate Aminotransferase-Other

Laboratory	Chemistry
Order Code	ASTO
CPT Code	84450
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Aspartate Aminotransferase (AST), Plasma
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Aspergillus DNA, PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	ASPDNA
CPT Code	87798
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Acceptable: 5 mL Whole Blood (ACD, EDTA); suggest drawing TWO 3 mL Lavender EDTA or 1 mL Bronchoalveolar Lavage (BAL) or 1 mL Serum; or greater than 3 mm Tissue
Reference Range	Not detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Infections with Aspergillus spp. are frequently associated with immunodeficiency or immunosuppressive therapy. The detection of Aspergillus spp. DNA is based upon the real-time amplification and detection of specific Aspergillus genomic DNA sequences by PCR. This assay detects the nucleic acids of A. fumigatus, A. flavus and A. niger.
Analytic Time	3 days upon receipt at reference laboratory

Aspergillus Fumigatus

See:	 Fungal Culture

Aspergillus Galactomannan Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	BALGALAC
CPT Code	87305
Collection Medium	Sterile container
Minimum	1-3 mL BAL (bronc lavage) in sterile container
Rejection Criteria:	<pre>Lipemic, icteric, or hemolyzed specimens. Specimens that have been stored at ambient temperature. Specimens that have been stored at 2-8°C for >5 days. If storage longer than 5 days is needed, samples should be frozen at -70°C. Unless indicated as stored frozen, the specimen will be rejected if the draw date is >5 days from receipt at reference laboratory. </pre>
Reference Range	<pre> The reference range is an index of <0.5. Numerical index values will bereported. Patients with an index of ≥ 0.5 are considered to be positive for galactomannan antigen. Patients with an index of <0.5 are considered to be negative for galactomannan antigen. Specimens testing positive will be retested to confirm the positive result.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The Aspergillus Galactomannan EIA is a test, when used in conjunction with other diagnostic procedures, such asmicrobiological culture, histological examination of biopsy specimens, and radiographic evidence that can be used to aid in the diagnosis of Invasive Aspergillosis. Twice weekly monitoring of neutropenic patients is often recommended in the peer-reviewed literature to obtain maximum diagnostic utility of the assay.
Methodology	Enzyme Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Aspergillus Galactomannan Antigen Assay

Laboratory	Commercial Mail-out Laboratory
Order Code	GALACMAN
CPT Code	87305
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">BD Gold SST 5 mL Vacutai </tr> </table>
Minimum	1 mL serum
Rejection Criteria:	<pre>Lipemic, icteric, or hemolyzed specimens. Specimens that have been stored at ambient temperature. Specimens that have been stored at 2-8°C for >5 days. If storage longer than 5 days is needed, samples should be frozen at -70°C. Unless indicated as stored frozen, the specimen will be rejected if the draw date is >5 days from receipt at reference laboratory. </pre>
Reference Range	<pre> The reference range is an index of <0.5. Numerical index values will bereported. Patients with an index of ≥ 0.5 are considered to be positive for galactomannan antigen. Patients with an index of <0.5 are considered to be negative for galactomannan antigen. Specimens testing positive will be retested to confirm the positive result.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The Aspergillus Galactomannan EIA is a test, when used in conjunction with other diagnostic procedures, such asmicrobiological culture, histological examination of biopsy specimens, and radiographic evidence that can be used to aid in the diagnosis of Invasive Aspergillosis. Twice weekly monitoring of neutropenic patients is often recommended in the peer-reviewed literature to obtain maximum diagnostic utility of the assay.
Methodology	Enzyme Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Aspergillus spp. Antibody Immunodiffusion

Laboratory	Commercial Mail-out Laboratory
Order Code	ASPERG
CPT Code	86606
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.2 mL serum
Rejection Criteria:	Body fluid.
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test uses culture filtrates of Aspergillus fumigatus, Aspergillus flavus, Aspergillus niger, and Aspergillus terreus.
See:	 Blastomyces Dermatitidis Abs ID, Serum Coccidioides Antibody, CF/ID, CSF Coccidioides Antibody, CF/ID, Serum Fungal Serology, Serum Histoplasma Antibodies CF/ID, Serum
Methodology	Qualitative Immunodiffusion
Analytic Time	2-4 days upon receipt at reference laboratory

Aspirated Knee/Joint/Cyst

Laboratory	Cytopathology
Minimum	1 mL fluid aspirated from joints, cysts, masses, or breast lesions.
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	2 days
Testing Schedule	The requisition with complete patient history must accompany the specimen. Between 0800-1700, cap and label with patient's name the syringe into which it was aspirated and deliver promptly to the laboratory fresh. Do NOT make smears. After 1700 daily, weekends and holidays transfer specimen to Vacutainer tube, label with patient name and deliver to Specimen Control (6240 RCP).

AST

See:	 Aspartate Aminotransferase (AST), Plasma

Atazanavir

Laboratory	Commercial Mail-out Laboratory
Order Code	ATAZ
CPT Code	80299
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum in a red top tube
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> No medication should have been taken since the previously scheduled doses (12 to 24 hours prior). For many drugs, a 2-hour peak sample will be collected. You can consider a second blood draw 6 hours post dose to rule out late absorption, or to determine the serum half-life for certain drugs that have short half-lives, such isoniazid and rifampin. For most HIV drugs, the preferred time of draw is a pre-dose trough. Please print, complete and submit the <a href= http://www.nationaljewish. Pharmacokinetics Laboratory Requisition from the National Jewish Health Lab.</pre>
Methodology	High Performance Liquid Chromatography (HPLC)
Analytic Time	2 working days upon receipt at reference laboratory

Atrial Natriuretic Peptide

Comments	Recommended alternative test is N-terminal-pro-BNP, plasma.
See:	 N-terminal-pro-BNP, Plasma

Autoimmune Lymphoproliferative Syndrome (ALPS)

See:	 Immunodeficiency Evaluations; Adult and Pediatric, Peripheral Blood

Automated Reticulocyte Count

See:	 Reticulocyte Count (Automated), Whole Blood

Autosomal Recessive Limb Girdle Muscular Dystrophy

See:	 Limb-Girdle Muscular Dystrophy (LGMD), Autosomal Recessive Common Variants with Interpretation, Whole Blood

Azathioprine

See:	 Imuran (6MP/6TG Thiopurine Therapy), Whole Blood

B

B-cell Clonality

See:
IGH Gene Clonality by PCR with Interpretation, Various

B. burgdorferi (Lyme)

Laboratory: Commercial Mail-out Laboratory
Order Code: CLYMEAB
CPT Code: 86618
Collection Medium:
```
<table>
<tr>
<td align=center><a href="javascript:larger_tube('24.jpg')"></a></td></tr
<tr>
<td width="110" valign="top" align="center">CSF container</td>
</tr>
</table>
```
Minimum:
```
Preferred Minimum: 3 mL CSF<br />
Absolute Minimum: 0.5 mL CSF
```
Rejection Criteria: Contaminated or heat-inactivated specimens.
Reference Range:
```
<pre>
0.99 LIV: Negative - Antibody to Borrelia burgdorferi not detected.
1.00-1.20 LIV: Equivocal - Repeat testing in 10-14 days may be helpful.
1.21 LIV or greater: Positive - Probable presence of antibody to
                                Borrelia burgdorferi detected.</pre>
```
Order Form: A-1a Miscellaneous Request or Epic Req
Comments:
```
<pre>
*** Serum testing for Lyme Antibody (Borrelia burgdorferi) should be
sent to Clinical Microbiology, 6004 BT.

Note - Once this test is performed, if:
  a) Negative - no further testing is done.
  b) Positive or equivocal - Western blot testing will be performed on
     the original sample upon receiving a request. Sample will be held
     for 30 days only.</pre>
```
Methodology: Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time: 1-3 days upon receipt at reference laboratory

B. burgdorferi (Lyme), PCR

Laboratory: Commercial Mail-out Laboratory
Order Code: LYMEPCR
CPT Code: 87476
Collection Medium:
```
<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>
```
Minimum:
```
Adult:  1 mL serum<br />
<br />
For other sample types, please call Mailouts at 319-356-8593.
```
Rejection Criteria: Heparinized specimens. Frozen whole blood. Clotted or severely lipemic specimens.
Reference Range:
```
<pre>
Negative - Borrelia species DNA not detected by PCR.
Positive - Borrelia species DNA detected by PCR. </pre>
```
Order Form: A-1a Miscellaneous Request or Epic Req
See:
B. burgdorferi (Lyme), CSF
Methodology: Qualitative Polymerase Chain Reaction
Analytic Time: 4 working days upon receipt at reference laboratory
Testing Schedule: 1-4 days upon receipt at reference laboratory

B12

See:
```
<br />Vitamin B12, Plasma
<br />Vitamin B12, Reflexive, Serum
```

B2M

See:
```
<br />Beta-2-Microglobulin, Plasma
<br />Beta-2-Microglobulin, Random Urine
<br />Beta-2-Microglobulin-Other, Body Fluid
```

Bacterial Culture

Laboratory Order Form: Microbiology
A-1a Clinical Microbiology Laboratory or Epic Req

Comments <pre>
Gram stains are automatically performed on fluids and exudates other than blood and urine. Do not send sterile body fluids in plastic red top tubes. These tubes contain a clot activator which may make testing unreliable.

Label transport tube with two patient identifiers, date and time of collection. Transport at room temperature unless otherwise specified.

A. <u>Abscess</u> - Tissue or aspirates are always superior to swab specimens. Remove surface exudate by wiping with sterile saline or 70% alcohol. Aspirate with needle and syringe. Cleanse rubber stopper of anaerobic transport vial (59546) with alcohol; allow to dry 1 min before inoculating; push needle through septum and inject all abscess material on top of agar. If a swab must be used, pass the swab deep into the base of the lesion to firmly sample the fresh border. Transport time ≤2 hours.

B. <u>Anaerobic cultures</u> - Tissue or aspirates are preferred rather than swabs. Fluid collections should be aspirated through disinfected tissue or skin. For superficial ulcers, collect material from below the surface (after surface debridement or use a needle and syringe). Submit specimens using anaerobic transport media:
   a. Anaerobic transport vial (fluid specimen, 59546): Cleanse rubber stopper with alcohol; allow to dry 1 min before inoculation; push needle through septum and inject specimen on top of agar.
   b. Anaerobic jar (tissue specimen, 59547). Place sample on top of agar. Keep jar upright to maintain atmosphere in jar.
   c. A sterile container (37778) may be used for tissue if transported to the microbiology lab immediately (add drops of sterile saline to keep small pieces of tissue moist).
   d. Copan Liquid Amies Elution Swab (ESwab) (745421) - swab specimens are suboptimal, but will be accepted if no other sample can be obtained.
   e. Deliver all specimens to the laboratory immediately after collection.
   f. Anaerobic flora is prevalent on mucosal surfaces of the oral cavity, upper respiratory, gastrointestinal, and genital tracts; specimens collected from these sites should not ordinarily be cultured for anaerobic bacteria. The following is a list of specimens that are likely to be contaminated with anaerobic normal flora and are NOT routinely accepted for anaerobic culture.
      1) Throat or nasopharyngeal swabs
      2) Gingival or other intraoral surface swabs
      3) Expectorated sputum
      4) Sputum obtained by nasotracheal or endotracheal suction
      5) Bronchial washings
      6) Voided or catheterized urine
      7) Vaginal or cervical swabs
      8) Gastric and small bowel contents (except for "blind loop" or bacterial overgrowth syndrome)
      9) Feces (except for specific etiologic agents such as C. difficile and C. botulinum)
      10) Rectal swabs-Surface swabs from ulcers and wounds(collect material from below the surface)
      11) Material adjacent to a mucous membrane that has not been adequately decontaminated

C. <u>Blood</u>
   a. <u>Adult</u> - Cleanse oil or visible dirt from site with alcohol pads before using ChloraPrep skin prep. Cleanse skin with ChloraPrep® one-step 1.5 mL Frepp®
      1) Holding the applicator sponge downward, pinch wings on applicator to break ampule and release the antiseptic.
      2) Use a side-to-side motion to scrub the site with the friction pad for a full 30 sec; allow site to dry completely (at least 30 sec) before venipuncture. Do not touch site after prep.
      3) Remove overcaps from bottles (1 aerobic 924171 and 1 anaerobic 924172) and cleanse each rubber septum with separate 70%

alcohol swabs. Allow septum to dry for 1 mi
inoculating.

4) Draw 20 mL of blood and inoculate each bott
blood. Do not vent or overfill bottles. Ad
or high (>10 mL) volumes may adversely affe
organisms. Transport time <2 h.

5) For adults with a suspected bloodstream inf
collect two initial sets of blood cultures
separate phlebotomy procedures followed by
hour intervals (will detect >98% of BSIs).
blood cultures to detect BSIs in adults is
73% sensitivity); two sets of blood culture
detection of 87.7-89.7% of BSI episodes. (
2007;45:3546).

6) If patient is allergic to chlorhexidine, pr
povidone iodine swab stick (907172) applied
circles (start at center). Allow to dry at
venipuncture. If patient is allergic to iod
with 70% alcohol for 60 sec.

b. <u>Pediatric</u> - Apart from NICU patients, t
drawn should be 1 mL per year of age per blood
volume should be split between an aerobic and
See pediatric blood culture order for more det

D. <u>Bone marrow aspirate</u> - Prepare puncture si
incision. Inoculate blood culture bottle (924171
(lysis centrifugation) tube (922848). Transport
Routine bacterial culture of bone marrow is rarel

E. <u>Burn</u> - Clean and debride burn. Place tissu
cap container (37778). Transfer aspirates to a st
These are processed for aerobic culture only. Qua
may or may not be valuable. A 3 to 4 mm punch bio
optimum when quantitative cultures are ordered. C
samples can be misleading.

F. <u>Catheter Tips</u> - Only intravascular cathete
pediatric patients and SICU patients are routinel
culture. Send 5 cm of distal tip in sterile screw
(37778). Transport time is ≤15 min. Foley
accepted for culture since growth represents dist

G. <u>Cerebrospinal Fluid (CSF)</u> - Aseptically co
lumbar puncture into sterile tubes (907131). Send
(≥3 mL) to the Microbiology Laboratory. Tr
≤15 min. Cerebrospinal fluid for bacterial
never be refrigerated.

H. <u>Decubitus ulcer</u> - A swab is not the specim
Cleanse surface with sterile saline. Submit tissu
inflammatory material from the base of the ulcer
or anaerobic system. Transport time is ≤2

I. <u>Ear</u>

a. <u>Inner ear</u> - Tympanocentesis should be r
complicated, recurrent, or chronic persistent
intact eardrum, clean ear canal with soap solu
fluid via syringe aspiration. Submit in steril

ruptured eardrum, collect fluid on flexible sh
auditory speculum. Transport time <2 hours.
b. <u>Outer ear</u> - Use moistened swab to remov
crust from ear canal. Obtain sample by firmly
outer canal. For otitis externa, vigorous swab
surface swabbing may miss streptococcal cellul

J. <u>Eye</u>
a. <u>Conjunctiva</u> - Sample each eye with sepa
(premoistened with sterile saline) by rolling
When only one eye is infected, sampling both c
indigenous microflora from true pathogens.
b. <u>Corneal scrapings</u> - Collected by ophtha
sterile spatula, scrape ulcers and lesions; in
directly onto media (BHI with 10% sheep blood,
inhibitory mold agar). Prepare 2 smears by rub
1-2 cm area of slide. Transport time ≤15
c. <u>Vitreous fluid</u> - Prepare eye for needle
fluid. Transfer fluid to sterile tube. Transpo
≤15 min.

K. <u>Feces</u> - see stool.

L. <u>Fistula</u> - see abscess.

M. <u>Fluids</u> - see sterile body fluids.

N. <u>Genital</u> - Cultures for Neisseria gonor
be collected using a Copan Liquid amies Elution S
Transport to laboratory immediately.
a. <u>Endocervical</u> - Remove cervical mucus wi
discard.
Insert a second swab into endocervical canal a
walls. Allow time for organisms to absorb onto
b. <u>Urethral</u> - Collect urethral specimens a
patient has urinated. Insert small swab 2-4 cm
lumen, rotate, leave for 2s to facilitate abso

O. <u>Pilonidal cyst</u> - see abscess.

P. <u>Respiratory, lower</u> - Transport time is &#8
a. <u>Bronchoalveolar lavage or brush, endotrache
Collect fluid in a sputum trap (907093); trans
container (37778) for transport in pneumatic t
brush in sterile container with 1 mL saline.
b. <u>Sputum, expectorated</u> - Patient should r
gargle with water prior to collection; instruc
deeply. Collect specimens in sterile transpor
(37778).
c. <u>Sputum, induced</u> - Have patient brush gu
rinse mouth thoroughly with water. Using a ne
patient inhale 20-30 mL of 3 to 10% sterile sa
sputum in sterile container.
d. <u>If Nocardia is suspected</u>, culture for N
requested as an add-on test as standard cultur
for its recovery.

Q. <u>Respiratory, upper</u> - Transport time &#8804

a. <u>Oral</u> - remove oral secretions and debri
lesion with a swab. Use a second swab to vigo
lesion, avoiding normal tissue. Superficial s
should not be submitted. Tissue or needle asp
preferred.
b. <u>Nasal swabs (R/O SAPCR)</u> - Insert a ster
dual swab 26200) into the nose until resistanc
level of the turbinates (approximately 1-2 cm
Rotate the swab against the nasal mucosa for 3
pressure with a finger on the outside of the n
contact between swab and inside of nose. Using
repeat for the other nostril.
c. <u>Sinus aspirates</u> - Aspirate with needle
Cleanse rubber stopper of anaerobic transport
alcohol; push needle through septum and inject
agar.
d. <u>Throat</u> - Routine throat cultures will b
for growth of β-hemolytic Streptococc
Do not obtain throat samples if epiglottis is
sampling may cause serious respiratory obstruc
posterior pharynx, tonsils, and inflamed areas
Liquid Amies Elution Swab (ESwab).

R. <u>Sterile body fluids</u> (other than CSF) -
a. Transport fluid to laboratory in sterile, leak
(BD Vacutainer, no additive, yellow top, 92404
transport vial (Vial, 59546).
b. Cleanse rubber septum of container with 70% al
to dry for 1 min before inoculating.
c. Disinfect overlying skin with iodine or chlorh
preparation. Obtain specimen with needle and
needle through septum of transport container a
d. Amniotic and culdocentesis fluids should alway
an anaerobic transport vial (59546). Agar in a
should be clear before inoculation; inject flu
e. Submit as much fluid as possible. NEVER submit
fluid. NEVER inject fluid into swab container.
f. One aerobic blood culture bottle (924171) inoc
(up to 10 mL) is highly recommended provided a
available. If blood culture bottle is inoculat
aliquot in anaerobic transport vial (59546) or
(924044) for preparation of cytocentrifuged Gr
inoculation of solid media (allows quantitatio
interpretation).
g. Transport time ≤15 min, room temperature

S. <u>Stool</u> - Stools submitted on patients admit
will be rejected without prior preapproval (pager
pager 3404 evenings and weekends). Submit 10-20 g
container. Transport time is ≤1 hour. Refri
is delayed. Stools are cultured to isolate bacter
agents of diarrheal illness; Salmonella, Shig
Campylobacter. Routine stool culture inc
for Shiga toxin from E. coli. Cultures f
performed by special request. Stools for C. d
detection must be transported to the laboratory i
refrigerated if transport is delayed. Surveillanc
ordered on Bone Marrow transplant and other immun

patients to detect overgrowth of normal flora by
aureus, yeast or a gram negative bacillus.

T. <u>Tissue</u> - Submit in anaerobic collection ja
sterile screw-cap container (37778); add drops of
keep small pieces of tissue moist. Transport tim

U. <u>Urine</u> - Collect 20 mL of urine in a steril
container (37778). Transfer urine to a Boricon ur
container. Transport to the microbiology laborato
collect 20 mL of urine, collect in sterile specim
(37778) and transport urine specimens to the Micr
Laboratory or refrigerate within 30 minut
Refrigerated specimens should be delivered to the
possible, and may be rejected if not received wit
collection.
a. <u>Midstream clean catch method</u>: Patients
instructed to wash hands prior to collection a
gloves.
1. Female patients should be
on toilet with legs apart and spread labia
First void in toilet and then, continuing t
specimen container in "midstream" to collec
2. Male patients should be in
foreskin if uncircumcised. First void in to
continuing to void, hold specimen container
collect sample.
b. <u>Straight catheter</u>: Thoroughly cleanse t
with soap and water. Rinse area with wet gauze
insert catheter into the bladder. After discar
30 mL of urine, collect 20 mL of urine for sub
Boricon urine transport container.
c. <u>Indwelling catheter</u>: Clamp catheter bel
urine to collect in tubing. Disinfect the cath
port with 70% alcohol. Use needle and syringe
collect 20 mL freshly voided urine though cath
Transfer to Boricon urine transport container.
urine from collection bag.
d. <u>Ileal conduit</u>: Remove the external devi
urine
within device. Gently cleanse the stoma with 7
followed by povidone-iodine swab stick (907172
technique, insert a double catheter into the c
a depth beyond the fascial level, and collect
sterile container. Transfer to a Boricon urine
container. Use of a double catheter helps to
contamination of the specimen with skin flora.

V. <u>Wound</u> - See abscess.</pre>

See Appendix See Additional Information:
Microbiology Specimen Collection and Transport
Flora of Human Body
Specimens Requiring Immedia

BAL Cell Count and Diff

See:
Bronchoalveolar Lavage Cell Count and Diff, Bronchoalveolar Lavage

Barbiturates

See:
Pentobarbital (Nembutal) (As a Therapeutic Agent), Plasma

Phenobarbital, Plasma

Bartonella DNA Detection by PCR

Laboratory: Commercial Mail-out Laboratory
Order Code: BARTDNA
CPT Code: 87471
Collection Medium: <table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>

Alternate Collection Media: Call laboratory for additional acceptable specimen collection containers.
Minimum: Preferred Minimum: 1 mL serum
Rejection Criteria: Heparinized or hemolyzed specimens. Whole blood.
Order Form: A-1a Miscellaneous Request or Epic Req
Methodology: Qualitative Polymerase Chain Reaction
Analytic Time: 5 working days upon receipt at reference laboratory

Bartonella henselae Antibodies

Laboratory: Commercial Mail-out Laboratory
Order Code: BARTAB
CPT Code: 86611(x2)
Collection Medium: <table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>

Minimum: Preferred Minimum: 1 mL serum
Absolute Minimum: 0.15 mL serum
Rejection Criteria: Contaminated, hemolyzed, or severely lipemic specimens.
Reference Range: <pre>
Components
Bartonella henselae antibody, IgG
<1:64 Negative: No significant level of Bartonella henselae
IgG antibody detected.
1:64 - 1:128 Equivocal: Questionable presence of Bartonella
henselae IgG antibody detected. Repeat
testing in 10-14 days may be helpful.
> or = 1:256 Positive: Presence of IgG antibody to Bartonella
henselae detected, suggestive of current
or past infection.

Bartonella henselae antibody, IgM:
< 1:16 Negative: No significant level of Bartonella henselae
IgM antibody detected.
> or = 1:16 Positive: Presence of IgM antibody to Bartonella
henselae detected, suggestive of recent
infection.</pre>
Order Form: A-1a Miscellaneous Request or Epic Req
Methodology: Semi-Quantitative Indirect Fluorescent Antibody
Analytic Time: 1-8 days upon receipt at reference laboratory

Bartonella quintana IgG &IgM Antibodies by IFA

Laboratory	Commercial Mail-out Laboratory
Order Code	BARTPAN
CPT Code	86611(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 1 mL Adult/Pediatric Absolute Minimum: 0.2 mL</pre>
Rejection Criteria:	Severely lipemic, contaminated, or hemolyzed specimens.
Reference Range	<pre> IgG: < 1:64: Negative. No significant level of Bartonella quintana IgG antibody detected. 1:64-1:128: Equivocal. Questionable presence of Bartonella quintana IgG antibody detected. Repeat testing in 10-14 days may be helpful. Is greater than or equal to 1:256: Positive. Presence of IgG antibody to Bartonella quintana detected, suggestive of current or past infection. IgM: < 1:16: Negative. No significant level of Bartonella quintana IgM antibody detected. Is greater than or equal to 1:16: Positive. Presence of IgM antibody to Bartonella quintana detected, suggestive of recent infection.</pre>
Comments	Acute and convalescent specimens must be labeled as such; parallel testing is preferred and convalescent specimens must be received within 30 days from receipt of the acute specimens. Please mark specimens plainly as "acute" or "convalescent."
Methodology	Indirect Fluorescent Antibody
Analytic Time	8 working days upon receipt at reference laboratory

Basic Metabolic Panel

Laboratory	Chemistry
Order Code	BMP
CPT Code	80048
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer
Reference Range	Refer to individual components.
Comments	This panel includes Calcium (Total), Carbon Dioxide (CO2 Content), Chloride, Creatinine, Glucose, Potassium, Sodium, and Urea Nitrogen.
See:	 Calcium (Total), Plasma Carbon Dioxide (CO2 Content), Plasma Chloride, Plasma Creatinine, Plasma Glucose, Plasma Potassium, Plasma Sodium, Plasma Urea Nitrogen, Plasma
Methodology	Refer to individual components.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Bath Salts Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	BSPU
CPT Code	83789
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	1 mL Urine
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Test Includes: MDPV [LC-MS/MS], Mephedrone [LC-MS/MS], Methylone [LC-MS/MS]. "Bath salts" are a term used to describe amphetamine-like compounds that are abused and which share physiologic effects similar to amphetamine, methamphetamine, and MDMA/Ecstasy. This assay detects the three most common compounds that are distributed illicitly as bath salts (MDPV, mephedrone, and methylone). Compounds other than MDPV, mephedrone and methylone will not be detected. It should be kept in mind that there are large number of amphetamine-like compounds whose synthesis has been described and which could appear as drugs of abuse.
See:	 Amphetamines, Urine Confirmation, Urine Amphetamines-Urine Screen, Urine Drugs of Abuse-Urine + Confirm, Urine Drugs of Abuse-Urine, Urine
Methodology	High Performance Liquid Chromatography/Tandem Mass Spectrometry (LC-MS/MS)
Analytic Time	1 week upon receipt at reference laboratory

Battens Disease Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	BATTENZ
CPT Code	82657(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	<pre> Draw blood in a yellow-top (ACD) tube. Preferred Minimum: 7 mL of ACD whole blood Absolute Minimum: 5 mL of ACD whole blood</pre>
Reference Range	<pre> TPP1: 85-326 nmol/hr/mg protein PPT1: 20-93 nmol/hr/mg protein</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Useful for evaluation of patients with clinical presentations suggestive of NCL and an aid in the differential diagnosis of infantile and late infantile NCL. Cautions: This assay does not detect carrier status of NCL. Some variants with an age of onset occurring in older individuals have been noted. Neuronal ceroid lipofuscinoses (NCL) are inherited neurodegenerative disorders with an overall incidence in the United States estimated at1:12,500. Clinically they are characterized by vision loss, seizures, mental regression, behavioral changes, movement disorders, and the accumulation of storage material with a characteristic appearance by electron microscopy (EM). Tissue damage is selective for the nervous system and many patients succumb in the first decade of life due to central nervous system degeneration. The infantile NCL form is caused by deficiency of the lysosomal enzyme palmitoyl-protein thioesterase 1 (PPT1), which cleaves a thioester linkage between a fatty acid (palmitate) and cysteine in lipid-modified proteins. It is an early onset disease characterized by psychomotor degeneration, seizures, and progressive macular degeneration leading to blindness by the age of 2. Infantile NCL is an autosomal recessive disorder with an incidence of 1:20,000 in Finland and rare elsewhere. The late infantile form of NCL is caused by deficiency of the lysosomal enzyme tripeptidyl peptidase 1 (TPP1), which cleaves tripeptides from the N-terminus of polypeptides. Tissue damages are especially neuronal, resulting from the defective degradation and consequent lysosomal storage of small peptides. Disease onset occurs at 2 to 4 years of age with death occurring around the age of 10.</pre>
Methodology	Fluorometric
Analytic Time	Varies

Bcr/Abl (Cytogentics)

See:	 Fluorescence In-Situ Hybridization (FISH-Bone Marrow), Bone Marrow

BCR/ABL1 (T(9;22)) RNA Quantitative with Interpretation, Blood

Laboratory	Molecular Pathology
Order Code	BCRQNT
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	6 mL whole blood in ONE pink top tube or TWO lavender top tubes
Rejection Criteria:	Sample MUST be received by laboratory within 48 hours of collection due to lability of RNA.
Reference Range	Negative
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Serial analysis of BCR-ABL mRNA levels by real-time quantitative polymerase chain reaction (QRT-PCR) during and/or after therapy (imatinib, dasatinib, nilotinib, or stem cell transplantation) accurately reflects the levels of disease suppression and is an effective method for monitoring treatment efficacy. Major Molecular Response (MMR) reflects a patient’s response to CML treatment and MMR is defined as greater than or equal to a 3-log reduction in BCR-ABL/control gene ratio from a standardized median baseline value. In the International Randomized Interferon versus STI571 (IRIS) study, patients with a ratio at or below MMR within 18 months of starting treatment were 100% free from progressing to accelerated phase or blast crisis at 60 months. The laboratory employs an MMR reference value that has been validated with the WHO International Standard. Interassay Variability: Above MMR: less than 2-fold, Below MMR: less than 4-fold Sensitivity: One tumor cell in 1 x 10⁴ normal cells Limit of Quantitation: 30 BCR-ABL copies The laboratory reports the BCR-ABL/ABL raw ratio, the percent ratio standardized to the International Standard (%IS), the BCR-ABL copy number, and the ABL copy number as separate values that can be trended using Epic graph function. Breakpoint determination will be performed and reported for new diagnosis specimens only.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative real-time Polymerase Chain Reaction
Analytic Time	7 working days
Testing Schedule	Monday - Friday only, no holidays, no weekends.

BCR/ABL1 (T(9;22)) RNA Quantitative with Interpretation, Bone Marrow

Laboratory	Molecular Pathology
Order Code	BCRQTBM
CPT Code	81206
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	2 mL bone marrow (ONE pink top tube)
Rejection Criteria:	Sample MUST be received by laboratory within 48 hours of collection due to lability of RNA.
Reference Range	Negative
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Serial analysis of BCR-ABL mRNA levels by real-time quantitative polymerase chain reaction (QRT-PCR) during and/or after therapy (imatinib, dasatinib, nilotinib, or stem cell transplantation) accurately reflects the levels of disease suppression and is an effective method for monitoring treatment efficacy. Major Molecular Response (MMR) reflects a patient's response to CML treatment and MMR is defined as greater than or equal to a 3-log reduction in BCR-ABL/control gene ratio from a standardized median baseline value. In the International Randomized Interferon versus STI571 (IRIS) study, patients with a ratio at or below MMR within 18 months of starting treatment were 100% free from progressing to accelerated phase or blast crisis at 60 months. The laboratory employs an MMR reference value that has been validated with the WHO International Standard. Interassay Variability: Above MMR: less than 2-fold, Below MMR: less than 4-fold Sensitivity: One tumor cell in 1 x 10⁴ normal cells Limit of Quantitation: 30 BCR-ABL copies The laboratory reports the BCR-ABL/ABL raw ratio, the percent ratio standardized to the International Standard (%IS), the BCR-ABL copy number, and the ABL copy number as separate values that can be trended using Epic graph function. Breakpoint determination will be performed and reported for new diagnosis specimens only.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative real-time Polymerase Chain Reaction
Analytic Time	7 working days
Testing Schedule	Monday - Friday only, no holidays, no weekends.

Becker MD

See:	 Congenital Muscular Dystrophy, Muscle or Skin Biopsy DMD Gene Analysis Dup/Delet Variants, Whole Blood Duchenne/Becker Muscular Dystrophy, Muscle Biopsy Emery-Dreifuss Muscular Dystrophy, Muscle or Skin Biopsy Limb Girdle Muscular Dystrophy (LGMD), Muscle Biopsy Merosin-Deficient Congenital Muscular Dystrophy, Muscle or Skin Biopsy Sarcoglycan-Deficient Limb Girdle Muscular Dystrophy, Muscle Biopsy

Bence Jones Protein

See:	 Urine Immunofixation Electrophoresis, Urine

Benzodiazepine, Screen Blood Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	BENZOB
CPT Code	80101
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult preferred minimum: 1 mL Adult absolute minimum: 0.5 mL Pediatric minimum: 0.5 mL</pre>
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Positive results will seldom occur when the following drugs have been ingested: Xanax (alprazolam), Halcion (triazolam), Klonopin (clonazepam), Dalmane (flurazepam hydrochloride), Mogadon (nitrazepam), Ativan (lorazepam).
See:	 Clonazepam Drug Level, Serum
Methodology	Fluorescence Polarization Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Benzodiazepine, Urine, Conf

Laboratory	Commercial Mail-out Laboratory
Order Code	BENZOC
CPT Code	80154
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Minimum	Preferred Minimum: 4 mL urine with no additives or preservatives
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles.
Reference Range	<pre> Drugs covered: alprazolam, alpha-hydroxyalprazolam, clonazepam, 7-amino- clonazepam, desalkylflurazepam, 2-hydroxyethylflurazepam, diazepam, lorazepam, midazolam, nordiazepam, oxazepam, temazepam, and alpha-hydroxytriazolam. Positive cutoff: 20 ng/mL. For medical purposes only; not valid for forensic use. The absence of expected drug(s) and/or drug metabolite(s) may indicate non-compliance, inappropriate timing of specimen collection relative to drug administration, poor drug absorption, diluted/adulterated urine, or limitations of testing. The concentration value must be greater than or equal to the cutoff to be reported as positive. Interpretive questions should be directed to the laboratory.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-4 days upon receipt at reference laboratory

Benzodiazepines-Urine Screen

Laboratory	Chemistry
Order Code	BZOU
CPT Code	80101
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Urine (Random)-BD Vacutainer, no additive yellow top
Minimum	5 mL random urine
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Screen includes benzodiazepines only. For full drug of abuse-urine panel, see Drug of Abuse Screen. If confirmation is needed for benzodiazepines, call the Laboratory at 356-3527. Allow up to seven days for confirmatory results. Confirmation is at an additional charge. Approximate cut-off concentrations (ng/mL) ---------- Alprazolam* 108 Chlordiazepoxide 146 Clobazam 123 Clonazepam* 148 Clorazepate 124 Demoxepam 92 Diazepam 106 Flunitrazepam 142 Flurazepam 165 Lorazepam* 163 Midazolam 168 Oxazepam 122 Temazepam 145 Triazolam 115 *In patients taking typical therapeutic doses of these benzodiazepines for medical purposes, the benzodiazepines screen can often be negative due to the low concentrations of these drugs and their metabolites excreted in urine relative to the assay cut-offs. References: Belson MG, Simon HK, Sullivan K, Geller RJ. The Utility of Toxicologic Analysis in Children with Suspected Ingestion. Pediatr Emerg Care 1999;15:383-387. Bast RP, Helmer SD, Henderson SR, Rogers MA, Shapiro WM, Smith RS. Limited Utility of Routine Drug Screening in Trauma Patients. South Med J 2000;93:397-399. Hammett-Stabler CA, Pesce AJ, Cannon DJ. Urine Drug Screening in the Medical Setting. Clinica Chimica Acta 2002;315:125-135. Schiller MJ, Shumway M, Batki SL. Utility of Routine Drug Screening in a Psychiatric Emergency Setting. Psychiatric Services 2000;51:474-478. Sugarman JM, Rodgers GC, Paul RI. Utility of Toxicology Screening in a Pediatric Emergency Department. Pediatric Emergency Care. Pediatric Emergency Care 1997;13(3):194-197.</pre>
See:	 Drugs of Abuse-Urine + Confirm, Urine Drugs of Abuse-Urine, Urine
See Appendix	See Additional Information: Cross Reacting Drugs
Methodology	Assay is based on the kinetic interaction of microparticles in a solution (KIMS) as measured by changes in light transmission.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Beryllium

Laboratory	Commercial Mail-out Laboratory
Order Code	BER
CPT Code	86353 x6
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/green_10ml.png" clas <td align=center><img src="/path_handbook/gifs/tubes/green_10ml.png" clas <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Minimum	30 mL heparinized whole blood from a green top tube
Rejection Criteria:	Sample must be received at reference laboratory within 24 hours of collection, collect Monday through Thursday only; do not collect on Fridays, holidays, day before a holiday, or weekends.
Reference Range	From Report
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Lymphocyte transformation
Analytic Time	2 weeks upon receipt at reference laboratory

Beta 2 Glycoprotein I Antibodies, IgG and IgM

Laboratory	Immunopathology
Order Code	B2G
CPT Code	<pre> 86146 Beta 2 Glycoprotein Antibody, IgG 86146 Beta 2 Glycoprotein Antibody, IgM</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult minimum: 5 mL red top tube Pediatric minimum: 2 mL red top tube</pre>
Reference Range	<pre> IgG class antibodies: Negative: Less than or equal to 20 SGU Positive: >20 SGU IgM class antibodies: Negative: Less than or equal to 20 SMU Positive: >20 SMU Results are reported out in standard IgG or IgM units (SGU) and (SMU) </pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	The results will be obtained with the INOVA QUANTA Lite™ ELISA. Assay values obtained with different manufacturers' methods may not be used interchangeably. The magnitude of the reported antibody levels can not be correlated to an endpoint titer.
See Appendix	See Additional Information: Antiphospholipid Syndrome (APS): Laboratory Evaluation
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	1 week
Testing Schedule	Test performed once weekly.

Beta D Glucan (Fungitell)

Laboratory	Commercial Mail-out Laboratory
Order Code	BDGLUCAN
CPT Code	87449
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">BD Gold SST 5 mL Vacutai </tr> </table>
Minimum	<pre> Adult Absolute Minimum: 0.5 mL serum Pediatric Absolute Minimum: 0.2 mL serum</pre>
Rejection Criteria:	<pre> Lipemic, icteric, or hemolyzed specimens. Specimens that have been stored at ambient temperature. Specimens that have been stored at 2-8°C for >5 days. If storage longer than 5 days is needed, samples should be frozen at -70°C. Unless indicated as stored frozen, the specimen will be rejected if the draw date is >5 days from receipt at reference laboratory.</pre>
Reference Range	<pre> Negative: Less than 60 pg/mL Indeterminate: 60 to less than 80 pg/mL Positive: Greater than or equal to 80 pg/mL The Fungitell beta-D Glucan assay is indicated for presumptive diagnosis of fungal infection. It should be used in conjunction with other diagnostic procedures. The Fungitell beta-D Glucan assay does not detect certain fungal species such as the genus Cryptococcus, which produces very low levels of (1,3)- beta-D-glucan. This assay also does not detect the Zygomycetes, such as Absidia, Mucor and Rhizopus, which are not known to produce (1,3)- beta-D-glucan.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> The Fungitell beta-D Glucan assay is indicated for the presumptive diagnosis of invasive fungal disease through detection of elevated levels of (1,3)- beta-D-glucan in serum. Normal human serum contains low levels of (1,3)- beta-D glucan, typically 10 to 40 pg/mL, presumably from commensal yeasts present in the alimentary canal and gastrointestinal tract. However, (1,3)- beta-D-glucan is sloughed from the cell walls during the life cycle of most pathogenic fungi. Thus, monitoring serum for evidence of elevated and rising levels of (1,3)-beta-D-glucan provides a convenient surrogate marker for invasive fungal disease. The Fungitell beta-D Glucan assay detects (1,3)- beta-D-glucan from the following pathogens: Candida spp., Acremonium, Aspergillus spp., Coccidioides immitis, Fusarium spp., Histoplasma capsulatum, Trichosporon spp., Sporothrix schenckii, Saccharomyces cerevisiae, Pneumocystis jiroveci. The Fungitell beta-D Glucan assay does not detect certain fungal species such as the genus Cryptococcus, which produces very low levels of (1,3)- beta-D-glucan, nor the Zygomycetes, such as Absidia, Mucor, and Rhizopus, which are not known to produce (1,3)- beta-D-glucan. Studies indicate Blastomyces dermatitidis is usually not detected due to little (1,3)- beta-D-glucan produced in the yeast phase.</pre>
Methodology	Enzyme Immunoassay (EIA)
Analytic Time	24 hours upon receipt at reference laboratory

Beta HCG

See:	 HCG, Quant-Hum Chor Gon, Plasma

Beta Hydroxybutyrate

Laboratory	Chemistry
Order Code	BHY
CPT Code	82010
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 light green top microtainer for pediatric patients.
Reference Range	0.0-0.3 mEq/l
Order Form:	A-1a General Lab or Epic Req
Comments	Ketosis is a common feature in acutely ill patients. In subjects suffering from starvation, acute alcohol abuse, or diabetes mellitus, ketosis can result in severe life-threatening metabolic acidosis. The presence and degree of ketosis can be determined by measuring blood levels of β-hydroxybutyrate. Ordinarily, β-hydroxybutyrate is the ketoacid present in the greatest amount in serum. It accounts for approximately 75% of the ketone bodies which also include acetoacetate and acetone. During periods of ketosis, β-hydroxybutyrate increases even more than the other two keto acids (acetoacetate and acetone), and has been shown to be a good index of ketoacidosis, including the detection of subclinical ketosis. In diabetics, the measurement of β-hydroxybutyrate as well as blood glucose can help to assess the severity of diabetic coma and help exclude hyperosmolar non-ketotic diabetic coma. The β-hydroxybutyrate assay is specific for β-hydroxybutyrate and shows no cross-reactivity with acetoacetate or acetone.
See:	 Beta-Hydroxybutyrate-Other, Body Fluid Urinalysis, Urine
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Beta-2 Transferrin

Laboratory	Commercial Mail-out Laboratory
Order Code	B2TD
CPT Code	86334 IFE Serum, 86335 IFE Fluid
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult preferred minimum: 2 mL serum AND 2 mL aural or nasal fluid in a CSF container Adult absolute minimum: 0.5 mL serum AND 1 mL aural or nasal fluid in a CSF container Pediatric minimum: 0.5 mL of serum AND 1.0 mL of aural or nasal fluid in a CSF container</pre>
Rejection Criteria:	Plasma specimens
Reference Range	<pre> None detected Beta-2 transferrin is not detected in normal serum, tears, saliva, sputum, nasal, aural fluid, or endolymph by this method.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Immunofixation Electrophoresis
Analytic Time	4 working days upon receipt at reference laboratory

Beta-2-Microglobulin

Laboratory	Chemistry
Order Code	B2M
CPT Code	82232
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> Adult Minimum: 3 mL whole blood from one light green plasma separator tube (PST) Pediatric Minimum: ONE light green top microtainer</pre>
Reference Range	1.1-2.4 mg/L
Order Form:	A-1a General Lab or Epic Req
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Beta-2-Microglobulin

Laboratory	Commercial Mail-out Laboratory
Order Code	B2MUR
CPT Code	82232
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Adult/Pediatric Preferred Minimum: 3 mL random urine
Reference Range	<pre> Beta-2-Microglobulin, Urine 0-160 μg/L Beta-2-Microglobulin per gram of creatinine 0-300 μg/g crt</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Chemiluminescent Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Beta-2-Microglobulin-Other

Laboratory	Chemistry
Order Code	B2MO
CPT Code	82232
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a General Lab or Epic Req
See:	 Beta-2-Microglobulin, Plasma
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Beta-Hydroxybutyrate-Other

Laboratory	Chemistry
Order Code	BHYO
CPT Code	82010
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Beta Hydroxybutyrate, Plasma
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

BETAQ

See:	 Lipoprotein Profile, Serum

BHCG

See:	 HCG, Quant-Hum Chor Gon, Plasma

BHY

See:	 Beta Hydroxybutyrate, Plasma

Bicarbonate

See:	 Carbon Dioxide (CO2 Content), Plasma

Bile Acids, Fractionated

Laboratory	Commercial Mail-out Laboratory
Order Code	BAF
CPT Code	83789
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred minimum: 1 mL serum from red top tube Absolute minimum: 0.2 mL serum from red top tube</pre>
Reference Range	<pre> 7 years and older: Cholic acid (CA) 0-1.9 umol/L Chenodeoxycholic acid (CDC) 0-3.4 umol/L Deoxycholic acid (DCA) 0-2.5 umol/L Ursodeoxycholic acid (UDC) 0-1.0 umol/L Total 0-7.0 umol/L Note: Reference intervals were derived using samples obtained after an overnight fast.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient should be fasting a minimum of eight hours prior to specimen collection. Overnight fasting preferred.
Methodology	Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1 week upon receipt at reference laboratory

Bile Acids, Total

Laboratory	Commercial Mail-out Laboratory
Order Code	BAT
CPT Code	82239
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.5 mL serum
Rejection Criteria:	Heparinized or hemolyzed specimens. Body fluids.
Reference Range	<pre> 0-10 umol/L Reference interval applies to fasting specimens.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Enzymatic
Analytic Time	24 hours upon receipt at reference laboratory

Bilirubin Total

Laboratory	Special Care Nurseries Laboratory
Order Code	BILTC
CPT Code	82247
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Heparinized syringe or pediat </tr> </table>
Minimum	0.5 mL in Lithium/Sodium Heparin syringes.
Reference Range	<pre> 0.2-1.0 mg/dL Refer to: <a HREF="http://pediatrics.aappublications.org/cgi/content/full/114/1/297/ F 2"> Bilirubin Nomogram for designation of risk for newborns.</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	PLEASE NOTE: This test is only offered in Special Care Nurseries Laboratory.
See Appendix	See Additional Information: Special Care Nurseries Critical Lab Values Special Care Nurseries Pediatric Reference Ranges
Methodology	Oximetric
Analytic Time	10 minutes (upon receipt in laboratory)

Bilirubin, Direct-Other

Laboratory	Chemistry
Order Code	BILDO
CPT Code	82248
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Bilirubin, Direct, Plasma
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Bilirubin, Direct

Laboratory	Chemistry
Order Code	BILD
CPT Code	82248
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or ONE light green microtainer for pediatric patients
Reference Range	0.0 - 0.2 mg/dL
Order Form:	A-1a General Lab or Epic Req
See:	 Bilirubin, Direct-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Pediatric Reference Ranges
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Bilirubin, Total-Other

Laboratory	Chemistry
Order Code	BILTO
CPT Code	82247
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Bilirubin, Total, Plasma
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Bilirubin, Total

Laboratory	Chemistry
Order Code	BILT
CPT Code	82247
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 light green microtainer for pediatric patients
Reference Range	<pre> 0-2 days: 0.2-6.0 mg/dL 2-3 days: 0.2-7.0 mg/dL 3-11 days: 0.2-10.0 mg/dL 11-31 days: 0.2-1.0 mg/dL Adult and Children: 0.2-1.0 mg/dL Critical value: >10.0 mg/dL for first 24 hrs >13.0 mg/dL for 1-30 days Refer to: <a HREF="http://pediatrics.aappublications.org/cgi/content/full/114/1/297/ F 2"> Bilirubin Nomogram for designation of risk for newborns.</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Bilirubin, Total-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Biopsy

See:	 Immunoperoxidase Staining, Tissue, Body Fluids Muscle Biopsy, Fresh or Frozen Tissue Nerve Biopsy, Fresh Tissue Ocular Pathology Biopsy Renal Biopsy, Tissue Skin Biopsy, Tissue Surgical Pathology Consultation, Tissue

Biotinidase

Laboratory	Commercial Mail-out Laboratory
Order Code	BIOTS
CPT Code	82261
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum in red top tube
Reference Range	3.5 U/L to 13.8 U/L. Partial deficiencies and carriers may occur at the low end of the reference range. Values <3.5 U/L are occasionally seen in specimens from unaffected patients.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful For</u>: Preferred test for diagnosing biotinidase deficiency Follow-up testing for certain organic acidurias Please print, complete, and submit the following Informed Consent for Genetic Testing from Mayo Medical Laboratories with the A-1a Miscellaneous Request or Epic Req. <u>Cautions</u>: A diet high in biotin may result in normal clinical presentation even when the biotinidase level is low.
Methodology	Colorimetric
Analytic Time	4 days upon receipt at reference laboratory

Bismuth

Laboratory	Commercial Mail-out Laboratory
Order Code	BIS
CPT Code	83018
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	<pre> Preferred Adult minimum = 7 mL whole blood from Royal Blue K2EDTA tube Absolute Adult minimum = 0.5 mL whole blood from Royal Blue K2EDTA tube</pre>
Rejection Criteria:	Heparin anticoagulant specimens, frozen specimens
Reference Range	<pre> 0 - 5 mcg/L Elevated results from noncertified trace element-free collection tubes may be due to contamination. Elevated concentrations of trace elements in blood should be confirmed with a second specimen collected in a tube designed for trace element determinations, such as royal blue Na2EDTA tube.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	5 days upon receipt at reference laboratory

BK Virus DNA Quant, PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	BKQNTU
CPT Code	87799
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	2.0 mL from a random urine collection. No preservative.
Rejection Criteria:	Samples greater than 96 hours from collections.
Reference Range	Urine specimens report as 500 copies/mL to 1 x 1010 copies/mL. Expected Value: Not Detected
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery Urine Tests Requiring no Preservatives
Methodology	Extraction of BK Viral DNA from urine followed by amplification and detection using real-time, quantitative PCR. An internal control is added to ensure the extraction was performed correctly and the PCR reaction was not inhibited. The reference laboratory assay design includes multiple targets to account for viral mutations, which significantly reduces the chance of false negative results.
Analytic Time	24 hours upon receipt at reference laboratory
Testing Schedule	Reference Laboratory receives samples Monday-Saturday; Mailouts ships Monday-Friday.

BK Virus DNA Quant, PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	BKQNTP
CPT Code	87799
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	2 mL plasma in a pink K2EDTA top tube
Rejection Criteria:	Samples greater than 96 hours from collection. Bone marrow samples are NOT accepted for this test.
Reference Range	100 copies/mL to 1 x 10¹⁰ copies/mL The limit of detection (LOD) of this qPCR assay is approximately 100 copies/mL and the limit of quantitation (LOQ) is <600 copies/mL. Numerical results reported between the LOD and LOQ are potentially less precise than numerical results above the LOQ. Expected Value: Not Detected
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Extraction of BK Viral DNA from plasma followed by amplification and detection using real-time, quantitative PCR. An internal control is added to ensure the extraction was performed correctly and the PCR reaction was not inhibited. The reference laboratory assay design includes multiple targets to account for viral mutations, which significantly reduces the chance of false negative results.
Analytic Time	24 hours upon receipt at reference laboratory
Testing Schedule	Reference Lab receives samples Monday-Saturday; Mailouts ships Monday-Friday.

Bladder Brush, Bladder Wash

See:	 Cytologic Evaluation, Body Fluid Urine Cytology, Urine

Bladder Carcinoma

See:
Fluorescence In-Situ Hybridization (FISH-Bladder Carcinoma), Voided Urine, Bladder Wash

Blastomyces Antibody (Id)

See:
Fungal Serology, Serum

Blastomyces Antigen

Laboratory: Commercial Mail-out Laboratory
Order Code: BLAGU
CPT Code: 87449
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Yellow top conical tube (no a
</tr>
</table>

Minimum: Preferred Minimum: 2 mL urine
Absolute Minimum: 1.5 mL urine

Reference Range:

<pre>
<u>ng/mL</u> <u>Interpretation</u> <u>Comment</u>
None Detected Negative Antigen not detected.

Below the Limit of Quantification Positive, Low Antigen detected, below the limit of quantification.

0.2 - 1.9 Positive, Low Antigen detected, low concentration.

2.0 - 14.7 Positive, Moderate Antigen detected, moderate concentration.

Above the Limit of Quantification Positive, High Antigen detected, above the limit of quantification.

A change of 2 ng/mL or more compared to the prior specimen is significant, and should be considered in conjunction with clinical and other laboratory findings in deciding if the patient is responding to or failing treatment.</pre>

Order Form: A-1a Miscellaneous Request or Epic Req

Comments: Please print, complete, and submit the <a href="http://www.miravistalabs.
Diagnostics Test Requisition with the specimen and A-1a Miscellaneous Request or Epic Req.

Interfering substances include Sputolysin and Sodium hydroxide.

<u>Intended Use</u>
*Aid in the diagnosis of blastomycosis
*Monitoring therapy

See Appendix: See Additional Information:
Specimens Requiring Immediate Delivery

Methodology: Quantitative Sandwich Enzyme Immunoassay (EIA)

Analytic Time: 1 week upon receipt at reference laboratory

Blastomyces Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	BLAGO
CPT Code	87449
Collection Medium	Sterile container
Minimum	Preferred Minimum: 2 mL CSF, BAL or other Sterile Body Fluids Absolute Minimum: 1.5 mL CSF, BAL or other Sterile Body Fluids
Reference Range	<pre> **ng/mL** **Interpretation** **Comment** None Detected Negative Antigen not detected. Below the Limit of Quantification Positive, Low Antigen detected, below the limit of quantification. 0.2 - 1.9 Positive, Low Antigen detected, low concentration. 2.0 - 14.7 Positive, Moderate Antigen detected, moderate concentration. Above the Limit of Quantification Positive, High Antigen detected, above the limit of quantification. A change of 2 ng/mL or more compared to the prior specimen is significant, and should be considered in conjunction with clinical and other laboratory findings in deciding if the patient is responding to or failing treatment.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the <a href="http://www.miravistalabs. Diagnostics Test Requisition with the specimen and A-1a Miscellaneous Request or Epic Req. Interfering substances include Sputolysin and Sodium hydroxide. **Intended Use** *Aid in the diagnosis of blastomycosis *Monitoring therapy
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative Sandwich Enzyme Immunoassay (EIA)
Analytic Time	1 week upon receipt at reference laboratory

Blastomyces Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	BLAGB
CPT Code	87449
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL serum Absolute Minimum: 1.5 mL serum
Reference Range	<pre> <u>ng/mL</u> <u>Interpretation</u> <u>Comment</u> None Detected Negative Antigen not detected. Below the Limit of Quantification Positive, Low Antigen detected, below the limit of quantification. 0.2 - 1.9 Positive, Low Antigen detected, low concentration. 2.0 - 14.7 Positive, Moderate Antigen detected, moderate concentration. Above the Limit of Quantification Positive, High Antigen detected, above the limit of quantification. A change of 2 ng/mL or more compared to the prior specimen is significant, and should be considered in conjunction with clinical and other laboratory findings in deciding if the patient is responding to or failing treatment.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the <a href="http://www.miravistalabs. Diagnostics Test Requisition with the specimen and A-1a Miscellaneous Request or Epic Req. Interfering substances include Sputolysin and Sodium hydroxide. <u>Intended Use</u> *Aid in the diagnosis of blastomycosis *Monitoring therapy
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative Sandwich Enzyme Immunoassay (EIA)
Analytic Time	1 week upon receipt at reference laboratory

Blastomyces Dermatitidis Abs ID

Laboratory	Commercial Mail-out Laboratory
Order Code	BLASTO
CPT Code	86612
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.1 mL serum
Rejection Criteria:	Other body fluids.
Reference Range	None detected
See:	 Aspergillus spp. Antibody Immunodiffusion, Serum Coccidioides Antibody, CF/ID, CSF Coccidioides Antibody, CF/ID, Serum Fungal Serology, Serum Histoplasma Antibodies CF/ID, Serum
Methodology	Qualitative Immunodiffusion
Analytic Time	2-4 days upon receipt at reference laboratory

Blastomyces, Culture

See:
Fungal Culture

Bleeding Time (Standardized Ivy)

Comments: Bleeding times are no longer offered at UIHC. The test used to screen for platelet function is the PFA.

See:
Platelet Function Analysis, Blood

Blood Cell Profile

See:
CBC (Complete Blood Count), Blood

Blood Culture

See:
Bacterial Culture

Blood Gases (Arterial)

Laboratory: Critical Care Laboratory
Order Code: ABG
CPT Code: 82803
Collection Medium: <table>
<tr>
<td align=center></td></t
<tr>
<td width="110" valign="top" align="center">Lithium/Sodium Heparin syring
</tr>
</table>

Minimum: 0.5 mL in Lithium/Sodium Heparin syringes ONLY. No air bubbles in syringe.

Reference Range: <pre>

	adults	pediatrics
pH	7.35-7.45	7.32-7.42
PCO2	35-45	30-40
pO2	80-90	80-100
BE	-2 to 2	
HCO3	22-26 mEq/l	
TCO2	24-32 mEq/l	

Critical Care Critical Values:

pH	<7.20	and >7.60
pCO2 Adults	<20	and >70
Peds	<20	and >55
pO2	<40	

Special Care Nurseries Critical Values:

pH	<7.25 and >7.65
pCO2	<30 and >70</pre>

Order Form: A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments: If patient temperature is noted on requisition, blood gas will be corrected for temperature, otherwise 37°C will be assumed. Any air drawn in with the sample must be expelled immediately. Samples than contain greater than 25% air to sample volume ratio will not be analyzed. All needles must be removed from the syringe before delivery.

See Appendix: See Additional Information:
Critical Care Critical Lab Values
Specimens Requiring Immediate Delivery
Methodology: Traditional Electrodes
Analytic Time: 10 minutes (upon receipt in laboratory)
Testing Schedule: 24 hrs/day, 7 days a week, including holidays.

Blood Gases (Capillary Stick)

Laboratory	Critical Care Laboratory
Order Code	FBG
CPT Code	82803
Collection Medium	<table> <tr> <td align=center></td><td <td align=center><a href="javascript:larger_tube('920.jpg')"><img src="/p <tr> <td width="110" valign="top" align="center">Capillary tube</td> <td width="110" valign="top" align="center">Microvette, heparinized</td> </tr> </table>
Minimum	125 microliters; lyophilized heparin capillary tube.
Reference Range	<pre> <u>Pediatric Patients (<18 years old)</u> pH 7.30-7.40 PCO2 30-40 32-45 mm Hg for girls 35-48 mm Hg for boys pO2 50-65</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	If patient temperature is noted on requisition, blood gas will be corrected for temperature, otherwise 37°C will be assumed. Specimen must be collected anaerobically. Samples that contain greater than 25% air to sample volume ratio will not be analyzed. All needles must be removed from the syringe before delivery.
See Appendix	See Additional Information: Critical Care Critical Lab Values Specimens Requiring Immediate Delivery
Methodology	Traditional Electrodes
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Blood Gases (Venous)

Laboratory	Critical Care Laboratory
Order Code	VBG
CPT Code	82803
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Lithium/Sodium Heparin syring </tr> </table>
Minimum	0.5 mL in Lithium/Sodium Heparin syringes ONLY. No air bubbles in syringe.
Reference Range	<pre> adults pediatrics (<18 years old) pH 7.33-7.43 7.30-7.40 PCO2 37-50 32-45 mm Hg for girls, 35-48 mm Hg for boys pO2 37-47 50-65 torr Critical Care Critical Values: pH <7.20 and >7.60 pCO2 Adults <20 and >70 Peds <20 and >55 pO2 <20 Special Care Nurseries Critical Values: pH <7.25 and >7.65 pCO2 <30 and >70</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	If patient temperature is noted on requisition, blood gas will be corrected for temperature, otherwise 37°C will be assumed. Any air drawn in with the sample must be expelled immediately. Samples that contain greater than 25% air to sample volume ratio will not be analyzed. All needles must be removed from the syringe before delivery.
See Appendix	See Additional Information: Critical Care Critical Lab Values Specimens Requiring Immediate Delivery
Methodology	Traditional Electrodes
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Blood Parasite Exam (R/O Malaria/Bld Parasites)

Laboratory	Microbiology
Order Code	DR GIEM
CPT Code	87207
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	1 mL blood in lavender top tube
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	All specimens sent for malarial examination will be initially screened with a malarial antigen assay. This assay can rapidly identify patients infected with Plasmodium falciparum at levels of 0.1% or higher, and it can also identify cases of malaria caused by other species. However, it cannot specifically classify Plasmodium species other than P. falciparum. The assay has a very high negative predictive value (>99%) for malaria. All specimens will continue to be Giemsa stained and examined microscopically by a pathologist, regardless of the antigen result. One set of negative smears does not rule out malaria. If clinical suspicion for malaria remains after one set of negative smears, additional specimens should be submitted at 12 hour intervals for the subsequent 36 hour period. Note on requisition if a parasite infection other than malaria is suspected. Please contact the Microbiology resident from 0800-1700 (pager 4903) with questions. After hours, contact the Clinical Pathology resident on call (pager 3404).
Methodology	Lateral Flow Assay for antigen testing. Microscopic slide examination.
Analytic Time	Antigen results will be available within one hour of specimen arrival, 24 hours a day. Preliminary thin smear results will be available within 90 minutes of specimen arrival if the specimen arrives between 0700-1900 or by 0930 if specimen arrives after hours.
Testing Schedule	Giemsa smears and Malaria antigen testing 24 hrs/day, 7 days a week, including holidays.

Blood Smear, Path Morphologic Exam

Laboratory	Hematology
Order Code	BSM
CPT Code	80500
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Any size lavender top, full draw or fingerstick. (May also be added to a 'Blood Cell Profile' request).</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> Blood smears are routinely examined by technologists according to the criteria listed under 'CBC (Complete Blood Count), Blood'. However, this service is a direct examination by a pathologist in response to a specific inquiry. The specific reason for the examination must be noted on the requisition. Examination can be requested on either a current CBC or in review of a smear, if available. The pathologist's narrative interpretation is reported by computer. Blood smears reviewed will be held in a permanent file for future reference. A CBC is necessary to order this pathology slide review.</pre>
See:	 CBC (Complete Blood Count), Blood
Methodology	Wright Stain.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Blood Smear, Technologist Review

Laboratory	Hematology
Order Code	TSM
CPT Code	85008
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Full draw; 3.0 mL lavender top; (or fingerstick). (May also be added to a 'Blood Cell Profile' request).</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> Blood smears are routinely examined by technologists according to the criteria listed under 'CBC (Complete Blood Count), Blood'. However, this service is a direct examination by a technologist in response to a specific inquiry. The specific reason for the examination must be noted on the requisition. Examination can be requested on either a current CBC or in review of a smear, if available. The technologist's narrative interpretation is reported by computer. A CBC is necessary to order this pathology slide review.</pre>
See:	 CBC (Complete Blood Count), Blood
Methodology	Wright Stain.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Blood Type (ABO and Rh)

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	ABORH
CPT Code	ABO 86900, Rh 86901
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults: A filled 6 mL tube Pediatrics: A filled 3 mL tube 4 months-1 year: 0.5 mL in a 3 mL lavender top tube Neonates: 0.5 cc (full) lavender microtainer for patients 0-4 months.</pre>
Rejection Criteria:	Specimen must be labeled with patient’s first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Reference Range	not applicable
Order Form:	DeGowin Blood Center Requisition
Methodology	Tube
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Blood Type (ABO and Rh) Nonpatient

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	OTYPE
CPT Code	ABO 86900, Rh 86901
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults: A filled 6 mL tube Pediatrics: A filled 3 mL tube 4 months-1 year: 0.5 mL in a 3 mL lavender top tube Neonates: 0.5 cc (full) lavender microtainer for patients 0-4 months.</pre>
Rejection Criteria:	Specimen must be labeled with patient’s first and last name and medical record number, source of sample. Specimens will be rejected if information is not on the label when received.
Reference Range	Not applicable
Order Form:	DeGowin Blood Center Requisition
Comments	ABO and Rh type is performed on a nonpatient.
Methodology	Tube
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

BNP

See:	 N-terminal-pro-BNP, Plasma

Body Fluid Cell Count and Differential

Laboratory	Hematology
Order Code	BFX
CPT Code	89051
Collection Medium	Miscellaneous container; contact laboratory
Minimum	1.0 mL
Rejection Criteria:	Cyst fluids and pus from abscesses are not acceptable specimens.
Order Form:	A-1a General Lab or Epic Req
Comments	Includes cell counts and total nucleated cell differential if three or more cells are found. The differential is based on the morphologic examination of a wright-stained cytospin preparation. The cells are reported as number per ul; erythrocytes, total nucleated cells, neutrophils, lymphocytes, and a composite group of monocytes-histocytes-macrophages mesothelials. These slides are retained for approximately 2 months.
Methodology	Count and Wright Stain
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Bone Marrow Examination

Laboratory	Bone Marrow Lab
Order Code	BMBX
CPT Code	The CPT code is dependent on material submitted and diagnosis.
Minimum	Schedule with Bone Marrow Lab
Order Form:	Epic Consult Form
Comments	Includes description of findings and interpretation.
See Appendix	See Additional Information: Bone Marrow Laboratory Services
Methodology	Staining and microscopic examination.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Bone Marrow Examination

Laboratory	Bone Marrow Lab
Order Code	BMEX
CPT Code	85097
Minimum	<pre> Schedule with Bone Marrow Lab. Includes comments on cellularity, megakaryocytes, distribution and maturation of granulocytic and erythroid precursors, differential count, iron stores, peripheral blood findings and interpretation.</pre>
Reference Range	<pre> Normals for adult marrows with normal cellularity are: ME ratio 2:1 - 4:1 Erythrocyte precursors 18-32% Blasts 0-2% Promyelocytes 2-6% Myelocytes 3-7% Metamyeloctyes 5-9% Bands 10-16% Neutrophils 18-28% Eosinophils + precursors 1-5% Basophils + precursors 0-1% Monocytes + precursors 1-5% Lymphocytes 9-19% Plasma Cells 0-1%</pre>
Order Form:	Epic Consult Form
See Appendix	See Additional Information: Bone Marrow Laboratory Services
Methodology	Staining and microscopic examination.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Bone Marrow Examination

Laboratory	Bone Marrow Lab
Order Code	BMOS
CPT Code	The CPT code is dependent on material submitted and diagnosis.
Minimum	Slides, outside report, and Bone Marrow Examination Consult form with: patient name, hospital#, age, location plus pertinent clinical and laboratory data.
Order Form:	Epic Consult Form
Comments	Slides should be delivered to the Bone Marrow Lab.
See Appendix	See Additional Information: Bone Marrow Laboratory Services
Methodology	Staining and microscopic examination.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Bone Specific Alkaline Phosphatase

Laboratory	Commercial Mail-out Laboratory
Order Code	BSAP
CPT Code	84080
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Green top tube 4 mL (Na Heparin), Light Green top tube (Lithium Heparin)
Minimum	<pre> Preferred Minimum: 0.5 mL Absolute Minimum: 0.3 mL</pre>
Rejection Criteria:	Hemolyzed specimens. Plasma specimens.
Reference Range	<pre>

Age	Male	Female
6 months-2 years	31.6-122.6 μg/L	33.4-145.3 μg/L
3-6 years	31.3-103.5 μg/L	32.9-108.6 μg/L
7-9 years	48.6-140.4 μg/L	36.3-159.4 μg/L
10-12 years	48.8-155.5 μg/L	44.2-163.3 μg/L
13-15 years	27.8-210.9 μg/L	14.8-136.2 μg/L
16-17 years	15.3-126.8 μg/L	10.5- 44.8 μg/L
18-24 years	10.0- 28.8 μg/L	
25 years and older	6.5-20.1 μg/L	
Premenopausal Female		4.5-16.9 μg/L
Postmenopausal Female		7.0-22.4 μg/L</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	NOTE: Reference intervals have not been established for children younger than 7 years of age or males 18-24 years.
Methodology	Chemiluminescent Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Bordetella Pertussis Ab

Laboratory	Commercial Mail-out Laboratory
Order Code	BORDPAN
CPT Code	86615 x2 Bordetella (IgG & IgM); if reflexed add 86615 for each Bordetella Immunoblot
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred minimum: 1 mL serum Absolute minimum: 0.3 mL serum (does not allow for repeat)</pre>
Rejection Criteria:	Severely lipemic, contaminated, heat-inactivated.
Reference Range	<pre> Bordetella pertussis Antibody, IgG by ELISA 0.0-0.9 U/mL Bordetella pertussis Antibody, IgG by Immunoblot Bordetella pertussis Ab, IgG by Immunoblot Interp - Negative B. pertussis, IgG Immunoblot PT100 - Negative B. pertussis, IgG Immunoblot PT - Negative B. pertussis, IgG FHA - Negative</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Note: If Bordetella pertussis Antibody, IgG by ELISA is 2.5 U/mL or greater, then Bordetella pertussis IgG Immunoblot testing will be added; if Bordetella pertussis Antibody, IgM by ELISA is 1.2 U/mL or greater, then Bordetella pertussis IgM Immunoblot testing will be added. Additional charges apply.
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay/Qualitative Immunoblot
Analytic Time	1-8 working days upon receipt at reference laboratory

BRAF Gene Analysis V600E with Interpretation

Laboratory	Molecular Pathology
Order Code	BRAF
Minimum	Tumor cells more than 50% of the total tissue and greater than 10mm² in surface area on the block.
Rejection Criteria:	Specimens fixed in B5 fixative or that have been decalcified will not be accepted. Tumor specimens containing less than 50% tumor cells or are less than 10mm² in area may be unacceptable.
Reference Range	Negative
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	To aid in the diagnosis of papillary thyroid carcinoma. BRAF testing is generally not available on a STAT basis. However, expedited testing can be arranged by contacting the Molecular Pathology Laboratory at 384- 9568.
Methodology	Polymerase Chain Reaction (PCR) followed by Sequencing
Analytic Time	7-10 working days
Testing Schedule	Weekly

BRCA Comprehensive Analysis

Laboratory	Commercial Mail-out Laboratory
Order Code	BRCA
CPT Code	83891, 83898 (x81), 83904 (x81), 83909 (x81)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	10 mL EDTA whole blood from TWO pink top K2EDTA tubes.
Rejection Criteria:	Sample must be received at reference laboratory within 48 hours of collection, collect Monday through Thursday only; do not collect on Fridays, holidays, day before a holiday, or weekends; contact laboratory 6-3527 for Saturday delivery.
Reference Range	No mutation detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Includes BRCA1 and BRCA2 susceptibility testing. Genetic counseling is strongly recommended. Counseling is available through Dr. Adam Kanis in the Familial Cancer Center 384-9645.</pre>
Methodology	<pre> Mutational analysis Sequencing assay</pre>
Analytic Time	2 weeks upon receipt at reference laboratory

Breast Nipple Discharge

Laboratory	Cytopathology
Minimum	<pre> Smear(s); fix immediately (without air drying) in 95% ETOH. Collection materials (fully frosted glass slides and jars of 95% ETOH) are available in Cytology.</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
Comments	The Cytology requisition must contain pertinent clinical patient history. Pencil patient name and hospital number on one end of the fully frosted glass slide.
Analytic Time	2 days

Breath Hydrogen Analysis

Laboratory	Gastrointestinal (Peds) Lab
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	For determination of disaccharidase deficiency, small bowel bacterial overgrowth and/or estimation of small bowel transit time in children. Please consult Pediatric GI service 1-2 days in advance for scheduling, preparation, breath sample collection, analysis and interpretation.

Bronchial Brush Cytology

Laboratory	Cytopathology
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	2 days

Bronchial Cytopathology

See:	 Bronchial Brush Cytology, Bronchial Brush Bronchial Wash Cytology, Bronchial Wash Bronchioalveolar Lavage (BAL) for Cancer Evaluation, Bronchioalveolar Lavage Spontaneous Sputum for Cancer Evaluation, Sputum

Bronchial Wash Cytology

Laboratory	Cytopathology
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	2 days

Bronchioalveolar Lavage (BAL) for Cancer Evaluation

Laboratory	Cytopathology
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	2 days

Bronchoalveolar Lavage Cell Count and Diff

Laboratory	Hematology
Order Code	BAL
CPT Code	89051
Collection Medium	Miscellaneous container; contact laboratory
Minimum	1.0 mL
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> Includes nucleated cell count and a differential based upon the morphologic examination of a Wright's stained cytospin preparation. The cells are reported as number per ul of total nucleated cells, neutrophils, lymphocytes, eosinophils, lining cells and a composite group of monocytes/histocytes/macrophages. These slides are retained For approximately 2 months.</pre>
Methodology	Automated or manual cell count and Wright's Stain
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Bronchoalveolar Lavage for CD4/CD8

Laboratory	Flow Cytometry Service
CPT Code	88184, 88185x3, 88187
Collection Medium	Miscellaneous container; contact laboratory
Minimum	1.0 mL
Order Form:	A-1a Immunopathology or Epic Req
Comments	Include pertinent clinical information on the requisition. CD45 and CD3 will also be performed. A pathologist interpretation is included with the results.
Methodology	Flow Cytometry
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Brucella Antibody (Total) by Agglutination

Laboratory	Commercial Mail-out Laboratory
Order Code	BRUC
CPT Code	86622
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum Absolute Minimum: 0.2 mL serum
Rejection Criteria:	Severely lipemic, contaminated, hemolyzed, or heat-inactivated specimens.
Reference Range	< 1:20 Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Bacterial Agglutination
Analytic Time	4 working days upon receipt at reference laboratory

Bruton's Agammaglobulinemia

See:	 Immunodeficiency Evaluations; Adult and Pediatric, Peripheral Blood

BSM

See:	 Blood Smear, Path Morphologic Exam, (Wright Stain)

Buccal Smear

Comments	Test no longer performed. Call Cytogenetics Lab (356-3877) for more information and alternate testing.

Bullous Pemphigoid Antibodies

See:	 Pemphigus/Pemphigoid/EBA Antibodies Screen, Titer and Interpretation, Serum

BUN

See:	 Urea Nitrogen, Plasma

BUN-other

See:	 Urea Nitrogen-Other, Body Fluid

Bupropion Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	BUPR
CPT Code	82486
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimium: 2 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	Therapeutic Range: 50 - 100 ng/mL Toxic Level: Greater than 400 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	5 working days upon receipt at reference laboratory

Busulfan Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	BUS
CPT Code	83789
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Minimum	<pre> Preferred Minimum: 10 mL whole blood (sodium heparin) Absolute Minimum: 1-3 mL whole blood (sodium heparin)</pre>
Rejection Criteria:	<pre> Exact collection times must be written on tubes. Specimens must be placed on ice immediately after collection. Note: Collection times refer to time after the start time of IV. For Dose 1 only - end of infusion, 135 minutes, 150 minutes, 3 hours, 4 hours, 5 hours, and 6 hours. For follow-up doses - pre infusion (just prior to start of IV), end of infusion, 135 minutes, 150 minutes, 4 hours, and 6 hours.</pre>
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	GC Mass Spectrometry
Analytic Time	24 hours upon receipt at reference laboratory
Testing Schedule	Daily when scheduled.

C

C-ANCA

See:	 Neutrophil Cytoplas.Screen (ANCA), Serum

C-Difficile Toxin

See:	 C. difficile Toxin PCR, Stool

C-erb-2 Oncoprotein

Laboratory	Immunopathology
Order Code	ICERB
CPT Code	88360 Cerb-2, 88360-26 Cerb-2 Professional Interpretation
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	<pre> Please send a Surgical Pathology H-1 form to Immunopathology with this request. C-erb-2 oncoprotein is the product of the HER-2 (neu) oncogene which is overexpressed in a variety of adenocarcinomas arising at various sites. Overexpression of c-erb-2 is present in 15-30% of cases of breast carcinoma and has been demonstrated to be a negative prognostic indicator. C-erb-2 overexpression can be detected by immunohistochemical staining of formalin-fixed paraffin-embedded sections of tumor tissue. Membrane staining of the cells is the only reaction considered positive. A positive therapeutic response to Herceptin (TM) therapy with anti-C-erb-2 monoclonal antibody has been reported in association with 3+ staining intensity.</pre>
Methodology	Immunohistochemistry
Analytic Time	3 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

C-Peptide

Laboratory	Chemistry
Order Code	CPEP
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	5 mL whole blood in light green top tube (adults) or TWO microtainers (pediatric patients).
Reference Range	1.1-4.4 ng/mL in fasting specimens Reference interval applies to fasting specimens. To convert to nmol/L, multiply ng/mL by 0.33.
Order Form:	A-1a General Lab or Epic Req
Comments	Fasting sample preferred.
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

C-Reactive Protein (CRP)

Laboratory	Chemistry
Order Code	CRP
CPT Code	86140
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light gr een top tube or 1 light green microtainer for pediatric patients
Reference Range	<0.5 mg/dL
Order Form:	A-1a General Lab or Epic Req
See:	 C-Reactive Protein-Other, Body Fluid
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

C-Reactive Protein-Other

Laboratory	Chemistry
Order Code	CRPO
CPT Code	86140
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 C-Reactive Protein (CRP), Plasma
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

C. difficile Toxin PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	CDAB
CPT Code	87493
Collection Medium	Sterile container
Rejection Criteria:	Formed stool; specimen submitted within 10 days of positive result; more than 1 specimen/week.
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	This test targets toxin B gene sequences. Most pathogenic C. difficile strains produce toxin A and B, but some produce only toxin B. The number of C. difficile toxin PCR test requests for a patient will be limited to one per week. The higher sensitivity of PCR in comparison to cell cytotoxicity and immunoassay methods supports this policy [Ann Intern Med 2009; 151:176]. It is generally recommended that C. difficile PCR be performed only for patients with <u></u> 3 liquid stools within a 24 hour period. Since C. difficile colonization rather than infection may exist, only unformed stool specimens from patients with signs and symptoms of C. difficile infection should be tested. The significance of Clostridium difficile toxin detection in infants (<1 year old) is uncertain because of the high rate of asymptomatic C. difficile carriage in this age group. Once a patient is diagnosed with C. difficile infection, therapeutic response should be based on clinical signs and symptoms; a "test of cure" should not be done since patients may remain colonized with toxin-producing strains following recovery.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Polymerase Chain Reaction
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

C1 Functional Assay

See:	 C1q Complement Component Level, Serum or Plasma

C1 Inhibitor Functional Assay

Laboratory	Commercial Mail-out Laboratory
Order Code	C1INH
CPT Code	86161
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum
Rejection Criteria:	Nonfrozen specimens.
Reference Range	68% or greater: Normal 41-67%: Indeterminate 40% or less: Abnormal
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	4 working days upon receipt at reference laboratory

C1 Inhibitor, Protein

Laboratory	Commercial Mail-out Laboratory
Order Code	C1EI
CPT Code	86160
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum
Rejection Criteria:	Nonfrozen specimens.
Reference Range	21-39 mg/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 C1q Complement Component Level, Serum or Plasma
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Nephelometry
Analytic Time	4 working days upon receipt at reference laboratory

C13 Urea Breath Test

See:	 H. pylori Breath Test, Breath

C1q Complement Component Level

Laboratory	Commercial Mail-out Laboratory
Order Code	C1Q
CPT Code	86160
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	<pre> Adult minimum: 1.0 mL serum or plasma Pediatric minimum: 0.1 mL serum or plasma</pre>
Rejection Criteria:	Gross hemolysis, lipemic or SST or serum separtor tubes.
Reference Range	<pre> By report Low levels of C1q indicate either increased consumption (catabolism) or decreased synthesis.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 C1 Inhibitor, Protein, Serum
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Radial Immunodiffusion
Analytic Time	7 working days upon receipt at reference laboratory

C2 Complement Component

Laboratory	Commercial Mail-out Laboratory
Order Code	C2
CPT Code	86160
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred minimum: 1 mL serum
Rejection Criteria:	Plasma is not accepted.
Reference Range	1.0-4.0 mg/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Radial Immunodiffusion
Analytic Time	5-10 days upon receipt at reference laboratory.

C3 Complement Component

Laboratory	Chemistry
Order Code	C3
CPT Code	86160
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer
Reference Range	90-180 mg/dL
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> Measures concentration by specific antibody. If cryoglobulin present or suspected, collect specimen as directed for ’Cryoglobulin, Serum’.</pre>
See:	 Cryoglobulin Quantitation, Serum
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

C3 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	C3MORL
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href= "http://www.healthcare.uic from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. <u>The reference laboratory offers a known familial variant test. If you want to order the known familial variant version of the test, please order LAB7836</u>.
Methodology	Oligonucleotide primers have been designed to amplify each exon of C3. Amplimers are sequenced directly using overlapping primer sets.
Analytic Time	3 months

C3 Nephritic Factor Analysis

Laboratory	Commercial Mail-out Laboratory
Order Code	C3NEF
CPT Code	86161
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult/Pediatric preferred minimum: 1 mL serum Adult/Pediatric absolute minimum: 0.5 mL serum</pre>
Rejection Criteria:	No gel or clot activtor tubes.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	2-D Immunoelectrophoresis
Analytic Time	1 month

C4 Complement Component

Laboratory	Chemistry
Order Code	C4
CPT Code	86160
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer
Rejection Criteria:	Specimens collected in Sodium Citrate tubes.
Reference Range	16-47 mg/dL
Order Form:	A-1a General Lab or Epic Req
Comments	Measures concentration by specific antibody. If cryoglobulin present or suspected, collect specimen as directed for 'Cryoglobulin, Serum'.
See:	 Cryoglobulin Quantitation, Serum
Methodology	Immunoturbimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

C5 Complement Level

Laboratory	Commercial Mail-out Laboratory
Order Code	C5
CPT Code	86160
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Plasma is not accepted.
Reference Range	7-20 mg/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Sample must be processed and frozen within 2 hours of blood draw.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Radial Immunodiffusion
Analytic Time	1 week upon receipt at reference laboratory

C5 Complement, Functional

Laboratory	Commercial Mail-out Laboratory
Order Code	C5FX
CPT Code	86161
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL Serum Absolute Minimum: 0.5 mL Serum
Reference Range	29-53 unit/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Useful for investigation of a patient with an undetectable total complement (CH[50]) level.
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Turbidimetry
Analytic Time	3 working days upon receipt at reference laboratory

CA 125

See:	 Cancer Antigen 125, (Ca 125), Plasma

CA 15-3

See:	 Cancer Antigen 15-3, Serum

CA 27.29

Laboratory	Commercial Mail-out Laboratory
Order Code	C2729
CPT Code	86300
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Recommended minimum: 1.0 mL serum Absolute minimum: 0.5 mL serum</pre>
Rejection Criteria:	Plasma
Reference Range	0-40 U/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Chemiluminescent Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Cadmium

Laboratory	Commercial Mail-out Laboratory
Order Code	CDB
CPT Code	82300
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	<pre> Adult minimum: 7.0 mL whole blood from Royal Blue (K2 EDTA) tube Absolute minimum: 0.5 mL whole blood from Royal Blue (K2 EDTA) tube</pre>
Rejection Criteria:	Heparinized anticoagulant specimens.
Reference Range	0.0 - 5.0 mcg/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Royal Blue trace metal tube available from the Clinical Pathology Core Laboratory, 6240 RCP.
Methodology	Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	3 working days upon receipt at reference laboratory

Cadmium

Laboratory	Commercial Mail-out Laboratory
Order Code	CDU
CPT Code	82300
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 8 mL aliquot from a well-mixed collection Absolute Minimum: 1 mL aliquot from a well-mixed collection <u>Patient Prep</u>: Diet, medication, and nutritional supplements may introduce interfering substances. Patients should be encouraged to discontinue nutritional supplements, vitamins, minerals, and non-essential over-the-counter medications (upon the advice of their physician). High concentrations of iodine may interfere with elemental testing. Abstinence from iodine-containing medications or contrast agents for at least 1 month prior to collecting specimens for elemental testing is recommended.
Rejection Criteria:	Urine collected within 48 hours after administration of a gadolinium (Gd) containing contrast media (may occur with MRI studies). Acid preserved urine.
Reference Range	<pre> Cadmium, Urine - per volume 0.0-2.6 μg/L Cadmium, Urine - per 24-hour 0.0-3.3 μg/d Cadmium, Urine - ratio to CRT 0.0-3.0 μg/g crt Creatinine (24-hour) Male: 3-8 years: 140-700 mg/d 9-12 years: 300-1300 mg/d 13-17 years: 500-2300 mg/d 18-50 years: 1000-2500 mg/d 51-80 years: 800-2100 mg/d 81 years and older: 600-2000 mg/d Female: 3-8 years: 140-700 mg/d 9-12 years: 300-1300 mg/d 13-17 years: 400-1600 mg/d 18-50 years: 700-1600 mg/d 51-80 years: 500-1400 mg/d 81 years and older: 400-1300 mg/d</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Quantitative Inductively Coupled Plasma-Mass Spectrometry
Analytic Time	3 days upon receipt at reference laboratory

Caffeine

Laboratory	Commercial Mail-out Laboratory
Order Code	CAFF
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.2 mL serum
Rejection Criteria:	Citrated plasma. Tubes that contain liquid anticoagulant.
Reference Range	<pre> Therapeutic Range: 6-20 ug/mL (neonates) Toxic: > 40 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	Used in the treatment of apnea of prematurity.
Methodology	Immunoassay
Analytic Time	2 working days upon receipt at reference laboratory

CAH Profile 6

Comments	Profiles no longer available, order each test separately. Total serum required for all tests together is 3.5 mL serum (recommend 7-10 mL whole blood in red top tube).
See:	 11-Deoxycortisol Quantitative, Serum 17-Alpha Hydroxyprogesterone, Serum 17-OH-Pregnenolone, Serum Androstenedione, Serum Dehydroepiandrosterone, Serum Deoxycorticosterone (DOC), Serum Testosterone, Total, Pediatric, Serum

Calcitonin

Laboratory	Commercial Mail-out Laboratory
Order Code	CALC
CPT Code	82308
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Green top tube 4 mL (Na Heparin), Light Green top tube (Lithium Heparin)
Minimum	Preferred Minimum: 2.0 mL serum
Rejection Criteria:	EDTA plasma. Grossly hemolyzed or lipemic specimens.
Reference Range	<pre> Male 3 years and older: 0.0 - 7.5 pg/mL Female 3 years and older: 0.0 - 5.1 pg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Chemiluminescent Immunoassay
Analytic Time	2 working days upon receipt at reference laboratory

Calcium (Total)

Laboratory	Chemistry
Order Code	CA
CPT Code	82310
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 light green microtainer for pediatric patients
Reference Range	<pre> 8.5-10.5 mg/dL Pediatric Reference Ranges: Age Male Female Units Birth-30 days 8.5-10.6 8.4-10.6 mg/dL 31 days-1 year 8.7-10.5 8.9-10.5 mg/dL 1-6 years 8.8-10.6 8.5-10.5 mg/dL 7-12 years 8.7-10.3 8.5-10.3 mg/dL 13-15 years 8.5-10.2 8.4-10.2 mg/dL 16-18 years 8.4-10.3 8.6-10.3 mg/dL Critical value: <6.0 mg/dL and >13.0 mg/dL</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Calcium-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Critical Lab Values Chemistry Pediatric Reference Ranges
Methodology	Colorimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Calcium, Ionized (Or Free)

Laboratory	Critical Care Laboratory
Order Code	ICA
CPT Code	82330
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Heparinized syringe or Green </tr> </table>
Minimum	<pre> 0.5 mL in Lithium/Sodium Heparin syringe or, Full draw; any size Lithium/Sodium Heparin green top tube.</pre>
Reference Range	<pre> 3.8-5.2 mg/dL for adults; Reference Range for neonatal: 1-5 Days: 4.2-5.9 mg/dL* *neonatal ref. Values for ionized calcium, ... Scand J Lab Invest, 1987, 47: 111-117. Critical Care Critical Value: <3.2 mg/dL and >5.9 mg/dL Special Care Nurseries Critical Value: <3.0 mg/dL and >6.5 mg/dL</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required); all needles must be removed from the syringe before delivery.
See Appendix	See Additional Information: Critical Care Critical Lab Values Critical Care Pediatric Reference Ranges Specimens Requiring Immediate Delivery
Methodology	Ion Selective Electrode
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Calcium, Ionized, Post-Filter

Laboratory	Critical Care Laboratory
Order Code	ICAPO
CPT Code	82330
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Heparinized syringe or Green </tr> </table>
Minimum	0.5 mL in Heparinized syringe or pediatric Green top tube (Na Heparin).
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required); all needles must be removed from the syringe before delivery.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Ion Selective Electrode
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Calcium

Laboratory	Chemistry
Order Code	UCA
CPT Code	82340
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> 24 hr urine; no preservative. Collection other than 24 hr will not be calculated for mg/24 hr. Must have at least 10 ml to titrate.</pre>
Reference Range	Diet dependent: Average diet - 15-150 mg/24 hr
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Collection and Preservation of 24-Hour Urine Specimens Urine Tests Requiring no Preservatives
Methodology	Colorimetric
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Calcium

Laboratory	Chemistry
Order Code	URCA
CPT Code	82340
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	10 mL; random specimen must have at least 10 mL to titrate.
Reference Range	Diet dependent; average diet, 15-150 mg/24 hr
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Colorimetric
Analytic Time	1 hour (upon receipt in laboratory)

Calcium-Other

Laboratory	Chemistry
Order Code	CAO
CPT Code	82310
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Calcium (Total), Plasma
Methodology	Colorimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Calcofluor White

See:	 KOH Prep (Fungal Stain, KOH with Calcofluor White), Skin Scrapings, Hair, Nail Clippings

Calculi Analysis

Laboratory	Commercial Mail-out Laboratory
Order Code	STONE
CPT Code	82365
Collection Medium	Miscellaneous container; contact laboratory
Rejection Criteria:	Any collection or shipping container with a needle attached.
Reference Range	By Report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Calculi specimens transported in liquid or contaminated with blood require special handling which will delay analysis. Samples that are wrapped in tape or embedded in wax will delay or prevent analysis and should not be submitted.</pre>
Methodology	Reflectance Fourier Transform Infrared Spectroscopy (FTIR)/Polarizing Microscopy
Analytic Time	5 working days upon receipt at reference laboratory

Calpain 3 Full Gene Sequence with Interpretation

Laboratory	Molecular Pathology
Order Code	CAPN
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult minimum: 3 mL whole blood in lavender top (EDTA) tube. Children minimum: 2 mL whole blood in lavender top (EDTA) tube. Optional specimen type: Formalin Fixed paraffin embedded tissue; Fresh Frozen tissue. Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing.</pre>
Rejection Criteria:	Testing requires a dedicated collection tube.
Reference Range	Normal
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Methodology	Sequence Analysis of the coding region of the CAPN3 gene.
Analytic Time	21 days
Testing Schedule	Weekly

Cancer Antigen 125, (Ca 125)

Laboratory	Chemistry
Order Code	CA125
CPT Code	86304
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in plasma separator tube or TWO microtainers
Reference Range	0-34 U/mL
Order Form:	A-1a General Lab or Epic Req
Methodology	Chemiluminescent
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cancer Antigen 15-3

Laboratory	Commercial Mail-out Laboratory
Order Code	CA153
CPT Code	86300
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Light Green top tube (Lithium Heparin), Green top tube 4 mL (Na Heparin),
Minimum	<pre> Adult recommended volume: 1.0 mL serum Adult absolute minimum: 0.5 mL serum Pediatric absolute minimum: 0.2 mL serum</pre>
Reference Range	0 - 31 U/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Electrochemiluminescent Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

CAPN3

See:	 Calpain 3 Full Gene Sequence with Interpretation, Whole Blood

Carbamazepine

Laboratory	Chemistry
Order Code	CBZ
CPT Code	80156
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer
Reference Range	<pre> 4-12 mcg/mL Critical value: >12 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	Add-on testing permitted only within 24 hours of draw time. Unable to add on requested testing if sample is greater than 24 hours old.
See:	 Carbamazepine Epoxide & Total Drug Level, Serum
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Enzymatic Immunoassay (EIA)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Carbamazepine Epoxide & Total Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	CBZ-EP
CPT Code	Carbamazepine, Total, 80156; Carbamazepine, Epoxide, 82486
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Components Therapeutic Range Carbamazepine-10, 11 Epoxide Not well established Total Carbamazepine 4.0-12.0 mcg/mL Toxic Range: Greater than 20.0 mcg/mL The 10-11 epoxide metabolite has anticonvulsant activity similar to the parent drug. The expected range following chronic therapeutic dose (5.2 - 20.0 mg/kg) of carbamazepine is 0.5 - 2.0 mcg/mL.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Carbamazepine, Plasma
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry/Quantitative Immunoassay
Analytic Time	5 days upon receipt at reference laboratory

Carbohydrate Antigen 19-9 (CA 19-9)

Laboratory	Chemistry
Order Code	CA199
CPT Code	86301
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers
Reference Range	0.0 - 34 U/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Electrochemiluminescence Immunoassay (ECL)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Carbohydrate Deficient Transferrin

Laboratory	Commercial Mail-out Laboratory
Order Code	CDT
CPT Code	82373
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	0.1 mL of serum
Reference Range	<pre> < or = 0.10 0.11 - 0.12 (indeterminate)</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Chronic alcoholism causes a transient change in the glycosylation pattern of transferrin where the relative amounts of disialo- and asialotransferrin (carbohydrate deficient transferrin [CDT]) are increased over the amount of normally glycosylated tetrasialotransferrin. This recognition led to the use of CDT in serum as marker for chronic alcohol abuse. CDT typically normalizes within several weeks of abstinence of alcohol use. However, it is important to recognize that there are other causes of abnormal CDT levels, which include congenital disorders of glycosylation (CDG) and other genetic and nongenetic causes of acute or chronic liver disease. CDT testing alone is not recommended for general screening for alcoholism; however, when combined with other methods (ie, gamma-glutamyltransferase [GGT], mean corpuscular volume [MCV], patient self-reporting) clinicians can expect to identify 90% or more of heavily drinking patients. This assay has not been fully validated for the investigation of alcoholism. CDT testing alone is not recommended for general screening for alcoholism. The abnormal transferrin isoform pattern in patients with chronic alcoholism is similar to that observed in CDGS. However, unlike most patients with CDG, the relative amount of mono-glycosylated transferrin is much lower. Other conditions such as hereditary fructose intolerance, galactosemia, and liver disease may result in increased levels of CDT.</pre>
Methodology	Affinity Chromatography/Mass Spectrometry (MS)
Analytic Time	6 days upon receipt at reference laboratory

Carbon Dioxide (CO2 Content), Urine

Comments	This assay was discontinued as of 1/17/2012. There are other laboratory testing options.
See:	 Urinalysis, Urine pH, Urine

Carbon Dioxide (CO2 Content)

Laboratory	Chemistry
Order Code	CO2
CPT Code	82374
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer for pediatric patients
Reference Range	<pre> 24-32 mEq/L Pediatric Reference Ranges: Age Range Units Cord blood 15-20 mEq/l Child 18-27 mEq/l Critical value: <10 mEq/l and >50 mEq/l</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	This test measures bicarbonate + dissolved CO2.
See:	 Carbon Dioxide (CO2 Content)-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Critical Lab Values Chemistry Pediatric Reference Ranges
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Carbon Dioxide (CO2 Content)-Other

Laboratory	Chemistry
Order Code	CO2O
CPT Code	82374
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Carbon Dioxide (CO2 Content), Plasma
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Carbon Monoxide (Carboxyhemoglobin)

See:	 Carboxyhemoglobin, Blood

Carboxyhemoglobin

Laboratory	Critical Care Laboratory
Order Code	CHB
CPT Code	82375
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Heparinized syringe or Green </tr> </table>
Minimum	<pre> 0.5 mL in Lithium/Sodium Heparin syringe or, 1 mL whole blood in Lithium/Sodium Heparin green top tube</pre>
Reference Range	<pre> Non-smoker 1 - 3% Smoker 4 - 8% Critical Value: >10%</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required); all needles must be removed from the syringe before delivery.
Methodology	Oximetric
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Carcinoembryonic Antigen

Laboratory	Chemistry
Order Code	CEA
CPT Code	82378
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL light green top tube or TWO microtainers
Reference Range	0.0 - 5.40 ng/mL
Order Form:	A-1a General Lab or Epic Req
Methodology	Chemiluminescent Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cardiac CRP

Laboratory	Chemistry
Order Code	HSCRP
CPT Code	86141
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL plasma from light green top tube or 1 microtainer
Reference Range	<pre> Quintile CRP mg/L Risk of Coronary Heart Disease 1 < 0.7 Lowest Risk 2 0.7 - 1.1 Low Risk 3 1.2 - 1.9 Moderate Risk 4 2.0 - 3.8 High Risk 5 3.9 - 15.0 Highest Risk > 15.0 mg/L: When Cardiac CRP is greater than 15.0 mg/L, risk analysis may be confounded by recent or acute inflammatory disease. Therefore, the risk for coronary heart disease cannot be provided for this patient. A repeat specimen, taken two weeks after resolution of any acute inflammatory condition, may allow provision of coronary risk information. References: 1. Ridker, P.M. et al. 2000. N Engl J Med. 342;836-843. 2. Rifai N. and Ridker, P.M. 2001. Clin Chem. 47; 403-411. 3. Ridker, P.M. et al. 2002. N Engl J Med. 347;1557-1565.</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 C-Reactive Protein (CRP), Plasma
Methodology	Turbidimetric method utilizing latex particles coated with CRP monoclonal antibodies.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cardio CRP

See:	 Cardiac CRP, Plasma

Cardiolipin Antibody, IgG and IgM

Laboratory	Immunopathology
Order Code	ACA
CPT Code	86147 Cardiolipin Antibody, IgG; 86147 Cardiolipin Antibody, IgM
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL red top tube Pediatric - 2 mL red top tube</pre>
Reference Range	<pre> IgG class antibodies: Negative: <15 GPL Indeterminate: 15-20 GPL Positive: >20 GPL IgM class antibodies: Negative: <12.5 MPL Indeterminate: 12.5-20 MPL Positive: >20 MPL</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	Values will be reported in IgG (GPL) and IgM (MPL) phospholipid units, the WHO standard nomenclature. The results will be obtained with the INOVA QUANTA Lite™ ELISA. Assay values obtained with different manufacturers' methods may not be used interchangeably. The magnitude of the reported antibody levels can not be correlated to an endpoint titer.
See Appendix	See Additional Information: Antiphospholipid Syndrome (APS): Laboratory Evaluation
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	1 week
Testing Schedule	Weekly

Carnitine Palmitolyl Transferase Activity (includes CPT1 and CPT2)

See:	 Carnitine Palmitoyltransferase I or II Deficiency CPT I/II, Fibroblast

Carnitine Palmitoyltransferase I or II Deficiency CPT I/II

Laboratory	Commercial Mail-out Laboratory
Order Code	CPTI/II
CPT Code	82658, 88233, 87109
Collection Medium	Miscellaneous container; contact laboratory
Minimum	Fibroblast culture submitted to reference lab after growth of fibroblast from skin biopsy. Fibroblasts are grown in Cytogenetics Laboratory. Two confluent mycoplasma-tested T-25cm² tissue culture flasks of low passage number (<8) fibroblasts or amniocytes in tissue culture medium. Reference Laboratory "The Children’s Hospital of Philadelphia, The Metabolic Disease Laboratory" REQUIRES scheduled notificaiton for submission to lab.
Reference Range	<pre>CPT1: 0.62 plus or minus 0.26 CPT2: 0.28 plus or minus 0.07 nmol palmitoyl carnitine formed/min/mg protein CPT2: 15.8 plus or minus 4.0 CPT1/CPT2 ratio: 2:14 plus or minus 0.07 nmol palmitoyl CoA formedf/min/mg protein</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre>Provide clinical history including: Patient name, date of birth and test requested Requesting physician’s name and phone number Brief clinical history including test results This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.</pre>
Methodology	Radioisotope Tracer
Analytic Time	2 weeks upon receipt at reference laboratory

Carnitine, Free and Total

Laboratory: Commercial Mail-out Laboratory
Order Code: CARNFT
CPT Code: 82379
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar
</tr>
</table>

Minimum: Preferred Minimum: 4 mL heparinized plasma
Absolute Minimum: 0.5 mL heparinized plasma</pre>

Rejection Criteria: Serum or plasma from plasma separator tubes (lithium heparin gel) are NOT acceptable.

Reference Range:

<pre>

Age Group	Total Carnitine (TC) Range*	Free Carnitine (FC) Range*	Acylcarnitine (AC) Range*	AC/FC Ratio Range
1 day	23-68	12-36	7-37	0.4-1.7
2-7 days	17-41	10-21	3-24	0.2-1.4
8-31 days	19-59	12-46	4-15	0.1-0.7
32 days-12 months	38-68	27-49	7-19	0.2-0.5
13 months-6 years	35-84	24-63	4-28	0.1-0.8
7-10 years	28-83	22-66	3-32	0.1-0.9
11-17 years	34-77	22-65	4-29	0.1-0.9
> or = 18 years	34-78	25-54	5-30	0.1-0.8

*Values expressed as nmol/mL</pre>

Order Form: A-1a Miscellaneous Request or Epic Req

Comments:
Always include Date of Birth on the request form.

Determination of urine carnitine concentration concurrently with plasma concentration is recommended.

Carnitine and its esters are required for normal energy metabolism and serve 4 primary functions:
-Importing long-chain fatty acids into the mitochondria
-Exporting naturally-occurring short-chain acyl-CoA groups from the
 mitochondria
-Buffering the ratio of free CoA to esterified CoA
-Removing potentially toxic acyl-CoA groups from the cells and tissues

Evaluation of carnitine in plasma, tissue, and urine identifies patients with primary disorders of the carnitine cycle, as well as disturbances in carnitine levels as a result of organic acidemias and fatty acid oxidation disorders. In the latter disorders, acyl-CoA groups accumulate and are excreted into the urine and bile as carnitine derivatives, resulting in a secondary carnitine deficiency. More than 100 such primary and secondary disorders have been described. Individually, the incidence of these disorders varies from <1:10,000 to >1:1,000,000 live births. Collectively, their incidence is approximately 1:1,000 live births.

Other conditions that are associated with an abnormal carnitine status are neuromuscular diseases, gastrointestinal disorders, familial cardiomyopathy, renal tubulopathies and chronic renal failure (dialysis), and prolonged treatment with steroids, antibiotics (pivalic acid), anticonvulsants (valproic acid), and total parenteral nutrition.

<u>Clinical Reference</u>
1. Chalmers RA, Roe CR, Stacey TE, et al: Urinary excretion of l-carnitine and acylcarnitines by patients with disorders of organic acid metabolism: evidence for secondary insufficiency of l-carnitine. Ped Res 1984;18:1325-1328
2. Scaglia F, Wang YH, Singh RH, et al: Defective urinary carnitine transport in heterozygotes for primary carnitine deficiency. Genet Med 1998;1:34-39
3. Scaglia F, Longo N: Primary and secondary alterations of neonatal carnitine metabolism. Semin Perinatol 1999;23:152-161

	4. Longo N, Amat di San Filippo C, Pasquali M: Disor transport and the carnitine cycle. Am J Med Genet C 2006;142C(2):77-85 5. Zammit VA, Ramsay RR, Bonomini M, Arduini A: Carn mitochondrial function and therapy. Adv Drug Deliv R 2009;61(14):1353- 62
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Free and total carnitine are measured by tandem mass (MS/MS) stable isotope dilution analysis. Hydrolysis measurement of total carnitine, and esterified carni (acylcarnitine) is calculated as the difference betw free carnitine. Quantification is enabled using deut carnitine (d[3]-carnitine) added as internal standar reaction monitoring (SRM) experiment is performed by mass spectrometer (Q1) detects carnitine and d[3]-ca and transmits them to a collision cell (Q2) within t spectrometer where they are fragmented. Specific fra the carnitine and internal standard are monitored in spectrometer (Q3). (Stevens RD, Hillman SL, Worthy S free and total carnitine in human plasma using tande spectrometry. Clin Chem 2000;46:727-729)
Analytic Time	3 working days upon receipt at reference laboratory

Carnitine

Laboratory	Commercial Mail-out Laboratory
Order Code	CARNU
CPT Code	82379
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	3.0 mL from a random urine collection.
Reference Range	<pre> FREE 77-214 nmol/mg of creatinine TOTAL 180-412 nmol/mg of creatinine RATIO Acyl to free: 0.7-3.4</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Tandem Mass Spectrometry (MS/MS)
Analytic Time	2 weeks upon receipt at reference laboratory
Testing Schedule	Weekly

Carnitine Transport

Laboratory	Commercial Mail-out Laboratory
Order Code	CARNIFIBRO
CPT Code	84238
Collection Medium	Miscellaneous container; contact laboratory
Minimum	Two T-25 flasks of fibroblasts from skin biopsy
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Cells should be kept in 37°C incubator until shipped. Clinical information is needed for appropriate interpretation. Additional required information includes age, gender, diet, drug therapy, and family history. Please print, complete and submit the Patient History For Biochemical Genetics Testing form to the lab, with the specimen and the A-1a Miscellaneous Request.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Radioassay
Analytic Time	2 weeks upon receipt at reference laboratory

Carotene

Laboratory	Commercial Mail-out Laboratory
Order Code	CART
CPT Code	82380
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 3 mL of serum
Rejection Criteria:	Any specimen other than serum. Refrigerated or room temperature specimens. Hemolyzed or icteric specimens.
Reference Range	60 - 200 ug/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Avoid hemolysis. For specific measurement of one or more of the following analytes: alpha-carotene, beta-carotene, lutein, zeaxanthin; order Carotenes, Fractionated, Plasma or Serum (0021021).
Methodology	Spectrophotometry
Analytic Time	1 week upon receipt at reference laboratory

Cat Scratch Antibodies

See:	 Bartonella henselae Antibodies, Serum

Catecholamines, Fractionated

Laboratory	Commercial Mail-out Laboratory
Order Code	CATUR
CPT Code	82384
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 4 mL random urine Absolute Minimum: 2.5 mL random urine <hr> Abstain from medications for 72 hours prior to collection.
Rejection Criteria:	Room temperature specimens.
Reference Range	<pre> Reference Intervals for Ratio-to-Creatinine (CRT) Calculations (Random Urine) <u>Components</u> <u>Age</u> <u>Ref. Interval</u> Dopamine 0-11 months 240-1290 μg/g crt 1-3 years 80-1220 μg/g crt 4-10 years 220-720 μg/g crt 11-17 years 120-450 μg/g crt 18 years and older 0-250 μg/g crt Epinephrine 0-11 months 0-380 μg/g crt 1-3 years 0-82 μg/g crt 4-10 years 5-93 μg/g crt 11-17 years 3-58 μg/g crt 18 years and older 0-20 μg/g crt Norepinephrine 0-11 months 25-310 μg/g crt 1-3 years 25-290 μg/g crt 4-10 years 27-110 μg/g crt 11-17 years 4-105 μg/g crt 18 years and older 0-45 μg/g crt</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Secreting neuroendocrine tumors are typically associated with catecholamine concentrations several times higher than the upper reference intervals. Large elevations can be seen in life-threatening illnesses and drug interferences. Common reasons for slight and moderate elevations include intense physical activity, emotional and physical stress, drug interferences, and improper specimen collection. Medications which may physiologically interfere with catecholamines and metabolites include amphetamines and amphetamine-like compounds, appetite suppressants, bromocriptine, buspirone, caffeine, carbidopa-levodopa (Sinemet®), clonidine, dexamethasone, diuretics (in doses sufficient to deplete sodium), ethanol, isoproterenol, methyldopa (Aldomet®), MAO inhibitors, nicotine, nose drops, propafenone (Rythmol), reserpine, theophylline, tricyclic antidepressants, and vasodilators. The effects of some drugs on catecholamine results may not be predictable. Dopamine testing within this determination.
See:	 Homovanillic Acid, Random Urine Metanephrines Total, Random Urine Vanillylmandelic Acid, Random Urine
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-2 days upon receipt at reference laboratory

Catecholamines, Fractionated

Laboratory	Commercial Mail-out Laboratory
Order Code	CATP
CPT Code	82384
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/green_4ml.png" class <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Alternate Collection Media:	Light Green top tube (Lithium Heparin)
Minimum	Adult preferred minimum: 4 mL plasma (suggest drawing TWO 4 mL Green top tubes) Absolute Minimum: 2.1 mL plasma Patient must be calm and supine for 30 minutes pre-collection.
Rejection Criteria:	EDTA plasma, serum or urine.
Reference Range	<pre> Epinephrine 2-10 days 36-400 pg/mL 11 days-3 months 55-200 pg/mL 4-11 months 55-440 pg/mL 12-23 months 36-640 pg/mL 24-35 months 18-440 pg/mL 3-17 years 18-460 pg/mL 18 years and older 10-200 pg/mL Norepinephrine 2-10 days 170-1180 pg/m 11 days-3 months 370-2080 pg/m 4-11 months 270-1120 pg/mL 12-23 months 68-1810 pg/mL 24-35 months 170-1470 pg/mL 3-17 years 85-1250 pg/m 18 years and older 80-520 pg/mL Dopamine 2 days and older: 0-20 pg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Medications which may interfere with catecholamines and metabolites include amphetamines and amphetamine-like compounds, appetite suppressants, bromocriptine, buspirone, caffeine, carbidopa-levodopa (Sinemet), clonidine, dexamethasone, diuretics (in doses sufficient to deplete sodium), ethanol, isoproterenol, labetalol, methyldopa (Aldomet), MAO inhibitors, nicotine, nose drops, propafenone (Rythmol), reserpine, theophylline, tricyclic antidepressants, and vasodilators. The effects of drugs on catecholamine results may not be predictable. For optimum results, patient should be supine for 30 minutes prior to collection. "Upright" ranges show epinephrine up to 900 pg/mL, and norepinephrine up to 700 pg/mL. Children, particularly those under 2 years of age, often show an elevated catecholamine response to stress.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	High Performance Liquid Chromatography
Analytic Time	1 week upon receipt at reference laboratory

Catecholamines, Fractionated

```
                 Laboratory  Commercial Mail-out Laboratory
                 Order Code  CAT24
                   CPT Code  82384
          Collection Medium  <table>
                             <tr>
                             <td align=center><a href="javascript:larger_tube('26.jpg')"></a></td></tr
                             <tr>
                             <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic
                             </tr>
                             </table>

                     Minimum  Preferred Minimum:  4 mL from a well-mixed 24 hr urine collection.<br
                             />
                             Absolute Minimum:  2.5 mL from a well-mixed 24 hr urine collection.
        Rejection Criteria:  Room temperature specimens.
            Reference Range  <strong>Reference Intervals for 24-Hour Calculations (24-Hour Urine)
                             </strong><br />
                             <br />
                             <pre>
                             Components               Reference Interval

                             Dopamine
                                 0-17 years           Not Established
                                 18 years and older   60-440 &#956;g/d

                             Epinephrine
                                 0-17 years           Not Established
                                 18 years and older   0-25 &#956;g/d

                             Norepinephrine
                                 0-17 years           Not Established
                                 18 years and older   0-100 &#956;g/d

                             Creatinine (24 hr)
                               <strong>Male</strong>
                                 3-8 years            140-700 mg/d
                                 9-12 years           300-1300 mg/d
                                 13-17 years          500-2300 mg/d
                                 18-50 years          1000-2500 mg/d
                                 51-80 years          800-2100 mg/d
                                 81 years and older   600-2000 mg/d

                               <strong>Female</strong>
                                 3-8 years            140-700 mg/d
                                 9-12 years           300-1300 mg/d
                                 13-17 years          400-1600 mg/d
                                 18-50 years          700-1600 mg/d
                                 51-80 years          500-1400 mg/d
                                 81 years and older   400-1300 mg/d</pre>
                             <br />
                             <strong>Reference Intervals for Ratio-to-Creatinine (CRT) Calculations
                             (Random Urine)</strong><br />
                             <br />
                             <pre>
                             Dopamine
                                 0-11 months          240-1290 &#956;g/g crt
                                 1-3 years            80-1220 &#956;g/g crt
                                 4-10 years           220-720 &#956;g/g crt
                                 11-17 years          120-450 &#956;g/g crt
                                 18 years and older   0-250 &#956;g/g crt

                             Epinephrine
                                 0-11 months          0-380 &#956;g/g crt
                                 1-3 years            0-82 &#956;g/g crt
                                 4-10 years           5-93 &#956;g/g crt
                                 11-17 years          3-58 &#956;g/g crt
                                 18 years and older   0-20 &#956;g/g crt

                             Norepinephrine
                                 0-11 months          25-310 &#956;g/g crt
                                 1-3 years            25-290 &#956;g/g crt
                                 4-10 years           27-110 &#956;g/g crt
                                 11-17 years          4-105 &#956;g/g crt
```

	18 years and older 0-45 μg/g crt</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Secreting neuroendocrine tumors are typically associa catecholamine concentrations several times higher tha reference intervals. Large elevations can be seen in illnesses and drug interferences. Common reasons for moderate elevations include intense physical activity physical stress, drug interferences, and improper spe collection. Medications which may physiologically interfere with metabolites include amphetamines and amphetamine-like appetite suppressants, bromocriptine, buspirone, caf levodopa (Sinemet®), clonidine, dexamethasone, sufficient to deplete sodium), ethanol, isoprotereno (Aldomet®), MAO inhibitors, nicotine, nose drop (Rythmol), reserpine, theophylline, tricyclic antidep vasodilators. The effects of some drugs on catechola not be predictable. VMA, Catecholamines and Metanephrines may be done on Alpha methylodopa (Aldomet) and Labetalol (Normodyne elevate the apparent concentration of urine catechol containers available from pharmacy. Includes: Epidenphrine, No Dopamine. If screening for Neuroblastoma, the following tests a CAT24 (Catecholamines, Fractionated; Dopamine is inc (Homovanillic Acid), MET24 (Metanephrines), VMA24 (Va Acid).
See:	 Homovanillic Acid, 24 hr Urine Metanephrines Total, 24 hr Urine Vanillylmandelic Acid, 24 hr Urine
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration o Containers
Methodology	Quantitative High Performance Liquid Chromatography- Spectrometry
Analytic Time	1-2 days upon receipt at reference laboratory

CBC (Complete Blood Count)

Laboratory Hematology
Order Code CBC
CPT Code 85027
Collection Medium <table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA)
</tr>
</table>

Minimum Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range <pre>
ADULT RANGES UNLESS NOTED

	Male	Female
WBC*	3.7-10.5 k/mm3	3.7-10.5 k/mm3
Hemoglobin*	13.2-17.7 g/dL	11.9-15.5 g/dL
Hematocrit* (pcv)	40-55%	35-47%
Platelets*	150-400 k/mm3	150-400 k/mm3
Red Blood Count		
18 yr+	4.5-6.2 millions/mm3	4.0-5.2 millions/mm3
11 yr - <18 yr	4.3-5.6 millions/mm3	3.9-5.1 millions/mm3
5 yr - <11 yr	4.3-5.2 millions/mm3	4.1-5.2 millions/mm3
1 yr - <5 yr	3.8-5.5 millions/mm3	3.8-5.2 millions/mm3
6 mo - <1 yr	3.9-5.5 millions/mm3	3.9-5.1 millions/mm3
3 mo - <6 mo**	3.1-5.1 millions/mm3	3.1-5.1 millions/mm3
2 mo - <3 mo**	2.7-4.5 millions/mm3	2.7-4.5 millions/mm3
1 mo - <2 mo**	3.1-5.3 millions/mm3	3.1-5.3 millions/mm3
0 - <1 mo**	3.9-5.9 millions/mm3	3.9-5.9 millions/mm3
RDWCV	9.0-14.5%	9.0-14.5%
RDWSD	35.1-43.9 fL	36.4-46.3 fL
MCV		
18 yr+	82-99 femtoliters	82-99 femtoliters
12 yr - <18 yr	79-95 femtoliters	79-95 femtoliters
6 yr - <12 yr	77-90 femtoliters	77-90 femtoliters
1 yr - <6 yr	75-90 femtoliters	75-90 femtoliters
6 mo - <1 yr	70-85 femtoliters	70-85 femtoliters
3 mo - <6 mo	74-108 femtoliters	74-108 femtoliters
1 mo - <3 mo	91-112 femtoliters	91-112 femtoliters
Birth - <1 mo	88-123 femtoliters	88-123 femtoliters
MPV	9.4-12.3 fL	9.4-12.3 fL
MCH		
18 yr+	25-35 picograms	25-35 picograms
12 yr - <18 yr	25-33 picograms	25-33 picograms
6 yr - <12 yr	25-33 picograms	25-33 picograms
1 yr - <6 yr	23-31 picograms	23-31 picograms
6 mo - <1 yr	23-31 picograms	23-31 picograms
3 mo - <6 mo	25-35 picograms	25-35 picograms
1 mo - <3 mo	27-36 picograms	27-36 picograms
Birth - <1 mo	31-37 picograms	31-37 picograms
MCHC		
18 yr+	32-36 g/dL RBC	32-36 g/dL RBC
1 yr - <18 yr	31-37 g/dL RBC	31-37 g/dL RBC
6 mo - <1 yr	32-36 g/dL RBC	32-36 g/dL RBC
Birth - <6 mo	28-36 g/dL RBC	28-36 g/dL RBC

*A more complete listing of normal ranges based on age and sex are listed under each individual test code.
**Values refer to full term infants.</pre>

Order Form: A-1a General Lab or Epic Req
Comments <pre>
The Hematology Laboratory will make and review a smear if any of the following conditions apply: (1) patient's first CBC sample AND results meet laboratory review criteria; (2) questionable (not necessarily abnormal) CBC results; (3) CBC results are significantly different from that of a previous specimen; (4) a physician specifically requests a smear review by Technologist or a "Pathologist Review Blood Smear".

EDTA samples are saved in the laboratory until 4:00 p.m. the day after receipt. Upon request, a smear could be made up until that time if necessary. However, as the specimen ages, cell disintegration and distortion may occur. Stained smears are held in the laboratories for approximately two months.</pre>

See:	 Blood Smear, Path Morphologic Exam, (Wright St Blood Smear, Technologist Review, (Wright Stai
See Appendix	See Additional Information: Hematology Critical Lab Values Hematology Pedia Ranges
Methodology	<pre> Flow Cytometry hgb = Colorimetric</pre>
Analytic Time	Routine turnaround time is approximately 1 hour.
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

CBC with Automated Differential

Laboratory	Hematology
Order Code	CBCD
CPT Code	85025
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range	<table width="70"> <tr> <td align="left" nowrap="nowrap"> </td> <td align="center" nowrap="nowrap">Adults</td> <td align="center" nowrap="nowrap">Children (5-18 yrs)</td> </tr> <tr> <td align="left" nowrap="nowrap"> </td> <td align="center" nowrap="nowrap">(mm3)</td> <td align="center" nowrap="nowrap">(mm3)</td> </tr> <tr> <td align="left" nowrap="nowrap">Band Neutrophils</td> <td align="center" nowrap="nowrap">-</td> <td align="center" nowrap="nowrap">-</td> </tr> <tr> <td align="left" nowrap="nowrap">Neutrophils</td> <td align="center" nowrap="nowrap">2188-7800</td> <td align="center" nowrap="nowrap">1700-7500</td> </tr> <tr> <td align="left" nowrap="nowrap">Eosinophils</td> <td align="center" nowrap="nowrap">40-390</td> <td align="center" nowrap="nowrap">40-650</td> </tr> <tr> <td align="left" nowrap="nowrap">Basophils</td> <td align="center" nowrap="nowrap">10-136</td> <td align="center" nowrap="nowrap">7-140</td> </tr> <tr> <td align="left" nowrap="nowrap">Monocytes</td> <td align="center" nowrap="nowrap">130-860</td> <td align="center" nowrap="nowrap">28-825</td> </tr> <tr> <td align="left" nowrap="nowrap">Lymphocytes</td> <td align="center" nowrap="nowrap">875-3300</td> <td align="center" nowrap="nowrap">1250-3380</td> </tr> <tr> <td align="left" nowrap="nowrap">Immature Granulocytes</td> <td align="center" nowrap="nowrap">-</td> <td align="center" nowrap="nowrap">-</td> </tr> </table>
Order Form:	A-1a General Lab or Epic Req
Comments	A CBC must be ordered to perform a differential. Hematology instruments are automated differential screening instruments that identify WBC's by their size and staining activity. It performs a complete cell identification that includes neutrophils, lymphocytes, monocytes, basophils, eosinophils and immature granulocytes. The automated instruments count 32,000 white blood cells and statistically provide a more accurate differential count than a manual differential. All differentials will be analyzed on the instrument first. If the results fail the screening criteria, a manual differential will be performed. Pathologist approval is required to perform a manual differential on a specimen with an automated differential that passed the screening criteria.

See Appendix	See Additional Information: Hematology Pediatric Reference Ranges
Methodology	<pre> Flow Cytometry Auto Diff Cytochemical Staining Manual Diff Wright’s Stain</pre>
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

CBFB/MYH11 INV(16) Quantitative RT-PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	INVER16
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	<pre> Requested minimum: 5 mL whole blood or bone marrow Absolute minimum: 2 mL whole blood or bone marrow</pre>
Rejection Criteria:	Hemolysis or Clotted blood
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Clinical Significance</u> This Real-Time Quantitative (Reverse Transcription Polymerase Chain Reaction) for the amplification of CBFB/MYH11 fusion transcript can be used to detect the chromosome aberration of inv (16) or t (16;16). It can be used to detect Minimal Residual Disease (MRD) and assess the risk for disease relapse in inv (16) or t (16;16) Acute Myeloid Leukemia (AML).
Methodology	Real-Time Reverse Transcriptase Polymerase Chain Reaction
Analytic Time	1 week upon receipt at reference laboratory

CD34 Stem Cells

See:	 Stem Cell Quantitation, Peripheral Blood

CD4 Lymphocytes

Laboratory	Flow Cytometry Service
Order Code	CD4/3
CPT Code	86361
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube
Minimum	<pre> Adult: 5 mL whole blood (Lavender) or 6 mL whole blood (Pink) Pediatric: 2 mL whole blood</pre>
Reference Range	<pre> Adult reference ranges for whole blood lysis method by flow cytometry: T Cells (CD4) 34-62% Absolute Counts: 298-2045/mm3 CD3 test is run as an internal quality assurance measure as directed by CDC guidelines. The results of this QA will not be charged. Pediatric reference ranges will be provided with the interpretive report.</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	<pre> Specimens with absolute lymphocyte counts of <100/mm3 will not be tested. Include pertinent clinical information on the requisition. Recent corticosteroid or chemotherapy may invalidate result.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow Cytometry-Whole Blood Lysis
Analytic Time	2 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

CDKL5 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	CDKL5
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	3 mL whole blood; suggest drawing in a 6 mL pink top tube
Reference Range	Technical staff members assess the quality and interpretation of all test results. Following an independent analysis of results by the Director of the Laboratory, a hard copy report will be issued.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Molecular Diagnostic Request Form from Greenwood Genetic Center, with the specimen and the A-1a Miscellaneous Request. Cyclin-dependent kinase-like 5 (CDKL5 or STK9) has been associated with an atypical variant of Rett syndrome, with severe early-onset seizures or infantile spasms, loss of communication and motor skills, and severe mental retardation. The CDKL5/STK9 gene has been localized to Xp22, and mutations in this gene are predominantly seen in females.
Analytic Time	Testing will be completed within 6 weeks of sample receipt in reference laboratory
Testing Schedule	Collect Monday - Thursday, no weekends or holidays.

CDKL5 Gene Analysis Known Familial Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	CDKL5KNM
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	3 mL whole blood; suggest drawing in a 6 mL pink top tube
Reference Range	Technical staff members assess the quality and interpretation of all test results. Following an independent analysis of results by the Director of the Laboratory, a hard copy report will be issued.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Molecular Diagnostic Request Form from Greenwood Genetic Center, with the specimen and the A-1a Miscellaneous Request. Cyclin-dependent kinase-like 5 (CDKL5 or STK9) has been associated with an atypical variant of Rett syndrome, with severe early-onset seizures or infantile spasms, loss of communication and motor skills, and severe mental retardation. The CDKL5/STK9 gene has been localized to Xp22, and mutations in this gene are predominantly seen in females.
Analytic Time	Testing will be completed within 6 weeks of sample receipt in reference laboratory.
Testing Schedule	Collect Monday - Thursday, no weekends or holidays.

CDT Congenital Glycosylation

Laboratory: Commercial Mail-out Laboratory
Order Code: CDG
CPT Code: 82373
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>

Minimum: 0.1 mL of serum
Reference Range:

<pre>

Ratio	Normal	Indeterminate	Abnormal
Transferrin Mono-oligo/Di-oligo Ratio	< or =0.06	0.07-0.09	> or =0.10
Transferrin A-oligo/Di-oligo Ratio	< or =0.011	0.012-0.021	> or =0.022
Transferrin Tri-sialo/Di-oligo Ratio	< or =0.05	0.06-0.12	> or =0.13
Apo CIII-1/Apo CIII-2 Ratio	< or =2.91	2.92-3.68	> or =3.69
Apo CIII-0/Apo CIII-2 Ratio	< or =0.48	0.49-0.68	> or =0.69

</pre>

Order Form: A-1a Miscellaneous Request or Epic Req
Comments: Congenital disorders of glycosylation (CDG), formerly known as carbohydrate-deficient glycoprotein syndrome, are a group of more than 45 inherited metabolic disorders affecting several steps of the pathway involved in the glycosylation of proteins. CDG are classified into 2 groups. Type I CDG is characterized by defects in the assembly or transfer of the dolichol-linked glycan, while type II involves processing defects of the glycan. Apolipoprotein CIII (Apo-CIII) isoforms, a protein with a single core 1 mucin type O-glycosylate protein, is a complementary evaluation for the CDG type II profile. This analysis will evaluate mucin type O-glycosylation, a defect that happens in the Golgi apparatus, and will change the ratios, increasing the asialo or monoisalo forms and decreasing the fully sialilate (disialo) forms. In young children (>1 month) and in liver disease, the Apo-CIII2 may be increased. Children younger than 6 months, and clinically suspected of having ATP6V0A2-CDG, may have normal transferrin profile with abnormal Apo-CIII profile.

<u>Useful For</u>
Screening for congenital disorders of glycosylation.

See:
Carbohydrate Deficient Transferrin, Serum
Methodology: Affinity Chromatography/Mass Spectrometry (MS)
Analytic Time: 5 days upon receipt at reference laboratory

CEA

See:
Carcinoembryonic Antigen, Plasma

CEBPA Full Gene Sequence with Interpretation, Blood

Laboratory	Molecular Pathology
Order Code	CEBPA
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	3 mL of peripheral blood. Specimens for which the AML blast count is at least 20% will be tested. Testing on specimens with a lower blast count may be attempted with approval of lab director. However, such testing is not recommended due to the increased possibility of a false-negative result.
Reference Range	Unaffected samples will lack disease-associated CEBPA mutations, but may harbor previously identified single nucleotide polymorphisms (SNPs) that are reported as incidental findings.
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	In the bone marrow, the CCAAT/enhancer-binding protein, alpha (CEBPA) is a myelomonocytic lineage-specific transcription factor that promotes myeloid differentiation (1). Mutations in the CEBPA gene have been reported in acute myelogenous leukemia (AML; 5-14% of cases) and myelodysplastic syndromes (2-7). In the absence of other genetic lesions known to confer a poor prognosis (e.g., FLT3-ITD mutation), mutations in CEBPA are associated with a favorable prognosis for AML. However, the benefit appears to be restricted to cases in which there are biallelic CEBPA mutations, often consisting of two discrete (compound heterozygous) mutations affecting different functional domains of the CEBPA protein (3-5). A variety of inactivating point mutations, deletions and insertions have been described, requiring evaluation of the entire CEBPA coding sequence. <u>References</u> 1. Zhang P, et al. Immunity 2004;21(6):853-63. 2. Nerlov C. Nature Reviews Cancer 2004;4(5):394-400. 3. Dufour A, et al. J Clin Oncol 2010;28(4):570-7. 4. Wouters BJ, et al. Blood 2009;113(13):3088-91. 5. Taskesan E, et al. Blood 2011;117:2469-75. 6. Gombart AF, et al. Blood 2002;99(4):1332-1340. 7. Shih LY, et al. Clin Cancer Res 2005;11(5):1821-26.
Methodology	PCR amplification of CEBPA-specific fragments followed by DNA cycle sequencing (Sanger method).
Analytic Time	7-10 working days
Testing Schedule	Weekly

CEBPA Full Gene Sequence with Interpretation, Bone Marrow

Laboratory	Molecular Pathology
Order Code	CEBBM
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	2 mL bone marrow aspirate. Specimens for which the AML blast count is at least 20% will be tested. Testing on specimens with a lower blast count may be attempted with approval of lab director. However, such testing is not recommended due to the increased possibility of a false-negative result.
Rejection Criteria:	Blast count less than 20%, hemolyzed, green top, decalcified bone marrow.
Reference Range	Unaffected samples will lack disease-associated CEBPA mutations, but may harbor previously identified single nucleotide polymorphisms (SNPs) that are reported as incidental findings.
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	In the bone marrow, the CCAAT/enhancer-binding protein, alpha (CEBPA) is a myelomonocytic lineage-specific transcription factor that promotes myeloid differentiation (1). Mutations in the CEBPA gene have been reported in acute myelogenous leukemia (AML; 5-14% of cases) and myelodysplastic syndromes (2-7). In the absence of other genetic lesions known to confer a poor prognosis (e.g., FLT3-ITD mutation), mutations in CEBPA are associated with a favorable prognosis for AML. However, the benefit appears to be restricted to cases in which there are biallelic CEBPA mutations, often consisting of two discrete (compound heterozygous) mutations affecting different functional domains of the CEBPA protein (3-5). A variety of inactivating point mutations, deletions and insertions have been described, requiring evaluation of the entire CEBPA coding sequence. <u>References</u> 1. Zhang P, et al. Immunity 2004;21(6):853-63. 2. Nerlov C. Nature Reviews Cancer 2004;4(5):394-400. 3. Dufour A, et al. J Clin Oncol 2010;28(4):570-7. 4. Wouters BJ, et al. Blood 2009;113(13):3088-91. 5. Taskesan E, et al. Blood 2011;117:2469-75. 6. Gombart AF, et al. Blood 2002;99(4):1332-1340. 7. Shih LY, et al. Clin Cancer Res 2005;11(5):1821-26.
Methodology	PCR amplification of CEBPA-specific fragments followed by DNA cycle sequencing (Sanger method).
Analytic Time	7-10 working days
Testing Schedule	Weekly

Celiac Disease

See:	 Deamidated Gliadin Peptide IgA and IgG Antibody, Serum Endomysial IgA Antibody Screen with Reflex Titer and Interpretation, Serum Endomysial IgG Antibody Screen with Reflex Titer and Interpretation, Serum Tissue Transglutaminase, Serum

Celiac Genetic HLA-DQ2/DQ8

Laboratory	Commercial Mail-out Laboratory
Order Code	CELIAC
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	5 mL Whole Blood; suggest drawing TWO 3 mL Lavender EDTA
Reference Range	Anti-gliadin IgG Elisa: <16.3 U/mL Anti-gliadin IgA Elisa: <9.3 U/mL Anti-human tTG IgA Elisa: <10.3 U/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Celiac genetic assessment HLA DQ2/DQ8 Please print, complete and submit the <a href= "http://www.prometheuslabs with the specimen and the A-1a Miscellaneous Request.
Analytic Time	4 working days upon receipt at reference laboratory

Cell Count And Differential

See:	 CBC (Complete Blood Count), Blood

Cell Count and Differential

Laboratory	Hematology
Order Code	CFX
CPT Code	89051
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	1.0 ml; CSF
Reference Range	<pre> WBC Normals 0-1 yrs 0-30/ul 1-5 yrs 0-20/ul 5-13 yrs 0-10/ul adult 0-5/ul</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Includes cell counts, total nucleated cells and RBC and nucleated cell differential if three or more cells are found. The differential is based on the morphologic examination of a wright-stained cytospin preparation. The cells are reported as number per ul; erythrocytes, total nucleated cells, neutrophils, lymphocytes, eosinophils, and a composite group of monocytes-histocytes-macrophages. These slides are retained for approximately 2 months.
Methodology	Hemocytometer/Automated Count and Wright Stain
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cell Culture (Biochemical and Molecular Studies)

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88233, 88240
Minimum	Specimen obtained <u>aseptically</u> according to your protocol. DO NOT PUT SPECIMEN IN ALCOHOL OR FORMALIN OR FREEZE. Label tube with patient name and medical record number.
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	Results of send-out studies will be available from the reference lab. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

CellCept

See:	 Mycophenolic Acid Drug Level, Serum

Centromere B Antibody

Laboratory	Chemistry
Order Code	CENTB
CPT Code	83520
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Plasma Separator Tube</td></tr></table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Reference Range	1.0 AI (antibody index) or less
Order Form:	A-1a General Lab or Epic Req
Comments	New assay introduced February 25, 2013.
See:	 Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum Scl-70 Antibody, Serum
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cerebral Spinal Fluid Cytology

Laboratory	Cytopathology
Minimum	0.5 mL (or 1 microtube) without fixative
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
Comments	The requisition with complete patient history must accompany the specimen. Deliver fresh to the lab in a plastic screw top tube labeled with patient name. Refrigerate if delay in transport. After 1700 daily,weekends and holidays deliver to Specimen Control (6240 RCP).
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	2 days

Cerebrotendinous xanthomatosis

Ceruloplasmin

Laboratory	Chemistry
Order Code	CERU
CPT Code	82390
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer
Reference Range	16-66 mg/dL
Order Form:	A-1a General Lab or Epic Req
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cervical Vaginal Cytology

See:	 Pap Smear, Cervical/Vaginal Smear Pap Test-Liquid Based Collection, Cervical/Endocervical/Vaginal Cells in Fluid Collection Media

CF

See:	 Cystic Fibrosis Mutation Analysis, Whole Blood

CFH Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	CFHR5
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href= "http://www.healthcare.uic from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Oligonucleotide primers have been designed to amplify each exon of CFHR5. Because CFHR5 contains many non-disease causing polymorphisms, it is sequenced directly using overlapping primer sets.
Analytic Time	3 months

CFH Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	CFRH
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href= "http://www.healthcare.uic from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. <u>The reference laboratory offers a known familial variant test. If you want to order the known familial variant version of the test, please order LAB7841</u>.
Methodology	Oligonucleotide primers have been designed to amplify each exon of HF1. Because HF1 contains many non-disease causing polymorphisms, it is sequenced directly using overlapping primer sets.
Analytic Time	3 months

CFI Gene Analysis Full Gene Sequence

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                 Laboratory  Commercial Mail-out Laboratory
                 Order Code  FIMORL
           Collection Medium  <table>
                              <tr>
                              <td align=center></td><td rowspan=2 width=20 align=center>and</td>
                              <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt
                              <tr>
                              <td width="110" valign="top" align="center">Pink top tube</td>
                              <td width="110" valign="top" align="center">Pink top tube</td>
                              </tr>
                              </table>

                     Minimum  <pre>
                              Preferred Minimum:  8 mL whole blood
                              Absolute Minimum:  4 mL whole blood</pre>
             Reference Range  None detected
                 Order Form:  A-1a Miscellaneous Request or Epic Req
                    Comments  <strong>This mailout test requires pathologist approval for orders
                              during inpatient encounters.  Mailouts staff will not process order
                              without approval.  The pathologist covering mailouts approval can be
                              reached at pager #5379.  If approval is given, the name of the
                              pathologist can be selected in the drop-down menu to the right of the
                              approval warning in Epic when ordering the test.</strong><br />
                              <br />
                              Please print, complete and submit the <a href= "http://www.healthcare.uic
                              from the
                              Molecular Otolaryngology & Renal Research Laboratory, to Specimen
                              Control/Mailouts with the specimen and the Epic Requisition.<br />
                              <br />
                              <u>The reference laboratory offers a known familial variant test. If
                              you want to order the known familial variant version of the test,
                              please order LAB7838</u>.

                  Methodology  Oligonucleotide primers have been designed to amplify each exon of
                              CFI.  Because CFI contains many non-disease causing polymorphisms, it
                              is sequenced directly using overlapping primer sets.
                Analytic Time  3 months
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CFTR Gene Alalysis 508 First Plus Reflex

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                 Laboratory  Commercial Mail-out Laboratory
                 Order Code  CF508
           Collection Medium  <table>
                              <tr>
                              <td align=center></td><td rowspan=2 width=20 align=center>and</td>
                              <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt
                              <tr>
                              <td width="110" valign="top" align="center">Pink top tube</td>
                              <td width="110" valign="top" align="center">Pink top tube</td>
                              </tr>
                              </table>

 Alternate Collection Media:  Lavender top tube 3 mL (EDTA)
                     Minimum  <pre>
                              Adult preferred minimum: TWO 6 mL pink (EDTA sprayed) tubes or THREE 4
                              mL lavender top (EDTA) tubes
                              Adult absolute minimum: 3 mL in lavender top (EDTA) tube
                              Pediatric minimum: 2 mL in lavender top (EDTA) tube

                              Blood Spots: Three Blood Spots
                              Absolute minimum: One complete spot of approximately 0.5 inch in
                              diameter on specimen collection paper.</pre>
                 Order Form:  A-1a Miscellaneous Request or Epic Req
                    Comments  Please print, complete and submit the <a href= "http://www.ambrygen.com/s
                              Ambry
                              Genetics with the A-1a Miscellaneous Request.

                         See:  <br />Cystic Fibrosis Amplified, Whole Blood
                              <br />Cystic Fibrosis Del/Dup, Whole Blood
                Analytic Time  4 weeks
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CFTR Gene Analysis CF 102 Screening Panel

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                  Laboratory  Commercial Mail-out Laboratory
                  Order Code  CF102
                    CPT Code  81221
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Pink top tube</td>
                               </tr>
                               </table>

 Alternate Collection Media:  Lavender top tube 3 mL (EDTA)
                     Minimum  <pre>
                               Adult preferred minimum: ONE 6 mL pink (EDTA sprayed) tubes or TWO 4
                               mL lavender top (EDTA) tubes
                               Absolute minimum: 3 mL in lavender top (EDTA) tube

                               Blood Spots: Three Blood Spots
                               Absolute minimum: One complete spot of approximately 0.5 inch in
                               diameter on specimen collection paper.</pre>
                  Order Form:  A-1a Miscellaneous Request or Epic Req
                     Comments  <strong class="style_red">This test is designed for:<br />
                               1. a pateint known or suspected to have CF<br />
                               2. a carrier screen for relatives of CF patient's<br />
                               3. a carrier testing for known familial mutations<br />
                               There are known currently to be 102 mutations in CFTR
                               gene.</strong><br />
                               <br />
                               Please print, complete and submit the <a href= "http://www.ambrygen.com/s
                               Ambry
                               Genetics with the A-1a Miscellaneous Request.

                          See:  <br />CFTR Gene Analysis CF 33 Screening Panel, Whole Blood
                               <br />Cystic Fibrosis Amplified, Whole Blood
                               <br />Cystic Fibrosis Del/Dup, Whole Blood
                Analytic Time  4 weeks upon receipt at reference laboratory
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CFTR Gene Analysis CF 33 Screening Panel

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                  Laboratory  Commercial Mail-out Laboratory
                  Order Code  CF33
                    CPT Code  81220
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Pink top tube</td>
                               </tr>
                               </table>

 Alternate Collection Media:  Lavender top tube 3 mL (EDTA)
                     Minimum  <pre>
                               Adult preferred minimum: ONE 6 mL pink (EDTA sprayed) tubes or TWO 4
                               mL lavender top (EDTA) tubes
                               Absolute minimum: 3 mL in lavender top (EDTA) tube

                               Blood Spots: Three Blood Spots
                               Absolute minimum: One complete spot of approximately 0.5 inch in
                               diameter on specimen collection paper.</pre>
                  Order Form:  A-1a Miscellaneous Request or Epic Req
                     Comments  <strong class="style_red">This test is used to test a patient against
                               the known 33 disease causing mutations on CFTR gene.</strong><br />
                               <br />
                               Please print, complete and submit the <a href= "http://www.ambrygen.com/s
                               Ambry
                               Genetics with the A-1a Miscellaneous Request.

                          See:  <br />CFTR Gene Analysis CF 102 Screening Panel, Whole Blood
                               <br />Cystic Fibrosis Amplified, Whole Blood
                               <br />Cystic Fibrosis Del/Dup, Whole Blood
                Analytic Time  4 weeks upon receipt at reference laboratory
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CH-50

See:
Complement, Total (CH50), Serum

Chain of Custody

See:
Medical/Legal Specimens

Charcot-Marie-Tooth Disease, Axonal type 2B1, CMT2B1

See:
Lamin (LMNA) Full Gene Sequence with Interpretation, Whole Blood

CHD7 Gene Analysis Full Gene Sequence

Laboratory: Commercial Mail-out Laboratory
Order Code: CHD7
Collection Medium:
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<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA)
</tr>
</table>
```

Minimum: 2-5 mL whole blood (EDTA)
Reference Range: Capillary Sequencing
Order Form: A-1a Miscellaneous Request or Epic Req
Comments:
```
<strong>This mailout test requires pathologist approval for orders
during inpatient encounters.  Mailouts staff will not process order
without approval.  The pathologist covering mailouts approval can be
reached at pager #5379.  If approval is given, the name of the
pathologist can be selected in the drop-down menu to the right of the
approval warning in Epic when ordering the test.</strong><br />
<br />
Clinical features:  CHARGE syndrome refers to a specific set of birth
defects, including coloboma of the eye, heart defects, choanal atresia,
mental and growth retardation and ear anomalies or hearing loss.
Congenital anomalies, which when seen together are quite specific to
CHARGE syndrome, include coloboma of the iris, retina, choroid and/or
optic disc with or without microphthalmos; choanal atresia or stenosis;
and hypoplastic semi-circular canals.  Cranial nerve dysfunction is a
minor sign and include anosmia, neurosensory deafness, facial palsy
and swallowing difficulties.  Ear abnormalities involving the helices,
middle ear and inner ear are very common and were seen in 90% of
affected individuals in one study (Stromland, 2005).  Affected
patients may also have genital abnormalities (hypogonadotropic
hypogonadism), pre- and post-natal growth deficiency, hypotonia, and
characteristic hands (broad palms with "hockey-stick" palmar crease,
short fingers and small/unusual thumbs).  The characteristic facial
appearance includes square face with broad prominent forehead, arched
eyebrows, large eyes with or without ptosis, prominent nasal bridge and
columella, flat midface, small mouth and facial asymmetry.  CHARGE
syndrome encompasses additional nonspecific features such as mental
retardation, skeletal abnormalities, hypodontia, orofacial clefting,
tracheoesophageal fistula, and urinary tract and renal anomalies.<br />
<br />
Reasons for referral:<pre>
1. Confirmation of the clinical diagnosis
2. Differential diagnosis from the 22q11 deletion spectrum
   (VCFS/DiGeorge syndrome), VACTERAL association, PAX2 mutations and
   Retinoic embryopathy
3. Development of appropriate evaluation and management plan
4. Genetic counseling
5. Prenatal diagnosis in at-risk pregnancies</pre>
<br />
Please print, complete and submit the following forms to the lab, with
the specimen and the A-1a Miscellaneous Request:  <a
href="http://www.genedx.com/wp-
content/uploads/crm_docs/icd_chd.pdf">Informed Consent for DNA
Testing</a> and the <a href="http://www.genedx.com/wp-content/uploads/crm
Submission Form - Testing Services for Rare Mendelian Disorders</a>
from GeneDx DNA Diagnostic Experts.
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Methodology: See report
Analytic Time: 9-10 weeks upon receipt at reference laboratory

Chitotriosidase (CHITO) for Gaucher clinical drug monitoring

Laboratory	Commercial Mail-out Laboratory
Order Code	GENCHITO
CPT Code	82657, 84155
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Pediatric minimum: 2.0 mL serum Absolute Pediatric minimum: 1.0 mL serum</pre>
Rejection Criteria:	Specimens must be received at reference laboratory within 4 days of specimen collection; do not collect on Fridays, holidays, day before a holiday, or weekends.
Reference Range	4 - 120 nmoles/hr/mL: median=22 nmoles/hr/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> The Chitotriosidase fluorometric enzyme assay uses 4-methylumbelliferyl-beta-D-triacetylchitotrioside as substrate. Testing used for patients on Cerezyme (part of Gaucher Disease clinical drug monitoring including ACE, TRAP and CHITO).</pre>
See:	 Angiotensin Converting Enzyme (ACE) for Gaucher Clinical Drug Monitoring, Serum Tartrate Resistant Acid Phosphatase (TRAP) for Gaucher clinical drug monitoring, Serum
Methodology	Fluorometric enzyme assay
Analytic Time	1 week upon receipt at reference laboratory

Chlamydia Trach Nucleic Acid Amp

Laboratory	Commercial Mail-out Laboratory
Order Code	CDNA
CPT Code	87491
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">APTIMA® Unisex Swab Kit </tr> </table>
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful For</u>: Detection of Chlamydia trachomatis <u>Cautions</u>: This report is intended for use in clinical monitoring or management of patients; it is not intended for use in medico-legal applications. Appropriate specimen collection and handling is necessary for optimal assay performance. Results should be interpreted in conjunction with other laboratory and clinical information. A negative test result does not exclude the possibility of infection. Improper specimen collection, concurrent antibiotic therapy, presence of inhibitors, or low numbers of organisms in the specimen (ie, below the sensitivity of the test) may cause false-negative test results. In low-prevalence populations, positive results must be interpreted carefully as false-positive results may occur more frequently than true- positive results in this setting. In general, this assay should not be used to assess therapeutic success or failure, since nucleic acids from these organisms may persist for 3 weeks or more following antimicrobial therapy. The presence of mucous does not interfere with this assay. However, this test requires endocervical cells, and if excess mucous is not removed prior to collection, adequate numbers of these cells may not be obtained. No interference is expected with swab specimens due to: -Blood -Lubricants and spermicides The effects of use of tampons, douching, specimen types other than those listed in Specimen Required, and specimen collection variables have not been determined. This assay does not detect Chlamydia pneumoniae.
Methodology	Transcription Mediated Amplification
Analytic Time	1 day upon receipt at reference laboratory.
Testing Schedule	Test performed Monday through Saturday.

Chlamydia trachomatis Detection by PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	CHPCR
CPT Code	87491
Collection Medium	<table> <tr> <td align=center></td><t <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Abbott Multi-Collection Devic <td width="110" valign="top" align="center">Sterile container</td> </tr> </table>
Minimum	Specimens must be collected using the multi-Collect Specimen Collection Kit (Hospital Stores No. 46161).
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Refer to the multi-Collect Specimen Collection product insert for detailed sample collection instructions.
Methodology	Polymerase Chain Reaction (PCR)
Analytic Time	6 days
Testing Schedule	Tests are run three times weekly (Monday, Wednesday and Friday).

Chlamydia trachomatis Genital Culture

Laboratory	Commercial Mail-out Laboratory
Order Code	CHLAM
CPT Code	87110 Culture; 87140 Stain
Collection Medium	<table> <tr> <td align=center></td><td <td align=center><a href="javascript:larger_tube('993.jpg')"><img src="/p <tr> <td width="110" valign="top" align="center">Chlamydia/Viral Transport Kit <td width="110" valign="top" align="center">Swab Kit Flexible Nasopharyng </tr> </table>
Minimum	Rectal, eye swab or peritoneal fluid. <u>Also acceptable for newborns</u>: nasopharyngeal aspirate/washing/swab
Rejection Criteria:	Samples not collected in Chlamydia culture transport media. Dry swabs, wood swabs, and calcium alginate swabs.
Reference Range	Culture negative for Chlamydia trachomatis.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Specimens are recommended to be collected in viral transport media; available in Hospital Stores #33595.
Methodology	Cell Culture/Immunofluorescence
Analytic Time	2-3 days upon receipt at reference laboratory.

Chlamydia/Gonorrhea (Mailout by Aptima)

Laboratory	Commercial Mail-out Laboratory
Order Code	CGAMD
CPT Code	87491 Chlamydia trachomatis 87591 Neisseria gonorrhoeae
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Absolute Minimum: 2 mL random urine
Rejection Criteria:	Urine samples not in APTIMA® transport tube. Urine samples submitted will be transferred to Aptima tube for submission to reference laboratory.
Reference Range	Chlamydia trachomatis by Transcription-Mediated Amplification (TMA) - Negative Neisseria gonorrhoeae by Transcription-Mediated Amplification (TMA) - Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Culture is recommended for Chlamydia trachomatis and Neisseria gonorrhoeae detection in cases of suspected sexual abuse or suspected failure of therapy.
Methodology	Qualitative Target Amplification Nucleic Acid Probe
Analytic Time	2 working days upon receipt at reference laboratory

Chlamydia/Gonorrhoeae-Donor

Laboratory	Commercial Mail-out Laboratory
Order Code	GCMN
CPT Code	87491 Chlamydia trachomatis (Chlamydia); 87491 Neisseria Gonorrhoeae (Gonorrhea)
Collection Medium	Miscellaneous container; contact laboratory
Minimum	<pre> Recommended minimum urine (male/female patients): 15-20 mL random urine Absolute minimum urine (male/female patients): 10 mL random urine Endocervical swabs (female patients only) may be submitted on first visit. Urine may also be submitted on female patients for testing.</pre>
Reference Range	<pre> Chlamydia trachomatis (Chlamydia): Negative Neisseria Gonorrhoeae (Gonorrhea): Negative</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Collection kits for urine and endocervical swabs are available from Specimen Control, 6240 RCP, 356-3527.
Methodology	<pre> Chlamydia trachomatis (Chlamydia): Aptima GenProbe-urine (male and/or female) Neisseria Gonorrhoeae (Gonorrhea): Aptima GenProbe-urine (male and/or female) Chlamydia/Gonorrhoeae: Aptima GenProbe: Unisex swab collection kit for endocervical swab specimens (female only) </pre>
Analytic Time	4 days upon receipt at reference laboratory

Chlamydophila (Chlamydia) pneumoniae by PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	CPPCR
CPT Code	87486
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Swab Kit Flexible Nasopharyng </tr> </table>
Minimum	2 mL respiratory specimen in sterile container or swab. Samples submitted to Specimen Control will be transferred to UTM viral transport media.
Rejection Criteria:	Dry swabs and leaking or nonsterile containers. Respiratory aspirates in collection containers with tubing (sample tends to leak from these containers, compromising the specimen).
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Qualitative Polymerase Chain Reaction
Analytic Time	5 days upon receipt at reference laboratory

Chloride

Laboratory	Chemistry
Order Code	CL
CPT Code	82435
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer for pediatric patients
Reference Range	95-107 mEq/l
Order Form:	A-1a General Lab or Epic Req
See:	 Chloride-Other, Body Fluid
Methodology	Ion Selective Electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Chloride-Other

Laboratory	Chemistry
Order Code	CLO
CPT Code	82438
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Chloride, Plasma
Methodology	Ion specific electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Chloride

Laboratory	Critical Care Laboratory
Order Code	CLC
CPT Code	82435
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Heparinized syringe or Green </tr> </table>
Alternate Collection Media:	Light Green top tube (Lithium Heparin)
Minimum	0.5 mL in Lithium/Sodium Heparin syringes
Reference Range	95-107 mEq/L
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Methodology	Ion Selective Electrode
Analytic Time	10 minutes (upon receipt in laboratory)

Chloride-Urine, Random

Laboratory	Chemistry
Order Code	URCL
CPT Code	82436
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL urine, random specimen; no preservative. Do not collect in acid.
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Ion Selective Electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Chloride

Laboratory	Chemistry
Order Code	UCL
CPT Code	82436
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> 24 hr urine; no preservative. Collections other than 24 hr will not be calculated for mEq/24 hr. Do not collect in acid.</pre>
Reference Range	50-250 mEq/24 hr
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Ion Selective Electrode
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cholestanol (Cerebro Xanth)

Laboratory	Commercial Mail-out Laboratory
Order Code	CHOLEST
CPT Code	82542
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Green top tube 4 mL (Na Heparin)
Minimum	1.0 mL plasma
Reference Range	0-8 weeks: 0.89 - 5.18 ug/mL (n=38) >8 weeks: 0.86 - 3.71 ug/mL (n=68)
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Gas Chromatography/Mass Spectrometry (GC/MS)
Analytic Time	2 weeks upon receipt at reference laboratory

Cholesterol, High-Density Lipoprotein

Laboratory	Chemistry
Order Code	HDLP
CPT Code	83718
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer for pediatric patients
Reference Range	>41 mg/dL
Order Form:	A-1a General Lab or Epic Req
Comments	Fasting for at least 8 hours prior to collection is recommended.
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cholesterol, Low-Density Lipoprotein (calculated)

Laboratory	Chemistry
Order Code	LDLC
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or ONE microtainer.
Reference Range	<130 mg/dL (Approved by NCEP, National Cholesterol Education Program) Normal - <100 mg/dL Above Normal - 100-129 mg/dL Borderline High - 130-159 mg/dL High - 160-189 mg/dL Very High - ≥190 mg/dL
Order Form:	A-1a General Lab or Epic Req
Comments	Fasting for at least 8 hours prior to collection is recommended. Cholesterol, Triglyceride and HDL Cholesterol must all be ordered for the Calculated LDL to be completed. The LDL Calculation cannot be done if Triglyceride value > 400 mg/dL. EDTA plasma causes decreased values.
See:	 Low Density Cholesterol Measured, Plasma
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Calculated
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cholesterol-Other

Laboratory	Chemistry
Order Code	CHOLO
CPT Code	82465
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Cholesterol, Plasma
Methodology	Enzymatic colorimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cholesterol

Laboratory	Chemistry
Order Code	CHOL
CPT Code	82465
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or 1 microtainer for pediatric patients
Reference Range	<pre> < 200 mg/dL - desirable 200-240 mg/dL - increase risk above 240 mg/dL - significant increased risk</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Fasting for at least 8 hours prior to collection is recommended.
See:	 Cholesterol-Other, Body Fluid
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Enzymatic Chemiluminescence
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cholinesterase, RBC/Hb Ratio

Laboratory	Commercial Mail-out Laboratory
Order Code	CHERBC
CPT Code	82482
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube
Minimum	Preferred Minimum: 3 mL whole blood in EDTA Lavender top tube Absolute Minimum: 1 mL whole blood in EDTA Lavender top tube
Rejection Criteria:	Frozen, clotted, or hemolyzed samples. Specimens collected in green (sodium or lithium heparin).
Reference Range	25-52 U/g Hb
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Pseudocholinesterase, Total, Serum
Methodology	Quantitative Enzymatic
Analytic Time	1-4 days upon receipt at reference laboratory
Testing Schedule	Testing performed Monday-Friday.

Chorionic Gonad Beta-Subunit

Laboratory	Commercial Mail-out Laboratory
Order Code	CGCSF
CPT Code	84702
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL CSF Absolute <inimum: 0.5 mL CSF
Reference Range	<pre> < or = 1.5 IU/L Tumor markers are not specific for malignancy, and values may vary by method.</pre>
Methodology	Immunoenzymatic Assay
Analytic Time	1 week upon receipt at reference laboratory

Chorionic Gonadotropin

See:	 Pregnancy Test, Qualitative, Plasma

Chorionic Gonadotropin, Total, Human, Quantitative (hCG)

See:	 HCG, Quant-Hum Chor Gon, Plasma

Chorionic Villi Status

Laboratory	Commercial Mail-out Laboratory
Order Code	CVS
CPT Code	88235(x2), 88267, 88280, 88291
Collection Medium	Miscellaneous container; contact laboratory
Order Form:	A-1a Miscellaneous Request or Epic Req
Analytic Time	8 working days upon receipt at reference laboratory

Chromatin Antibody

Laboratory	Chemistry
Order Code	CHROM
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers
Reference Range	1.0 AI (antibody index) or less
Order Form:	A-1a General Lab or Epic Req
Comments	New assay introduced February 25, 2013.
See:	 Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum Double Stranded DNA Antibody, Plasma RNP Antibody, Plasma Ribosomal P Protein, Plasma SS-A Antibody, Plasma SS-B Antibody, Plasma Sm/RNP (Common Motif) Antibodies, Plasma
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Chromium

```
                Laboratory  Commercial Mail-out Laboratory
                Order Code  CRS
                  CPT Code  82495
          Collection Medium  <table>
                             <tr>
                             <td align=center></td></tr>
                             <tr>
                             <td width="110" valign="top" align="center">Royal Blue top tube; serum, n
                             </tr>
                             </table>

                   Minimum  <pre>
                             Preferred minimum:  2.0 mL serum from Royal Blue top tube (no additive)
                             Absolute minimum:  0.5 mL serum from Royal Blue top tube (no
                             additive)</pre>
        Rejection Criteria:  Gel separator tubes
            Reference Range  Less than or equal to 5.0 ug/L
                Order Form:  A-1a Miscellaneous Request or Epic Req
                   Comments  Royal Blue trace metal tube available from Specimen Control, 6240 RCP.

                Methodology  Inductively Coupled Plasma/Mass Spectrometry (DRC)
              Analytic Time  1 week upon receipt at reference laboratory
```

Chromogenic X

```
                Laboratory  Hemostasis/Thrombosis
                Order Code  CH10
                  CPT Code  85260
          Collection Medium  <table>
                             <tr>
                             <td align=center></td></tr>
                             <tr>
                             <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N
                             </tr>
                             </table>

                   Minimum  Full draw; 2.7 mL light blue top
        Rejection Criteria:  Short drawn tube, clot, traumatic tap (excessive hemolysis).
            Reference Range  <pre>
                             Greater than 50%

                             Therapeutic reference range is 11-42%</pre>
                Order Form:  A-1a Miscellaneous Request or Epic Req
                       See:  <br />Factor II Assay, Plasma
               See Appendix  See Additional Information: <br />
                             Phlebotomy Tubes and Order of Draw<br />Specimens Requiring Immediate
                             Delivery
                Methodology  Activity detection by chromogenic substrate
              Analytic Time  24-36 hours
           Testing Schedule  0800-1630 Monday through Friday.  For additional services,
                             contact Clinical Pathology Resident on-call at pager #3404.
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Chromogranin A

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                Laboratory  Commercial Mail-out Laboratory
                Order Code  CGA
                  CPT Code  86316
          Collection Medium  <table>
                             <tr>
                             <td align=center></td></tr>
                             <tr>
                             <td width="110" valign="top" align="center">Red top tube</td>
                             </tr>
                             </table>

                   Minimum  <pre>
                             1 mL serum required
                             Adult and Pediatrics absolute minimum:  0.5 mL serum</pre>
        Rejection Criteria:  Plasma, icteric or lipemic specimens.
            Reference Range  0-95 ng/mL
                Order Form:  A-1a Miscellaneous Request or Epic Req
                Methodology  Enzyme Immunoassay
              Analytic Time  1 week upon receipt at reference laboratory
```

Chromosomal Analysis

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88237, 88262
Minimum	Obtain 3 cc of first-draw aspirate in a bone marrow media tube available from our lab or a green-top vacutainer with sodium heparin. Send the specimen at room temperature. Label tube with patient name and medical record number. (Do NOT use lithium heparin green-top vacutainer). DO NOT FREEZE OR CENTRIFUGE THE SPECIMEN.
Reference Range	Male: 46,XY Female: 46,XX
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	The specimen can be processed to rule out both acquired chromosomal abnormalities (in hematological malignancies) as well as constitutional abnormalities. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See:	 Fluorescence In-Situ Hybridization (FISH-Bone Marrow), Bone Marrow
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Preliminary report is generally given within 24-48 hours in most cases. If you want preliminary results over the weekend (or holiday) on specimens received on Friday, please notify the lab. Otherwise, preliminary results are given on Monday. Allow two weeks for final results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Chromosomal Analysis

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88230, 88262
Minimum	5-10 cc adult, 2 cc infants of venous blood collected in a green-top vacutainer with sodium heparin. Invert tube to mix well. Label tube with patient name and medical record number. DO NOT FREEZE OR CENTRIFUGE.
Reference Range	Male: 46,XY Female: 46,XX
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	If the patient has been transfused, wait a minimum of two weeks before obtaining the specimen. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Allow a minimum of 7-14 days for final results. Preliminary results are given for STAT cases within 48 hours.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Chromosomal Analysis for Fragile X

See:	 FMR1 Gene Analysis Characterization of Alleles with Interpretation, Whole Blood

Chromosomal Analysis

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88237, 88262
Minimum	5-10 cc adult, 2 cc infants of venous blood collected in a green-top vacutainer with sodium heparin. Invert tube to mix well. Label the tube with patient name and medical record number. DO NOT FREEZE OR CENTRIFUGE.
Reference Range	Male: 46,XY Female: 46,XX
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	The specimen can be processed to rule out both acquired chromosomal abnormalities (in hematological malignancies) as well as constitutional abnormalities. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See:	 Fluorescence In-Situ Hybridization (FISH-Hematological Blood), Peripheral Blood
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Preliminary report is given within 24-48 hours in most cases. If you want preliminary results over the weekend or holiday on specimens received on Friday, please notify the lab. Otherwise, preliminary results are given on Monday. Allow two weeks for final results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Chromosomal Analysis

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88233, 88262; 88230, 88262
Minimum	Specimen obtained aseptically according to your protocol. DO NOT PUT SPECIMEN IN ALCOHOL OR FORMALIN OR FREEZE. Label tube with patient name and medical record number.
Reference Range	Male: 46,XY Female: 46,XX
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	Specimen should be collected as soon as possible. In the case of a recently deceased infant (< 24 hours) a blood specimen from a cardiac puncture usually gives a good result. Skin and other tissues obtained more than 48 hours post-mortem have a markedly decreased success rate of cell growth for cytogenetic analysis.<pre> I. Peripheral blood: -Collect 5-10 cc adult, 2 cc infants of blood in a green-top vacutainer with sodium heparin. Invert tube to mix well. DO NOT FREEZE OR CENTRIFUGE. -Deliver specimen to the Cytogenetics Lab (W-101, GH) as soon as possible during work hours (Monday through Friday, 0800-1700). II. Skin, fetal tissue, diaphragm tissue, tumor tissue, other tissue: -Call the Cytogenetics lab for specimen transport tubes with media. If special transport media is not available, sterile Ringers lactate solution can be used. -Specimen should be obtained aseptically. Do not put specimen in alcohol or formalin. Do not freeze or flame or refrigerate. -In cases of abortion, don’t send intact fetus. Send only tissue specimen to the lab (skin, diaphragm, lung, etc). -Label the tube(s) with patient name and medical record number (there should be two identifications). -Specimens should be sent at room temperature. Also call the lab at 319-356-3877 with any questions.</pre> Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Allow 2-3 weeks for blood specimens, and 3-6 weeks for tissue specimens, to obtain final results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Chromosomal Analysis

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88235, 88267
Minimum	Specimen obtained by the referring staff physician. Aseptically obtain 20-30 mg of chorionic villi. Immediately place specimen in the media tube provied. DO NOT FREEZE OR CENTRIFUGE. Immediately send specimen at room temperature. Label tubes with patient name and medical record number.
Reference Range	Male: 46,XY Female: 46,XX
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	A repeat will be requested if there is no cell growth after 10 days. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Allow 10-12 days for results.
Testing Schedule	Direct requests for performing CVS procedure to the Prenatal Clinic in the Department of Obstetrics and Obstetrics (356-3561).

Chromosomal Analysis

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88233, 88262
Minimum	Specimen obtained aseptically according to your protocol. DO NOT SEND INTACT FETUS. Send only tissue specimen to the lab (chorionic villi - first choice; skin, diaphragm, chorion). Multiple tissue sources are acceptable. DO NOT PUT SPECIMEN IN ALCOHOL OR FORMALIN OR FREEZE. Label tube with patient name and medical record number.
Reference Range	Male: 46,XY Female: 46,XX
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Allow 3-6 weeks for final results.

Chromosomal Analysis

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88233, 88262
Minimum	Specimen obtained <u>aseptically</u>, according to your protocol. DO NOT PUT SPECIMEN IN ALCOHOL OR FORMALIN OR FREEZE. Label tube with patient name and medical record number.
Reference Range	Male: 46,XY Female: 46,XX
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Allow 3-6 weeks for results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Chromosomal Analysis

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88230, 88262
Minimum	1-2 cc blood collected in a green-top vacutainer with sodium heparin. Invert tube to mix well. Label the tube with patient name and medical record number. DO NOT FREEZE OR CENTRIFUGE. Specimen should be obtained by the referring staff physician.
Reference Range	Male: 46,XY Female: 46,XX
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Preliminary results are given for STAT cases within 24-72 hours. Allow 7 days for the final results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Chromosomal Analysis

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88235, 88267
Minimum	Specimen obtained by referring staff physician. Aseptically obtain 2 sterile 15 cc tubes (7-10 cc in each tube) of amniotic fluid. DO NOT FREEZE OR CENTRIFUGE. Send specimen at room temperature. Label tube with patient name and medical record number.
Reference Range	Male: 46,XY Female: 46,XX
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	A repeat specimen will be requested if there is no cell growth after 10 days. Questions regarding AFP testing and other prenatal screening tests, call the Prenatal Clinic (356-3561). Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See:	 Chromosomal Analysis, Fetal Blood (Prenatal Diagnosis) Fluorescence In-Situ Hybridization (FISH-Prenatal-Aneuploidy/Microdeletion), Amniocytes, Chorionic Villi
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Allow 10-12 days for results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Chromosomal Breakage Studies

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88230, 88248
Minimum	5-10 cc adult, 2 cc infants (the minimum draw may preclude complete testing, please contact the lab) of venous blood collected in a green-top vacutainer with sodium heparin. Invert tube to mix well. Label the tube with patient name and medical record number. DO NOT FREEZE OR CENTRIFUGE
Reference Range	Male: 46,XY Female: 46,XX Cells with breakage compared to control.
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	Breakage studies are cultured with a concurrent control. If the patient has been transfused, wait a minimum of two weeks before obtaining the specimen. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Allow 2-3 weeks for final results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Chronic Leukemia

See:	 Chronic Lymphocytic Leukemia, Various

Chronic Lymphocytic Leukemia

Laboratory	Flow Cytometry Service
CPT Code	88184, 88185(x20) technical; 88189 professional; T cell or NK cell disorder: 88184, 88185(x15) technical; 88188 professional
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Alternate Collection Media:	Green top tube 4 mL (Na Heparin), Lavender top tube 3 mL (EDTA)
Minimum	<pre> Peripheral Blood: 10 mL Bone Marrow: 2-4 mL yellow top tube (ACD solution A) Fluids and Tissue: Dispense sample into vial of RPMI-1640 tissue culture media.</pre>
Reference Range	<pre> Antibodies routinely included are: CD2, CD3, CD5, CD10, CD11c, CD14, CD19, CD20, CD22, CD23, CD25, CD38, CD45, CD103, CD138, FMC7, Heavy chains, Kappa and Lambda. Antibodies will also identify cases of Prolymphocytic and Hairy Cell Leukemia. If clinical or morphologic features suggest a "T" or "NK" lymphocyte disorder, then the following additional antibody combinations are performed: CD3/CD4/CD8, CD7/CD5/HLA-DR, CD14/CD45, CD25/CD2/CD3, CD16/CD56/CD19, CD57/CD8/CD3, TCR alpha-beta/delta-gamma/CD3. The pathologist will provide an interpretative report.</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	Please state the clinical question to be answered on the requisition. Specimens accepted from Monday 0800 until Friday 1630. Clinical Pathology resident should be contacted if studies are needed emergently at other times.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow Cytometry-Whole Blood Lysis
Analytic Time	2 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Chronic Urticaria (CU) Index

Laboratory	Commercial Mail-out Laboratory
Order Code	CUINDEX
CPT Code	86343, 83088, 86021, 86376, 84443, 86800
Minimum	3 mL serum
Reference Range	The result is reported as an index value. The reference range for a healthy non-CU population is less than 10. Values greater than or equal to 10 indicate that donor basophils were stimulated by patient serum to release histamine. The larger the value the more histamine released.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Ex Vivo Challenge, Cell Culture and Histamine Analysis
Analytic Time	7 working days upon receipt at reference laboratory

Chronic Urticaria (CU) Index Functional

Laboratory	Commercial Mail-out Laboratory
Order Code	CUFUNC
CPT Code	86343, 83088, 86021
Minimum	1 mL serum
Reference Range	The result is reported as an index value. The reference range for a healthy non-CU population is less than 10. Values greater than or equal to 10 indicate that donor basophils were stimulated by patient serum to release histamine. The larger the value the more histamine released.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Ex Vivo Challenge, Cell Culture and Histamine Analysis
Analytic Time	5 days upon receipt at reference laboratory

Chylomicron Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	CHYLO
CPT Code	82664
Collection Medium	Miscellaneous container; contact laboratory
Minimum	<pre> Preferred Minimum: 1 mL body fuild Absolute Miniumum: 0.2 mL body fluid</pre>
Rejection Criteria:	Plasma, serum, or whole blood. Frozen specimens.
Reference Range	Absent
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Electrophoresis
Analytic Time	within 10 days upon receipt at reference laboratory

Circulating Tumor Cells, Prostate

Laboratory	Commercial Mail-out Laboratory
Order Code	CTCP
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">CellSave Preservative Tube</t </tr> </table>
Minimum	Preferred Minimum: TWO 10 mL whole blood in CellSave Preservative Tube
Rejection Criteria:	Clotted whole blood, frozen or refrigerated whole blood, samples over 96 hours from collection.
Reference Range	<pre>A Circulating Tumor Cell (CTC) count of <u></u>5 per 7.5 mL of blood at any time during the course of the disease has been reported to be associated with a poor prognosis and is predictive of shorter Progression Free Survival (PFS) and Overall Survival (OS) in patients with androgen-independent, hormone-resistant prostate cancer. The table lists median PFS and OS based on CTC counts.

Number of CTC	PFS (months)	OS (months)
At all time <5	6.5	>26
Baseline <5; at final draw <u></u>5	4.2	9.3
Baseline <u></u>5; at final draw <5	7.3	21.3
At all time points <u></u>5	2.5	6.8

	CellSearch™ results should be used in conjunction with all clinical information derived from diagnostic tests (i.e., imaging, laboratory tests), physical examination and complete medical history in accordance with appropriate patient management procedures. This prognostic study does not demonstrate that any current line of therapy is any more or less effective than any other or no therapy.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test can detect the presence of circulating tumor cells (CTC) in the peripheral blood of patients with metastatic breast cancer, colorectal or prostate cancer in patients. A count of 5 CTC or more in breast and prostate cancers and 3 CTC or more in colon cancer in 7.5 mL of blood is predictive of shorter progression free survival and overall survival. Physicians can draw samples prior to a new line of therapy for baseline prediction. Physicians can also draw samples at the first follow-up visit for evaluating response to therapy. The Veridex CellSearch System is the only semi-automated system designed to standardize and optimize the measurement of CTC in peripheral blood, this test is also the only FDA approved kit for CTC detection.
Methodology	Veridex CellSearch™
Analytic Time	4 working days upon receipt at reference laboratory

Citalopram Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	CELEXA
CPT Code	80299
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	0.5 mL serum in a plain, red-tope tube
Rejection Criteria:	Gel separator tubes
Reference Range	<pre> R S-CITALOPRAM: 100-250 ng/mL S-CITALOPRAM: 50-130 ng/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)
Analytic Time	1 week upon receipt at reference laboratory

Citric Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	CITU
CPT Code	82507
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	<pre> 4 mL of a 24 hr or random urine from refrigerated collection. Absolute minimum: 0.5 mL</pre>
Reference Range	320 - 1240 mg/d
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Quantitative Enzymatic
Analytic Time	1 week upon receipt at reference laboratory

CK

See:	 Creatine Kinase, Plasma

CKMB

See:	 Troponin T, Plasma

CLL

See:	 Chronic Lymphocytic Leukemia, Various

Clomipramine & Metabolite Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	CLOM
CPT Code	82491 (x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Therapeutic Range: Total clomipramine and norclomipramine: 220 - 500 ng/mL Toxic: > 900 ng/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-3 days upon receipt in reference laboratory.

Clonazepam Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	CLON
CPT Code	80154
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Dose-Related Range: 10 - 75 ng/mL Based on dosages up to 6 mg per day Toxic = > 100 ng/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Methodology	Liquid Chromatography/Tandem Mass Spectrometry
Analytic Time	1-4 days upon receipt at reference laboratory.

Clozapine Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	CLOZ
CPT Code	82486
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	Therapeutic Range: Not well established. Toxic Level: Greater than 2000 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Gel separator tubes are not recommended.
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-3 days upon receipt at reference laboratory

Clozaril

See:	 Clozapine Drug Level, Serum

CMA Array

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	81229, 88291
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	For infants under 1 year of age: 1-2 mL in a lavender (EDTA) For children over 1 year of age: 3-5 mL in a lavender (EDTA) For adults: 5-7 mL in a lavender (EDTA)
Reference Range	Male: arr (1-22)x2, (XY)x1 Female: arr (1-22,x)x2
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	CMA is indicated for patients with normal chromosome analysis and: Unexplained developmental delay or mental retardation Dysmorphic features or congenital anomalies Autism spectrum disorders, seizures, or a clinical presentation suggestive of a chromosomal syndrome CMA is also indicated for individuals with a previously identified chromosomal abnormality: For unbalanced rearrangements, oligo array can be used to size the deletion or duplication, and identify the number of genes involved For 'apparently balanced' rearrangements and an abnormal clinical phenotype, CMA can be used to test for cryptic deletions/ duplications at the breakpoints or at other regions </pre> Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
Methodology	DNA isolated from peripheral blood is hybridized to an Affymetrix array containing oligonucleotide probes across the genome to detect copy number imbalances.
Analytic Time	Final results within 30 days
Testing Schedule	<pre> Specimens are accepted Monday - Friday, 0800-1700. Provide details of clinical information. If the specimen is collected over the weekend, please page the technologist on call by dialing 1-888-533-0186. When it stops ringing, enter your phone number, the '#' sign, and hang up.</pre>

CMV

See:	 CMV IgG Antibody Detection, Plasma CMV IgM Antibody Detection, Plasma Cytomegalovirus (CMV) Quantitation by PCR, Whole Blood, CSF Cytomegalovirus Antigen Detection

CMV by PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	CMVBM
CPT Code	87496
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube
Minimum	<pre> Preferred Minimum: 1 mL bone marrow Absolute Minimum: 0.5 mL bone marrow</pre>
Rejection Criteria:	Nonsterile or leaking containers. Heparinized, frozen, hemolyzed or bone marrow samples or plasma.
Reference Range	<pre> Negative - Cytomegalovirus DNA not detected by PCR. Positive - Cytomegalovirus DNA detected by PCR.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Real Time Polymerase Chain Reaction
Analytic Time	1 week upon receipt at reference laboratory

CMV IgG Antibody Detection

Laboratory	Chemistry
Order Code	CMVG
CPT Code	86644
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers.
Reference Range	Reference range and methodology changed effective 12/11/2012. 0.8 AI or less: Negative - No significant level of detectable CMV IgG antibody. 0.9-1.0 AI: Equivocal - Repeat testing in 10-14 days may be helpful. 1.1 AI or greater: Positive - IgG antibody to CMV detected, which may indicate a current or past CMV infection.
Order Form:	A-1a General Lab or Epic Req
Comments	The best evidence for current infection is a significant change on two appropriately timed specimens, where both tests are done in the same laboratory at the same time.
Methodology	Multiplex Flow Immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

CMV IgM Antibody Detection

Laboratory	Chemistry
Order Code	CMVM
CPT Code	86645
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers.
Reference Range	Reference range and methodology changed effective 12/11/2012. 0.8 AI or less: Negative - No significant level of detectable CMV IgM antibody. 0.9-1.0 AI: Equivocal - Repeat testing in 10-14 days may be helpful. 1.1 AI or greater: Positive - IgM antibody to CMV detected, which may indicate a current or past CMV infection.
Order Form:	A-1a General Lab or Epic Req
Comments	Low levels of CMV IgM antibodies may occasionally persist for more than 12 months post-infection.
Methodology	Multiplex Flow Immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

CMV Rapid Culture

Laboratory	Commercial Mail-out Laboratory
Order Code	CMVCU
CPT Code	87254 Shell vial
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine</td> </tr> </table>
Minimum	Urine in a sterile, leak-proof container.
Rejection Criteria:	Stool, rectal swab, and CSF samples. Whole blood in Viral Transport Media. Dry swabs, wood swabs, calcium alginate swabs, and frozen samples.
Reference Range	Culture negative for CMV by early antigen test.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Cytomegalovirus by PCR is a more sensitive method for the detection of CMV viremia and central nervous system infections, especially in the immunocompromised patient.
Methodology	Cell Culture/Immunofluorescence
Analytic Time	1-5 days upon receipt at reference laboratory

CO2

See:	 Carbon Dioxide (CO2 Content), Plasma

CO2-other

See:	 Carbon Dioxide (CO2 Content)-Other, Body Fluid

Coagulation Factor Inhibitor Quantitation

Laboratory	Hemostasis/Thrombosis
Order Code	IQ*
CPT Code	<pre>

Computer Code	Name	CPT Code
IQ2	Factor II Quant Inhibitor	85335
IQ5	Factor V Quant Inhibitor	85335
IQ7	Factor VII Quant Inhibitor	85335
IQ8	Factor VIII Quant Inhibitor	85335
IQ9	Factor IX Quant Inhibitor	85335</pre>

Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lt_blue_2.7ml.png" c <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; TWO 2.7 mL light blue top. Deliver to lab promptly.
Reference Range	<pre> Negative Quantitates inhibitors > 10 B.U.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Must have Hematology Consult approval from pager 4326. Results expressed in Bethesda units when an inhibitor is detected.</pre>
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Coagulation Factor Inhibitor

Laboratory	Hemostasis/Thrombosis
Order Code	IN*
CPT Code	<pre>

Computer Code | Name | CPT Code

Computer Code	Name	CPT Code
IN2	Factor II Inhibitor	85335
IN5	Factor V Inhibitor	85335
IN7	Factor VII Inhibitor	85335
IN8	Factor VIII Inhibitor	85335
IN9	Factor IX Inhibitor	85335
IN10	Factor X Inhibitor	85335
IN11	Factor XI Inhibitor	85335
IN12	Factor XII Inhibitor	85335</pre>

Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lt_blue_2.7ml.png" c <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; TWO 2.7 mL light blue top
Reference Range	<pre> Negative Quantitates inhibitors up to 10 B.U.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Must have Hematology Consult approval from pager 4326.
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Coagulation Factor V Assay

See:	 Leiden Variant Factor 5 & F2 1199G>A Variant Factor 2 with Interpretation, Whole Blood

Cobalt

Laboratory	Commercial Mail-out Laboratory
Order Code	COS
CPT Code	83018
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	2 mL plasma from royal blue K2 EDTA tube available from Specimen Control, 6240 RCP.
Rejection Criteria:	Separator tubes and specimens that are not separated from the red cells, or clot, within 6 hours.
Reference Range	Less than or equal to 1.0 μg/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Analytic Time	5 days upon receipt at reference laboratory

Cocaine Confirmation

Laboratory	Commercial Mail-out Laboratory
Order Code	COCAC
CPT Code	82520
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 4 mL random urine with no additives or preservatives Absolute Minimum: 2.0 mL random urine with no additives or reservatives
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Requires presumptively positive result on Drugs of Abuse Screen, Urine (see below).
See:	 Drugs of Abuse-Urine, Urine
Methodology	Quantitative Gas Chromatography-Mass Spectrometry/Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-4 days upon receipt at reference laboratory

Cocaine-Urine Screen

Laboratory	Chemistry
Order Code	COCU
CPT Code	80101
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Urine (Random)-BD Vacutainer, no additive yellow top
Minimum	5 mL random urine
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Screen includes cocaine only. For full drug of abuse-urine panel, see "Drug of Abuse Screen". If confirmation is needed for cocaine, call the Laboratory at 356-3527. Allow up to seven days for confirmatory results. Confirmation is at an additional charge. Approximate cut-off concentrations (ng/mL) ---------- Benzoylecgonine (metabolite) 300 Cocaine 21,200 Ecgonine methyl ester (metabolite) 326,000 Lidocaine No cross-reactivity* Procaine No cross-reactivity* *In general, local anesthetics do not cross-react with the cocaine immunoassay. References: Belson MG, Simon HK, Sullivan K, Geller RJ. The Utility of Toxicologic Analysis in Children with Suspected Ingestion. Pediatr Emerg Care 1999;15:383-387. Bast RP, Helmer SD, Henderson SR, Rogers MA, Shapiro WM, Smith RS. Limited Utility of Routine Drug Screening in Trauma Patients. South Med J 2000;93:397-399. Hammett-Stabler CA, Pesce AJ, Cannon DJ. Urine Drug Screening in the Medical Setting. Clinica Chimica Acta 2002;315:125-135. Schiller MJ, Shumway M, Batki SL. Utility of Routine Drug Screening in a Psychiatric Emergency Setting. Psychiatric Services 2000;51:474-478. Sugarman JM, Rodgers GC, Paul RI. Utility of Toxicology Screening in a Pediatric Emergency Department. Pediatric Emergency Care. Pediatric Emergency Care 1997;13(3):194-197.</pre>
See:	 Drugs of Abuse-Urine + Confirm, Urine Drugs of Abuse-Urine, Urine
See Appendix	See Additional Information: Cross Reacting Drugs
Methodology	Assay is based on the kinetic interaction of microparticles in a solution (KIMS) as measured by changes in light transmission.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Coccidioides Antibody (CF)

See:	 Fungal Serology, Serum

Coccidioides Antibody, CF/ID

```
                Laboratory  Commercial Mail-out Laboratory
                Order Code  COCCI
                  CPT Code  <pre>
                            86635 Cocci Ab (CF)
                            86635 Cocci Ab (ID)
                            86635 Cocci Ab, IgG (EIA)
                            86635 Cocci Ab, IgM (EIA)</pre>
          Collection Medium  <table>
                            <tr>
                            <td align=center></td></tr>
                            <tr>
                            <td width="110" valign="top" align="center">Red top tube</td>
                            </tr>
                            </table>

                   Minimum  Preferred Minimum: TWO 1 mL aliquots of serum<br />
                            Absolute Minimum: 0.3 mL serum
       Rejection Criteria:  Lipemic, hemolyzed, or contaminated specimens.  Other body fluid
                            specimens.
          Reference Range  <pre>
                                  Component Name                  Reference Range
                            Coccidioides Antibody by CF:                < 1:2

                            Coccidioides Antibody by ID:             None detected

                            Coccidioides Antibody, IgG by ELISA:
                                                                    0.9 IV or less = Negative
                              Negative-No significant level of Coccidioides IgG antibody detected.
                                                                    1.0-1.4 IV = Equivocal
                              Equivocal-Questionable presence of Coccidioides IgG antibody
                              detected.  Repeat testing in 10-14 days may be helpful
                                                                    1.5 IV or greater = Positive
                              Positive-Presence of IgG antibody to Coccidioides detected,
                              suggestive of current or past infection.

                            Coccidioides Antibody, IgM by ELISA:   0.9 IV or less = Negative
                              Negative-No significant level of Coccidioides IgM antibody detected.
                                                                    1.0-1.4 IV = Equivocal
                              Equivocal-Questionable presence of Coccidioides IgM antibody
                              detected.  Repeat testing in 10-14 days may be helpful.
                                                                    1.5 IV or greater = Positive
                              Positive-Presence of IgM antibody to Coccidioides detected,
                              suggestive of current or recent infection.</pre>
             Order Form:  A-1a Miscellaneous Request or Epic Req
                    See:  <br />Aspergillus spp. Antibody Immunodiffusion, Serum
                          <br />Blastomyces Dermatitidis Abs ID, Serum
                          <br />Coccidioides Antibody, CF/ID, CSF
                          <br />Fungal Serology, Serum
                          <br />Histoplasma Antibodies CF/ID, Serum
             Methodology  Semi-Quantitative Complement Fixation/Qualitative Immunodiffusion/Semi-
                          Quantitative Enzyme-Linked Immunosorbent Assay
           Analytic Time  2-5 days upon receipt at reference laboratory.
```

Coccidioides Antibody, CF/ID

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                 Laboratory  Commercial Mail-out Laboratory
                 Order Code  COCCICSF
                   CPT Code  <pre>
                             86635 Cocci Ab (CF)
                             86635 Cocci Ab (ID)
                             86635 Cocci IgG (EIA)
                             86635 Cocci IgM (EIA)</pre>
           Collection Medium  <table>
                             <tr>
                             <td align=center><a href="javascript:larger_tube('24.jpg')"></a></td></tr
                             <tr>
                             <td width="110" valign="top" align="center">CSF container</td>
                             </tr>
                             </table>

                    Minimum  <pre>
                             Preferred Minimum: TWO 1 mL aliquot CSF
                             Absolute Minimum: TWO 0.3 mL aliquot CSF</pre>
         Rejection Criteria:  Grossly bloody or hemolyzed specimens.
        Reference Range  <pre>
                                Component Name                  Reference Range
                             Coccidioides Antibody by CF:               < 1:2

                             Coccidioides Antibody by ID:            None detected

                             Coccidioides Antibody, IgG by ELISA:
                                                                     0.9 IV or less = Negative
                               Negative-No significant level of Coccidioides IgG antibody detected.
                                                                     1.0-1.4 IV = Equivocal
                               Equivocal-Questionable presence of Coccidioides IgG antibody
                               detected.  Repeat testing in 10-14 days may be helpful
                                                                     1.5 IV or greater = Positive
                               Positive-Presence of IgG antibody to Coccidioides detected,
                               suggestive of current or past infection.

                             Coccidioides Antibody, IgM by ELISA:   0.9 IV or less = Negative
                               Negative-No significant level of Coccidioides IgM antibody detected.
                                                                     1.0-1.4 IV = Equivocal
                               Equivocal-Questionable presence of Coccidioides IgM antibody
                               detected.  Repeat testing in 10-14 days may be helpful.
                                                                     1.5 IV or greater = Positive
                               Positive-Presence of IgM antibody to Coccidioides detected,
                               suggestive of current or recent infection.</pre>
              Order Form:  A-1a Miscellaneous Request or Epic Req
                     See:  <br />Aspergillus spp. Antibody Immunodiffusion, Serum
                             <br />Blastomyces Dermatitidis Abs ID, Serum
                             <br />Coccidioides Antibody, CF/ID, Serum
                             <br />Fungal Serology, Serum
                             <br />Histoplasma Antibodies CF/ID, Serum
              Methodology  Semi-Quantitative Complement Fixation/Qualitative Immunodiffusion/Semi-
                             Quantitative Enzyme-Linked Immunosorbent Assay
            Analytic Time  2-5 days upon receipt at reference laboratory.
```

COCH (Deafness Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	COCH
CPT Code	83891, 83894, 83898 (x12), 83903 (x12), 83904 (x10)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href= "http://www.healthcare.uic Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Screening for COCH is performed via DHPLC and sequencing. Oligonucleotide primers have been designed to amplify each exon. Amplified samples are run on the DHPLC; abnormal elution profiles are sequenced to identify specific mutations. Exons carrying known SNPs are directly sequenced.
Analytic Time	3 months

Coenzyme Q10, Total

Laboratory	Commercial Mail-out Laboratory
Order Code	COENZQ10
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult preferred minimum: 1 mL serum Adult absolute minimum: 0.3 mL serum Pediatric minimum: 0.3 mL serum</pre>
Rejection Criteria:	Specimens other than serum. Hemolyzed specimens. Specimens exposed to repeated freeze thaw cycles.
Reference Range	0.4-1.6 mg/L
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Quantitative High Performance Liquid Chromatography
Analytic Time	1-6 days upon receipt at reference laboratory

COL1A1 & COL1A2 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	COL1A1/2
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">T25 Flask</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	<pre> Two T25 tissue flasks or 10-15 mL whole blood in lavender top (EDTA) tubes. Fibroblasts are grown in the cytogenetic laboratory after a skin punch biopsy. Fibroblasts are then submitted to the commercial laboratory.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Analytic Time	3 months

Cold Agglutinin Titer

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	CAGT
CPT Code	86157
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults - 2 mL Pediatrics - 1 mL</pre>
Rejection Criteria:	Specimen must be labeled with patient's first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Reference Range	Not significant with titer of 32 or less.
Order Form:	DeGowin Blood Center Requisition
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	serial dilution tube test
Analytic Time	Specimens analyzed on day received
Testing Schedule	0700-2200, 7 days a week.

Collagen Type I C-Telopeptide

Laboratory	Commercial Mail-out Laboratory
Order Code	CTX
CPT Code	82523
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL plasma Absolute Minimum: 0.5 mL plasma
Rejection Criteria:	Hemolyzed specimens.
Reference Range	<pre>Effective November 14, 2011 Age Female Male 6 months-6 years 500-1800 pg/mL 500-1700 pg/mL 7-9 years 566-1690 pg/mL 522-1682 pg/mL 10-12 years 503-2077 pg/mL 553-2071 pg/mL 13-15 years 160-1590 pg/mL 485-2468 pg/mL 16-17 years 167-933 pg/mL 276-1546 pg/mL 18-29 years 64-640 pg/mL 87-1200 pg/mL 30-39 years 60-650 pg/mL 70-780 pg/mL 40-49 years 40-465 pg/mL 60-700 pg/mL 50-69 years 40-840 pg/mL 70 years or greater 52-847 pg/mL Postmenopausal 104-1008 pg/mL </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	CTx is useful to assess bone resorption in patients with metabolic bone disease. The test is also useful in monitoring therapy to slow or halt osteoporotic bone loss.
Methodology	Quantitative Electrochemiluminescent Immunoassay
Testing Schedule	1-4 days upon receipt at reference laboratory.

Collagen VI

See:	 Congenital Muscular Dystrophy, Muscle or Skin Biopsy

Complement

See:	 C3 Complement Component, Plasma C4 Complement Component, Plasma C5 Complement Level, Serum

Complement Alternative Pathway

Laboratory	Commercial Mail-out Laboratory
Order Code	RCH50
CPT Code	86162
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.3 mL serum
Rejection Criteria:	Specimen types other than serum. Refrigerated or room temperature specimens. Specimens left to clot at refrigerated temperature. Specimens exposed to repeated freeze/thaw cycles.
Reference Range	Greater than or equal to 127 percent normal
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Semi-Quantitative Radial Immunodiffusion
Analytic Time	7-14 days upon receipt at reference laboratory.

Complement Factor H

Laboratory	Commercial Mail-out Laboratory
Order Code	COMPFH
CPT Code	86160
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	0.5 mL EDTA plasma
Reference Range	Human male: 160-412 mcg/mL Human female: 160-412 mcg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Radial Immunodiffusion (RID)
Analytic Time	within 10 days upon receipt at reference laboratory

Complement, Total (CH50)

Laboratory	Commercial Mail-out Laboratory
Order Code	CH50
CPT Code	86162
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum
Rejection Criteria:	Plasma is not accepted.
Reference Range	Low: 59 CAE Units or less Normal: 60-144 CAE Units High: 145 CAE Units or greater
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	4 working days upon receipt at reference laboratory

Complement, Various Hemolytic Functional Assays

Comments	Complete the A-1a Miscellaneous Request or Epic Req. Blood is referred to a Commercial Laboratory. Draw blood into red top tube, let clot form and transfer on ice to Specimen Control (6240 RCP), within 1 hour or freeze serum at -70C.
See:	 C1 Inhibitor Functional Assay, Serum C1 Inhibitor, Protein, Serum C1q Complement Component Level, Serum or Plasma C2 Complement Component, Serum C3 Nephritic Factor Analysis, Serum C5 Complement Level, Serum Complement Alternative Pathway, Serum Complement Factor H, Plasma Complement, Total (CH50), Serum

Complete Blood Profile

See:	 CBC (Complete Blood Count), Blood

Compound F

See:	 Cortisol, Plasma

Congenital Muscular Dystrophy, 1C (MDC1C) - FKRP Sequencing

See:	 FKRP Full Gene Sequence with Interpretation, Whole Blood

Congenital Muscular Dystrophy

Laboratory	Histopathology
CPT Code	<pre> 88305 Muscle Biopsy (technical and professional) 88346x Number of Immunofluorescent Stains (technical and professional) 88331 Frozen Section H&E (technical and professional)</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Methodology	Immunofluorescence
Analytic Time	1 week
Testing Schedule	0800-1700 Monday through Friday. For additional services, contact the Histopathology Laboratory at 356-2140 or contact Dr. Steve Moore at pager #5197.

Congenital Muscular Dystrophy, 1D

See:	 LARGE Full Gene Sequencing with Interpretation, Peripheral Blood, Muscle Biopsies, Cell Culture

Consult Pathology - Surgical Pathology

Laboratory	Surgical Pathology/Cytopathology Consult
Order Code	CONOSS
Collection Medium	Miscellaneous container; contact laboratory
Minimum	Outside slides with: patient name, hospital#, age, location plus pertinent clinical and laboratory data.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	Slides should be delivered to the Cytopathology Lab, 5222 RCP.
Methodology	Microscopic examination and report on referred slides prepared elsewhere.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Coombs Test

See:	 Antibody Screen, Plasma Direct Antiglobulin Test, Blood

Copper

Laboratory	Commercial Mail-out Laboratory
Order Code	CUU
CPT Code	82525
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 10 mL urine from a well-mixed, refrigerated, 24 hr or random collection Adult Absolute Minimum: 5 mL urine from a well-mixed, refrigerated, 24 hr or random collection</pre>
Rejection Criteria:	Urine collected within 48 hours after administration of a gadolinium (Gd) containing contrast media (may occur with MRI studies). Acid preserved urine.
Reference Range	<pre> Copper, Urine 0.2-8.0 μg/dL Copper, Urine (24-hour) 3-50 μg/d Creatinine (24-hour) Male 3-8 years: 140-700 mg/d 9-12 years: 300-1300 mg/d 13-17 years: 500-2300 mg/d 18-50 years: 1000-2500 mg/d 51-80 years: 800-2100 mg/d 81 years and older: 600-2000 mg/d Female 3-8 years: 140-700 mg/d 9-12 years: 300-1300 mg/d 13-17 years: 400-1600 mg/d 18-50 years: 700-1600 mg/d 51-80 years: 500-1400 mg/d 81 years and older: 400-1300 mg/d Copper per gram of creatinine - No reference interval (μg/g crt) </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Quantitative Inductively Coupled Plasma-Mass Spectrometry
Analytic Time	3 days upon receipt at reference laboratory

Copper

Laboratory	Commercial Mail-out Laboratory
Order Code	CULT
CPT Code	82525
Collection Medium	Miscellaneous container; contact laboratory
Minimum	At least a 1 cm long specimen (obtained with an 18 gauge needle) at 2-8°C. Tissue can be fresh, paraffin-embedded, formalin-fixed, or dried. Specimens other than paraffin-embedded should be stored and transported in a metal-free container such as a royal blue (no additive).
Rejection Criteria:	<pre> Specimens less than 0.25 mg will be rejected. Paraffin blocks that have been processed with Hollande’s stain will be rejected.</pre>
Reference Range	15 - 55 ug/g liver tissue
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Submit to Surgical Pathology 5804 JPP. Iron on Liver Tissue will be ordered if applicable by Pathologist review.
Methodology	Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	1 week upon receipt at reference laboratory

Copper

Laboratory	Commercial Mail-out Laboratory
Order Code	CUS
CPT Code	82525
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL plasma drawn in K2 EDTA royal blue tube
Rejection Criteria:	Separator tubes and specimens that are not separated from the red cells or clot within 6 hours of blood draw.
Reference Range	<pre> Age Male Female 0-10 years 75-153 μg/dL 75-153 μg/dL 11 years-12 years 64-132 μg/dL 64-132 μg/dL 13 years-18 years 57-129 μg/dL 57-129 μg/dL 19 years and older 70-140 μg/dL 80-155 μg/dL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Elevated results from noncertified trace element-free tubes may be due to contamination. Elevated concentrations of trace elements in serum should be confirmed with a second specimen collected in a trace element- free tube, such as royal blue sterile tube (no additive).
Methodology	Quantitative Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	1-3 days upon receipt at reference laboratory

Cordarone

See:	 Amiodarone & Metabolite Drug Level, Serum

Cortisol, Free

Laboratory	Commercial Mail-out Laboratory
Order Code	CORTF
CPT Code	82530
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	2 mL serum collected in a red-top tube (no gel)
Rejection Criteria:	Gross hemolysis • Received room temperature • Serum Separator Tube
Reference Range	<pre> Adult 8:00 A.M.-10:00 A.M. 0.07-0.93 μg/dL 4:00 P.M.-6:00 P.M. 0.04-0.45 μg/dL 10:00 P.M.-11:00 P.M. 0.04-0.35 μg/dL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Measurement of free cortisol is intended for situations where the total cortisol may be significantly affected by decreases in cortisol-binding globulin (e.g., decreased hepatic synthesis, nephrosis) or increases in cortisol-binding globulin (estrogens). Free cortisol is not intended as a first-line screening test for disorders of the adrenocortical axis. <u>Clinical Significance</u> Free cortisol is useful in the detection of patients with Cushing’s syndrome for whom free cortisol concentrations are elevated.
Methodology	Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) • Equilibrium Dialysis
Analytic Time	6-8 days upon receipt at reference laboratory

Cortisol, Urinary Free (HPLC)

Laboratory	Commercial Mail-out Laboratory
Order Code	UFCHPLC
CPT Code	<pre> Cortisol 82530 LC-MS/MS 83789</pre>
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 4 mL aliquot from well mixed 24 hr sample. Absolute Minimum: 1 mL aliquot from well mixed 24 hr sample.
Rejection Criteria:	Room temperature specimens. Acidified specimens or specimens with preservatives.
Reference Range	<pre> Cortisol (μg/day) Female 3-8 years: Less than 18 μg/day 9-12 years: Less than 37 μg/day 13-17 years: Less than 56 μg/day 18 years and older: Less than 45 μg/day Male 3-8 years: Less than 18 μg/day 9-12 years: Less than 37 μg/day 13-17 years: Less than 56 μg/day 18 years and older: Less than 60 μg/day Cortisol/Cortisone, Ratio* Female 0-17 years: To be determined 18 years and older: 0.15-0.50 Male 0-17 years: To be determined 18 years and older: 0.15-0.50 Cortisone Female Value used to calculate Cortisol/Cortisone ratio Cortisol (μg/g crt) Female Prepubertal: Less than 25 μg/g crt 18 years and older: Less than 24 μg/g crt Pregnancy: Less than 59 μg/g crt Male Prepubertal: Less than 25 μg/g crt 18 years and older: Less than 32 μg/g crt *The ratio of the concentrations of cortisol to cortisone will not be evaluated if the cortisol concentration is less than 5 μg/L.</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Reference intervals are based on literature from Taylor R.L. et al., Validation of a High-Throughput Liquid Chromatography-Tandem Mass Spectrometry Method for Urine Cortisol and Cortisone. Clinical Chemistry 2002; 48:1511-19.
See Appendix	See Additional Information: Collection and Preservation of 24-Hour Urine Specimens Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	2 working days upon receipt at reference laboratory

Cortisol

Laboratory	Commercial Mail-out Laboratory
Order Code	SALCT
CPT Code	82530
Collection Medium	Miscellaneous container; contact laboratory
Minimum	1.5 mL freshly collected saliva (use Salivette provided)
Reference Range	11 p.m.-midnight: <100 ng/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Cautions</u>: Acute stress (including hospitalization and surgery), alcoholism, depression, and many drugs (eg, exogenous glucocorticoids, anticonvulsants) can obliterate normal diurnal variation, affect response to suppression/stimulation tests, and cause elevated cortisol levels. Cortisol levels may be increased in pregnancy and with exogenous estrogens. Midnight salivary cortisol assay cannot diagnose hypocortisolism or Addison disease because of the limited sensitivity of the assay method.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)
Analytic Time	4 working days upon receipt at reference laboratory

Cortisol

Laboratory	Chemistry
Order Code	CORT
CPT Code	82533
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers
Reference Range	<pre> AM (7-10) 6.2-19.4 mcg/dL PM (4-8) 2.3-11.9 mcg/dL Significant value: <2.0 mcg/dL</pre>
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	ECL Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Cortisone

See:	 Cortisol, Plasma Cortisol, Urinary Free (HPLC), Urine

Cotinine

See:	 Nicotine & Metabolite, Random Urine

Coxiella burnetii

See:	 Q Fever Ab, IgG &IgM, Serum

CPK

See:	 Creatine Kinase, Plasma

Creatine Kinase-Other

Laboratory	Chemistry
Order Code	CKO
CPT Code	82550
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Creatine Kinase, Plasma
Methodology	Photometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Creatine Kinase

Laboratory	Chemistry
Order Code	CK
CPT Code	82550
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or 1 microtainer for pediatric patients
Reference Range	Male 40-200 u/l; female 35-150 u/l
Order Form:	A-1a General Lab or Epic Req
Comments	Avoid hemolysis.
See:	 Creatine Kinase-Other, Body Fluid
Methodology	Photometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Creatinine Clearance

Laboratory	Chemistry
Order Code	CRCL
CPT Code	82575
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><a href="javascript:larger_tube('26.jpg')"><img src="/pa <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in plasma separator tube and 24 hr urine with no preservative
Reference Range	80-120 mL/min
Order Form:	A-1a General Lab or Epic Req
Comments	In Epic, this is orderable as an order panel (263313) that orders both plasma creatinine (LAB66) and a 24 hr urine creatinine. The plasma creatinine must be collected at some time during the 24 hr urine collection for the creatinine clearance to be calculated. Not corrected for body surface area. Collection other than 24 hr will not be calculated for G/24 hr. mg/dL and clearance will be calculated on any accurately timed urine. Call lab for nomogram for body surface determination.
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Kinetic Colorimetric
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Creatinine-Other

Laboratory	Chemistry
Order Code	CRTO
CPT Code	82570
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Creatinine, Plasma
Methodology	Enzymatic colorimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Creatinine-Urine, Random

Laboratory	Chemistry
Order Code	URCRT
CPT Code	82570
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL urine, random sample; no preservatives.
Reference Range	Units are mg/dL. No established reference range for random urine creatinine measurement. See "Comments" for discussion of urine protein/creatinine ratio.
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> The urine protein/creatinine ratio is automatically calculated if a urine protein and urine creatinine are ordered on the same specimen. The urine protein/creatinine ratio allows for an estimation of proteinuria based on a single random urine collection. A 24 hour urine protein determination remains the recommended true measure of proteinuria. The reference range for the urine protein/creatinine ratio is < 0.2 for 2 years or older. Reference range for the ratio is not established for children less than 2 years old. References: Morgenstern BZ, Butini L, Wollan P, et al. Am J Kid Dis 2003 Apr;41(4):760-766 National Kidney Foundation: Am J Kid Dis 2002;39:S93-S102 (suppl1) Wilson DM, Anderson RL. Am J Clin Pathol 1993;100:419-424</pre>
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Creatinine

Laboratory	Chemistry
Order Code	UCRT
CPT Code	82570
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> 24 hr urine; no preservative. Collection other than 24 hr will not be calculated for G/24 hr.</pre>
Reference Range	<pre> Males: 1.0-2.0 g/24 hr Females: 0.8-1.8 g/24 hr</pre>
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Kinetic Colorimetric
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Creatinine

Laboratory	Chemistry
Order Code	CRT
CPT Code	82565
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or 1 microtainer for pediatric patients
Reference Range	<pre> Premature 0.3 - 1.0 mg/dL Neonates 0.2 - 0.9 mg/dL 2-12 months 0.2 - 0.4 mg/dL 1-2 years 0.2 - 0.5 mg/dL 3-4 years 0.3 - 0.7 mg/dL 5-6 years 0.3 - 0.7 mg/dL 7-8 years 0.2 - 0.6 mg/dL 9-10 years 0.3 - 0.7 mg/dL 11-12 years 0.3 - 0.9 mg/dL 13-15 years 0.4 - 0.9 mg/dL Males 16 years and older 0.6 - 1.2 mg/dL Females 16 years and older 0.5 - 1.0 mg/dL Note: There are gender-specific ranges only for ages 16 years and older.</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Methodology switched from Jaffe method (colorimetric) to enzymatic method on May 10, 2011. This switch also affected estimated glomerular filtration rate (eGFR) calculation. <u>References</u>: 1. National Kidney Foundation 2. National Kidney Disease Education Program (NKDEP) 3. Lamb EJ, Tomson CRV, Roderick PJ. Estimating kidney function in adults using formulae. Ann Clin Biochem 2005; 42:321-345. 4. Junge W, Wilke B, Balabi A, Klein G. Determination of reference intervals for serum creatinine, creatinine excretion, and creatinine clearance with an enzymatic and modified Jaffe method. Clin Chim Acta 2004; 137-148.
See:	 Creatinine-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Pediatric Reference Ranges Glomerular Filtration Rate (GFR)
Methodology	Enzymatic Colorimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Creuztfeld-Jakob Disease Monitor

Comments	<pre> Available as a research test only. Requires ordering physician to access the <a href=" http://www.cjdsurveillance.com">CJD Surveillance, Na On the CJD Surveillance web site, follow the menu to forms for the paperwork necessary and send a CSF (2 mL) and a urine sample (100 mL) to the National Prion Disease Center. In CSF, the analysis searches for the presence of the 14-3-3protein. The 14-3-3 protein is a marker for some prion diseases, such as Creutzfeldt-Jakob Disease (CJD), when a number of other neurodegenerative conditions are excluded. Notify Commercial Mailouts by calling 356-8593 when a sample is being collected for this test. The result for this is faxed directly to the ordering physician. The result will not be placed in Epic. Commercial Mailouts only facilities the collection and shipment of the samples.</pre>

CRMP-5-IgG Antibody

See:	 Paraneoplastic Autoantibody, CSF

Cross-Match, Per Unit

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	EXM
CPT Code	Electronic crossmatch 86923, Immediate spin crossmatch 86920, antiglobulin crossmatch 86922
Collection Medium	 Pink top tube
Order Form:	DeGowin Blood Center Requisition
Comments	Type and screen (ABO and Rh type with antibody screen) must be completed to perform electronic crossmatch (EXM). EXM can only be performed for patients who do not have a history of clinically significant antibodies. Immediate spin crossmatch will be performed for computer downtime in place of electronic crossmatch (EXM). For patients with antibodies, average TAT is at least 75 minutes; emergent at least 45 minutes. An antiglobulin crossmatch is required for most patients with antibodies.
See:	 Type and Screen (T&S), Epic Order Code LAB7602
See Appendix	See Additional Information: Blood Center Services
Methodology	Nonserological for electronic crossmatch and tube test for immediate spin
Analytic Time	15 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Crossmatch Flow Cytometry (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	86825, 86826
Minimum	Three 10 mL yellow top (ACD) tubes AND one 10 mL red top (no additive) from recipient (patient) AND donor.
Comments	Flow Cytometry T & B cell auto and allo crossmatch, current sample only. Each additional sample requires an additional fee. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Flow cytometry
Analytic Time	Verbal report within 24 hours. Resulted in Epic 48 hours. STAT results reported verbally within 5 hours. Resulted in Epic 24 hours.

Crossmatch Flow Cytometry Post Transplant Monitoring (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	86825, 86826
Minimum	Three 10 mL yellow top (ACD) tubes AND one 10 mL red top (no additive) from recipient (patient) AND donor.
Comments	Flow Cytometry T & B cell auto and allo crossmatch, two serum dates with dilutions. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Flow cytometry
Analytic Time	Verbal report within 5 hours. Resulted in Epic 24 hours. STAT results reported verbally within 5 hours. Resulted in Epic 24 hours.

CRP

See:	 C-Reactive Protein (CRP), Plasma

Cryoglobulin Quantitation

Laboratory	Commercial Mail-out Laboratory
Order Code	CRYO
CPT Code	82595 Cryoglobulin; if reflexed for positive cryoglobulins, add 82784 x3 (IgA, IgG, IgM) for quantitative IgA, IgG, and IgM concentrations on the cryoprecitipate.
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 3 mL serum Absolute Minimum: 1 mL serum Proper collection and transport of specimen is critical to the outcome of the assay. Quantities less than 3 mL may affect the sensitivity of the assay.
Rejection Criteria:	Plasma. Refrigerated or frozen specimens. Separator tubes. Grossly hemolyzed or lipemic specimens.
Reference Range	Cryoglobulin, Qualitative - Negative at 72 hours. Immunoglobulin A, Cryoprecipitate - None detected Immunoglobulin G, Cryoprecipitate - None detected Immunoglobulin M, Cryoprecipitate - None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Qualitative Cold Precipitation/Quantitative Nephelometry
Analytic Time	3-5 days upon receipt at reference laboratory.

Cryoglobulin Quantitation & Reflex IFE Typing

Laboratory	Commercial Mail-out Laboratory
Order Code	CRYTYP
CPT Code	82595 Cryoglobulin; if reflexed for positive cryoglobulins, add 86334 for IFE typing and 82784 x3 for the quantitative IgA, IgG, and IgM concentrations on the cryoprecitipate.
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	3 mL serum in red top tube Proper collection and transport of specimen is critical to the outcome of the assay. Quantities less than 3 mL may affect the sensitivity of the assay.
Rejection Criteria:	Plasma. Refrigerated or frozen specimens. Separator tubes. Grossly hemolyzed or lipemic specimens.
Reference Range	Cryoglobulin, Qualitative - Negative at 72 hours. Immunofixation Electrophoresis Gel Normal IFE Immunoglobulin A, Cryoprecipitate - None detected Immunoglobulin G, Cryoprecipitate - None detected Immunoglobulin M, Cryoprecipitate - None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Qualitative Cold Precipitation/ Qualitative IFE/Quantitative Nephelometry
Analytic Time	3-5 days upon receipt at reference laboratory.

Cryptococcus Antigen

Laboratory	Microbiology
Order Code	C CRYP
CPT Code	86403
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL; CSF or serum (red top)
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Latex agglutination antigen detection.
Testing Schedule	24 hrs/day, 7 days a week, including holidays. Results are available within 2 hours.

Cryptosporidium/Giardia

Laboratory	Microbiology
Order Code	C CRGR
CPT Code	87328, 87329
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Detection of Giardia or Cryptosporidium may require more than one specimen. Onset of diarrhea in patients hospitalized for >3 days is usually not attributed to a parasitic infection.
Methodology	Direct Antigen Detection
Analytic Time	12 hours (upon receipt in laboratory)
Testing Schedule	0700-2200, 7 days a week, including holidays.

Crystal Analysis by Polarization Microscopy

Laboratory	Hematology
Order Code	SYNC
CPT Code	89060
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/green_4ml.png" class <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	<pre> 1) several drops in syringe, minimum volume needed; prefer 1 mL in EDTA tube. 2) material removed from tophus by needle core procedure placed in EDTA tube. 3) sodium heparin tube for crystal analysis only, not body fluid counts.</pre>
Reference Range	Absence of monosodium urate (MSU) and calcium pyrophosphate dihydrate (CPPD) crystals.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Results posted in Epic under both Chart Review: Lab tab and Result Review.
Methodology	Wet prep microscopy with polarizer and red compensator
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Crystallographic Analysis

See:	 Calculi Analysis, Calculi specimen (air dried)

CSF

See:	 Cytologic Evaluation, Body Fluid

Culture

See:	 Bacterial Culture Fungal Culture Mycobacterial Culture

Culture Specimen (Delivery Procedure)

Comments	<pre> During routine hours (0700-2245), deliver directly to the Microbiology Laboratory, 6004 BT. All other times deliver to Specimen Control, 6240 RCP.</pre>

Culture-Anaerobic

Laboratory	Microbiology
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre>

Computer code for sterile specimens = C ANA1
Computer code for non-sterile specimens = C ANA2

Tissue or aspirates are preferred rather than swabs. Fluid collections should be aspirated through disinfected tissue or skin. For superficial ulcers, collect material from below the surface (after surface debridement or use a needle and syringe). Submit specimens using anaerobic transport media: BBL Port-A-Cul anaerobic collection jar (MH09109) for tissue or ACT II tube system for fluid and swab specimens (MH07787). A sterile screw-cap container (MH04506) may be used for tissue if transported to the microbiology lab immediately (add drops of sterile saline to keep small pieces of tissue moist).

Anaerobic flora is prevalent on mucosal surfaces of the oral cavity, upper respiratory, gastrointestinal, and genital tracts; specimens collected from these sites should not ordinarily be cultured for anaerobic bacteria.

The following is a list of specimens that are likely to be contaminated with anaerobic normal flora and are NOT routinely accepted for anaerobic culture.

- -Throat or nasopharyngeal swabs
- -Gingival or other intraoral surface swabs
- -Expectorated sputum
- -Sputum obtained by nasotracheal or endotracheal suction
- -Bronchial washings
- -Voided or catheterized urine
- -Vaginal or cervical swabs
- -Gastric and small bowel contents (except for "blind loop" or bacterial overgrowth syndrome)
- -Feces (except for specific etiologic agents such as C. difficile and C. botulinum)
- -Rectal swabs
- -Surface swabs from ulcers and wounds (collect material from below the surface)
- -Material adjacent to a mucous membrane that has not been adequately decontaminated

Questions regarding the proper collection of material for anaerobic cultures should be directed to the Microbiology Laboratory at 356-2591.</pre>

See:	 Bacterial Culture
Analytic Time	Cultures are completed within 3-5 days.
Testing Schedule	0700-1630, 7 days a week, including holidays.

Culture-Bacterial

Laboratory	Microbiology
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
See:	 Bacterial Culture
Analytic Time	Cultures are completed within 3-5 days.
Testing Schedule	0700-2200, 7 days a week, including holidays.

Culture-Blood

Laboratory	Microbiology
Order Code	C BLD
CPT Code	87040
Collection Medium	<table> <tr> <td align=center></td><td <td align=center><a href="javascript:larger_tube('933.jpg')"><img src="/p <tr> <td width="110" valign="top" align="center">Aerobic Blood Culture Bottle <td width="110" valign="top" align="center">Anaerobic Blood Culture Bottl </tr> </table>
Minimum	8-10 mL; adult blood culture bottle (pediatric volume as much as possible)
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
See:	 Bacterial Culture
Methodology	Automated, continuous monitoring.
Analytic Time	Cultures are completed within 5-7 days.
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Culture-Blood-Fungus

See:	 Isolator Blood Culture, Whole Blood

Culture-Enteric Pathogens

See:	 Microbiology: Stool/GI Aspirate, Stool

Culture-Fungus

See:	 Fungal Culture

Culture-Fungus-Blood

See:	 Isolator Blood Culture, Whole Blood

Culture-Group B Strep Screen

Laboratory	Microbiology
Order Code	C GPB
CPT Code	87081
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">ESwab Collection & Transport </tr> </table>
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> A culture used to screen OB or pediatric specimens for Group B Streptococcus. CDC recommends universal prenatal screening for vaginal and rectal GBS colonization of all pregnant women at 35-37 weeks gestation. Swab the lower vagina, followed by the rectum using the same swab. Reference: 1. CDC. Prevention of Perinatal Group B Streptococcal Disease. Revised Guidelines from CDC. MMWR. August 16, 2002; 51(RR-11).</pre>
Analytic Time	Cultures are completed within 2-3 days.
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Culture-Mycobacterial (TB)

See:	 Mycobacterial Culture
Analytic Time	See comments
Testing Schedule	0700-1630, 7 days a week, including holidays.

Culture-Mycology

See:	 Fungal Culture
Testing Schedule	0700-1630, 7 days a week, including holidays.

Culture-Possible N. Gonorrhea

See:	 Bacterial Culture Neisseria gonorrhoeae Culture

Culture-Urine

Laboratory	Microbiology
Order Code	C UR
CPT Code	87086
Collection Medium	Sterile container
Minimum	1.0 ml urine
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
See:	 Bacterial Culture
Analytic Time	Cultures are completed within 2-3 days.
Testing Schedule	0700-2200, 7 days a week, including holidays.

Culture-Yersinia

Laboratory	Microbiology
Order Code	C YER
CPT Code	87046
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Requires special request of 'Yersinia'.
See:	 Bacterial Culture Microbiology: Stool/GI Aspirate, Stool
Analytic Time	Cultures are completed within 2-5 days.
Testing Schedule	0700-2200, 7 days a week, including holidays.

Cyanide

Laboratory	Commercial Mail-out Laboratory
Order Code	CYA
CPT Code	82600
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	Preferred Minimum: 4 mL whole blood Absolute Minimum: 3 mL whole blood
Rejection Criteria:	Serum or plasma. Frozen or refrigerated specimens. Clotted or hemolyzed specimens.
Reference Range	<pre> Non-smokers: Less than 20 μg/dL Smokers: Less than 40 μg/dL Toxic Level: Greater than 100 μg/dL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Ambient: 72 hours (if tighly capped). Sample viability: 2 days only (per reference laboratory) Note: No laboratory test is available to assess cyanide toxicity in patients on nitroprusside therapy. However, thiocyanate toxicity may occur with long-term nitroprusside use (longer than 7-14 days with normal renal function and 3-6 days with renal impairment at greater than 2 μg/kg/min infusion rates). Thiocyanate levels may be monitored on an every other day basis to assess potential thiocyanate toxicity and to indicate possible adjustments in dosage.
Methodology	Quantitative Colorimetric
Analytic Time	3 working days upon receipt at reference laboratory

Cyclobenzaprine (Flexeril) Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	CYCLO
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/green_4ml.png" class <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Alternate Collection Media:	Red top tube
Minimum	Preferred minimum: 2.0 mL serum or plasma (Suggest drawing TWO 4 mL Green top tubes)
Rejection Criteria:	Gel separator tubes.
Reference Range	<pre> 10-30 ng/mL Critical Value: 100 ng/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Trough levels are most reproducible. Indicate specimen type on request form and label specimen appropriately.
Methodology	High Performance Liquid Chromatography with Ultraviolet Detection (HPLC- UV)
Analytic Time	1 week upon receipt at reference laboratory

Cyclosporine

Laboratory	Chemistry
Order Code	CYSP
CPT Code	80158
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	Full 3 mL lavender top (EDTA) tube or ONE lavender top (EDTA) microtube for pediatric patients.
Reference Range	100-300 ng/mL
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Methodology	Chemiluminescent Microparticle Immunoassay (CMIA)
Testing Schedule	Results are available 1200 Monday-Sunday. Samples need to be in lab by 0900 for results at 1200 (daily).

CYP21A2 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	CAHDNA
CPT Code	81405
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	3 mL whole blood in lavender top tube.
Rejection Criteria:	Frozen or heparinized samples.
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Informed Consent for Genetic Testing and the <a href="http://www.mayomedicallaboratories.com/it-mmfiles/CYP21A Information Sheet from Mayo Medical Laboratories with the specimen and the A-1a Miscellaneous Request or Epic Req. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Polymerase Chain Reaction (PCR) Amplification/DNA Sequencing
Analytic Time	5 days upon receipt at reference laboratory
Testing Schedule	Test performed Monday - Friday.

Cystatin C

Laboratory	Chemistry
Order Code	CYSTC
CPT Code	82610
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients.
Reference Range	0-3 months: 0.8-2.3 mg/L 4-11 months: 0.7-1.5 mg/L 1-17 years: 0.5-1.3 mg/L 18 years and older: 0.5-1.0 mg/L
Order Form:	A-1a General Lab or Epic Req
Comments	Cystatin C is produced by all nucleated cells at a constant rate and the production rate in humans is remarkably constant over the entire lifetime. Elimination from the circulation is almost entirely via glomerular filtration. For this reason the serum concentration of cystatin C is independent from muscle mass and gender in the age range 1 to 50 years. Therefore cystatin C in plasma and serum has been proposed as a more sensitive marker for GFR, and several studies, as well as one meta analysis, have suggested that cystatin C is superior to serum creatinine for estimation of GFR. Patient groups which benefit most are those with mild to moderate kidney disease and also those in acute renal failure, where toxic drugs have to be administered which are excreted by glomerular filtration, especially elder people (> 50 years), children, pregnant women with suspicion of pre-eclampsia, diabetics, people with diseases of skeletal muscle and renal transplant recipients. Additionally cystatin C has been discussed in recent literature as a prognostic marker for acute heart failure. <u>References</u>: 1. Levey AS, Coresh J, Balk E, Kausz AT, Levin A, Steffes MW, et al. National Kidney Foundation practice guidelines for chronic kidney disease: evaluation, classification, and stratification. Ann Intern Med 2003;139: 137-47. 2. Rule AD, Larson TS, Bergstralh EJ, Slezak JM, Jacobsen SJ, Cosio FG. Using serum creatinine to estimate glomerular filtration rate: accuracy in good health and in chronic kidney disease. Ann Intern Med 2004;141: 929-37. 3. Wasen E, Isoaho R, Mattila K, Vahlberg T, Kivelä SL, Irjala K. Estimation of glomerular filtration rate in the elderly: a comparison of creatinine based formulae with serum Cystatin C. J Intern Med 2004;256:70-8. 4. Kyhse-Andersen J, Schmidt C, Nordin G, Andersson B, Nilsson-Ehle P, Lindström V. Serum Cystatin C, determined by a rapid, automated particle enhanced turbidimetric method, is a better marker than serum creatinine for glomerular filtration rate. Clin Chem 1994;40:1921-6. 5. Mussap M, Dalla Vestra M, Fioretto P, Saller A, Varagnolo M, Nosadini R. Cystatin C is a more sensitive marker than creatinine for the estimation of GFR in type 2 diabetic patients. Kidney Int 2002; 61:1453-61. 6. Dharnidharka VR, Kwon C, Stevens G. Serum Cystatin C is superior to serum creatinine as a marker of kidney function: a meta analysis. Am J Kidney Dis 2002;40:221-6. 7. Risch L, Drexel H, Huber AR. Differences in glomerular filtration estimates by two cystatin C-based equations. Clinical Chemistry 2005; 51:2211-2212. 8. Grubb A, Nyman U, Björk J, Lindström V, Rippe B, Sterner G, Christensson A. Simple Cystatin C-based prediction equations for glomerular filtration rate compared with the modification of diet in

renal disease prediction equation for adults and the
Counahan-Barratt prediction equations for children.
2005; 51:1420-1431.

Methodology Particle enhanced immunoturbidimetric assay
Analytic Time 1 hour (upon receipt in laboratory)
Testing Schedule 24 hrs/day, 7 days a week, including holidays.

Cystic Fibrosis

See:
Cystic Fibrosis Mutation Analysis, Whole Blood

Cystic Fibrosis Amplified

Laboratory Commercial Mail-out Laboratory
Order Code CFAMP
Collection Medium <table>
<tr>
<td align=center></td><td rowspan=2 width=20 align=center>and</td>
<td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt
<tr>
<td width="110" valign="top" align="center">Pink top tube</td>
<td width="110" valign="top" align="center">Pink top tube</td>
</tr>
</table>

Alternate Collection Media: Lavender top tube 3 mL (EDTA), Yellow top tube (ACD solution A)
Minimum <pre>
Adult preferred minimum: TWO 6 mL pink top (EDTA sprayed) tubes or
THREE 4 mL lavender top (EDTA) tubes
Adult absolute minimum: 3-5 mL in lavender top (EDTA) tube
Pediatric minimum: 2 mL in lavender top (EDTA) tube</pre>
Reference Range Negative
Order Form: A-1a Miscellaneous Request or Epic Req
Comments <pre>
Depending on results of initial testing, the reference laboratory
performing this mailout test can initiate further reflex testing that
will involve additional charges for the patient.

Amplified testing may be reflexed if 508 FIRST is negative.

Cystic Fibrosis Full Gene Sequence Analysis followed by the
deletion/duplication test only if indicated.

Please print, complete and submit the <a href= "http://www.ambrygen.com/s
Ambry
Genetics with the A-1a Miscellaneous Request.</pre>

See:
CFTR Gene Alalysis 508 First Plus Reflex, Whole Blood

Cystic Fibrosis Del/Dup, Whole Blood
Methodology DNA sequencing
Analytic Time 3-5 weeks

Cystic Fibrosis Del/Dup

```
                  Laboratory  Commercial Mail-out Laboratory
                  Order Code  CFDELDUP
            Collection Medium  <table>
                               <tr>
                               <td align=center></td><td rowspan=2 width=20 align=center>and</td>
                               <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt
                               <tr>
                               <td width="110" valign="top" align="center">Pink top tube</td>
                               <td width="110" valign="top" align="center">Pink top tube</td>
                               </tr>
                               </table>

                     Minimum  <pre>
                               Adult Preferred Minimum: TWO 6 mL pink top (EDTA) tubes
                               Adult Absolute Minimum: 3-5 mL in pink top (EDTA) tube
                               Pediatric Minimum: 2 mL in a 3 mL lavender top (EDTA) tube</pre>
                  Order Form:  A-1a Miscellaneous Request or Epic Req
                         See:  <br />CFTR Gene Alalysis 508 First Plus Reflex, Whole Blood
                               <br />Cystic Fibrosis Amplified, Whole Blood
              Analytic Time  3-5 weeks
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Cystic Fibrosis Mutation Analysis

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                  Laboratory  Commercial Mail-out Laboratory
                  Order Code  CFMUT
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Pink top tube</td>
                               </tr>
                               </table>

 Alternate Collection Media:  Yellow top tube (ACD solution A)
                     Minimum  <pre>
                               Cheek cells/brushings or whole blood:
                               Adult minimum: 10-15 mL whole blood from TWO 10 mL lavender top
                               (EDTA)tubes
                               Children minimum: 5-8 mL whole blood from 10 mL lavender top (EDTA)
                               tube</pre>
               Reference Range  Negative for all mutations analyzed
                   Order Form:  A-1a Miscellaneous Request or Epic Req
                      Comments  <pre>
                               Contact Pediatric Genetics with questions regarding genetic counseling.

                               Record patient ethnicity and clinical indication for testing on
                               A-1a Miscellaneous Request or DNA Diagnostic form.</pre>

                Analytic Time  2 weeks upon receipt at reference laboratory
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Cystic Fibrosis Sputum Culture

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                  Laboratory  Microbiology
                  Order Code  C QSP
                    CPT Code  87070
            Collection Medium  Sterile container
          Rejection Criteria:  Specimens from patients who do not have cystic fibrosis.
                  Order Form:  A-1a Clinical Microbiology Laboratory or Epic Req
                     Comments  This culture includes special media to screen for organisms associated
                               with respiratory disease in cystic fibrosis patients. Emphasis is
                               placed on recovery of <em>Pseudomonas aeruginosa</em>,
                               <em>Staphylococcus aureus</em>, <em>Burkholderia cepacia</em> complex,
                               <em>Stenotrophomonas maltophilia</em>, <em>Haemophilus influenzae</em>,
                               and other non-fermenting Gram-negative rods. This culture should only
                               be ordered for cystic fibrosis patients. For a sputum culture on all
                               other patients, order a respiratory culture and indicate sputum as the
                               source.

                Analytic Time  <pre>
                               Not routinely available; special arrangements required.  Cultures are
                               completed within 5-7 days.</pre>
              Testing Schedule  0700-2200, 7 days a week, including holidays.
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Cysticercosis Ab, IgG, WB

Laboratory	Commercial Mail-out Laboratory
Order Code	CYSTCSF
CPT Code	86682
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	<pre> Adult Minimum: 3 mL CSF Adult Absolute Minimum: 0.4 mL CSF Pediatric Minimum: 0.4 mL CSF</pre>
Rejection Criteria:	Contaminated and heat-inactivated specimens.
Reference Range	<pre> Negative: No significant level of detectable T. solium IgG antibody. Positive: IgG antibody to T. solium detected suggestive of current or past infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Western Blot
Analytic Time	within 10 days upon receipt at reference laboratory

Cystine, Quantitative, Urine

Laboratory	Commercial Mail-out Laboratory
Order Code	CYSTU
CPT Code	82131
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 8 mL random urine collection Absolute Minimum: 3 mL random urine collection
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Screen for Cystine only. Deliver to Specimen Control 6240 RCP. Please print, complete and submit the <a href= http://www.aruplab.com/gui for Biochemical Genetic Testing form from ARUP to the lab with the specimen and the A-1a Miscellaneous Request.
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers Urine Tests Requiring no Preservatives
Methodology	Liquid Chromatography/Tandem Mass Spectromoetry
Analytic Time	3-7 days upon receipt at reference laboratory

Cytogenetics

See:	 Cell Culture (Biochemical and Molecular Studies), Amniotic Fluid, Skin, Fetal Tissue, Diaphragm, Other Tissue Chromosomal Analysis, Amniotic Fluid Chromosomal Analysis, Bone Marrow (for acquired and constitutional abnormalities) Chromosomal Analysis, Chorionic Villi (CV) Chromosomal Analysis, Fetal Blood (Prenatal Diagnosis) Chromosomal Analysis, Peripheral Blood for Hematological Disorders Chromosomal Analysis, Peripheral Blood, Cord Blood Chromosomal Analysis, Product of Conception (POC) Chromosomal Analysis, Skin or Internal Tissue or Blood from Autopsy Chromosomal Analysis, Skin, Other Tissue Chromosomal Breakage Studies, Peripheral Blood

Cytokine

See:	 Interleukin Secretion, Whole Blood

Cytokine Panel 12 by MAFD

Laboratory	Commercial Mail-out Laboratory
Order Code	CYT12SE
CPT Code	83520 x12
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Light Green top tube (Lithium Heparin)
Minimum	<pre> Adult Preferred Minimum: 1 mL serum or plasma Adult/Pediatric Absolute Minimum: 0.3 mL serum or plasma</pre>
Rejection Criteria:	Heat inactivated, refrigerated or contaminated specimens.
Reference Range	<pre>

Components	Reference Interval
Interleukin 2 Receptor by MAFD	0-1033 pg/mL
Interleukin 12 by MAFD	0-6 pg/mL
Interferon gamma by MAFD	0-5 pg/mL
Interleukin 4 by MAFD	0-5 pg/mL
Interleukin 5 by MAFD	0-5 pg/mL
Interleukin 10 by MAFD	0-18 pg/mL
Interleukin 13 by MAFD	0-5 pg/mL
Interleukin 1 beta by MAFD	0-36 pg/mL
Interleukin 6 by MAFD	0-5 pg/mL
Interleukin 8 by MAFD	0-5 pg/mL
Tumor Necrosis Factor - alpha	0-22 pg/mL
Interleukin 2 by MAFD	0-12 pg/mL</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Multi-Analyte Fluorescent Detection
Analytic Time	5 days upon receipt at reference laboratory

Cytologic Evaluation

Laboratory	Cytopathology
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
Comments	The requisition with complete patient history must accompany the specimen. Deliver fresh to the lab in a clean, secure container, appropriate to quantity of material obtained. Label container with patient name. Refrigerate if delay in transport. After 1700 daily, weekends and holidays deliver to Specimen Control (6240 RCP).
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	2 days

Cytologic Examination

Laboratory	Cytopathology
Minimum	Place specimen and collection brush in a secure container with 50% ETOH. Label container with patient name. Specimens must be obtained by endoscopy. Call 356-4901 for appointment.
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
Comments	The requisition with complete patient history must accompany specimen.
Analytic Time	2 days

Cytology Examination

See:	 Aspirated Knee/Joint/Cyst, Fluid Breast Nipple Discharge, Breast Nipple Discharge Bronchial Brush Cytology, Bronchial Brush Bronchial Wash Cytology, Bronchial Wash Bronchioalveolar Lavage (BAL) for Cancer Evaluation, Bronchioalveolar Lavage Cerebral Spinal Fluid Cytology, CSF Cytologic Evaluation, Body Fluid Cytologic Examination, Esophagus, Colon or Gastric Fluid Fat Pad Aspiration, for Amyloid, Aspiration Fine Needle Aspiration (FNA), Radiologic Guided Fine Needle Aspiration (FNA), Superficial Peritoneal Wash, for Cancer Evaluation Spontaneous Sputum for Cancer Evaluation, Sputum Urine Cytology, Urine

Cytomegalovirus (CMV) Qualitative by PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	CMVQL
CPT Code	87496
Collection Medium	Sterile container
Minimum	2.0 mL BAL or 1 mL amniotic fluid
Reference Range	Negative
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Submit to the lab as soon as possible. Specimens stored at 4°C will be accepted up to 72 hours after collection. Testing requires a dedicated tube.
Methodology	Real-Time Polymerase Chain Reaction (PCR)
Analytic Time	1-4 days
Testing Schedule	Batch analysis performed daily Monday through Friday. Sample must be received by the Molecular Pathology Laboratory by 1200 for same day testing. Specimens received on the weekend are analyzed on Monday. For additional services, contact Microbiology Resident on-call at pager #4903 weekdays; pager #3404 evenings and weekends.

Cytomegalovirus (CMV) Quantitation by PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	CMVPCR
CPT Code	87497
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Pink top tube</td></tr></table>
Minimum	Adult Preferred Minimum: 5 mL whole blood from pink top (K2-EDTA) tube Adult Absolute Minimum: 3 mL whole blood from pink top (K2-EDTA) tube Pediatric Minimum: 1 mL whole blood from pink top (K2-EDTA) tube
Reference Range	Negative Reportable linear range of 200 - 2,000,000 copy/mL Positive results less than 200 copy/mL will be reported as "POS <200 CPM" and negative results will be reported as "Negative".
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Submit to the lab as soon as possible. Specimens stored at 4°C will be accepted up to 72 hours after collection. Testing requires a dedicated tube.
Methodology	Real-Time Polymerase Chain Reaction (PCR)
Analytic Time	1-4 days
Testing Schedule	Batch analysis performed daily Monday through Friday. Sample must be received by the Molecular Pathology Laboratory by 1200 for same day testing. Specimens received on the weekend are analyzed on Monday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Cytomegalovirus Antigen Detection

Comments	The CMV Quantitative PCR assay will be performed on specimens submitted with an order for CMV pp65 antigenemia testing.
See:	 Cytomegalovirus (CMV) Quantitation by PCR, Whole Blood, CSF

Cytomegalovirus by PCR, Vitreous

Laboratory	Commercial Mail-out Laboratory
Order Code	CMVPR
CPT Code	87496
Collection Medium	Sterile container
Minimum	0.2-0.3 mL (This amount of sample will perform from 1 up to 4 viral tests).
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Useful for rapid qualitative detection of cytomegalovirus (CMV) DNA in specimens for laboratory diagnosis of disease due to this virus. <u>Cautions</u>: A negative result does not eliminate the possibility of cytomegalovirus (CMV) infection. This assay is only to be used for patients with a clinical history and symptoms consistent with CMV infection, and must be interpreted in the context of the clinical picture. This test should not be used to screen asymptomatic patients.
See:	 Herpes Simplex Virus PCR, Vitreous, Vitreous Toxoplasma gondii PCR, Vitreous, Vitreous Varicella-Zoster Virus PCR, Vitreous, Vitreous
Methodology	Real-Time Polymerase Chain Reaction (PCR)/DNA Probe Hybridization
Analytic Time	24 hours upon receipt at reference laboratory

Cytomegalovirus IgG Avidity

Laboratory	Commercial Mail-out Laboratory
Order Code	CMVGAVID
CPT Code	86644(x2)
Minimum	<pre>Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.25 mL serum</pre>
Reference Range	>= 0.60
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre>Discrimination between recent (primary) and past cytomegalovirus (CMV) infection can be an important tool in the clinical management of transplant recipients and pregnant women. Although nearly all individuals with recent CMV infection are positive for CMV IgM, individuals with past CMV may also express CMV IgM following viral reactivation; thus, detection of CMV IgM is not a reliable indicator of recent infection. Measurement of CMV IgG avidity can assist in discriminating recent from past CMV infection. Although a low avidity index is a reliable indicator of CMV infection within the previous 6 months, a high avidity index is more meaningful from a clinical standpoint; a high avidity index essentially excludes the possibility that infection occurred within the previous 4 months. In summary, assessment of CMV-specific IgG avidity is an extremely powerful tool for estimating the time of CMV infection. Such information is particularly important in the clinical management of pregnant women found to be positive for CMV antibodies at their first prenatal visit. Determining the time of primary infection can help guide decisions regarding antiviral therapy by identifying those women who should or should not be treated during pregnancy. CMV IgG avidity measurement also has broad applicability to the management of other patient groups with an increased risk of debilitating CMV disease, such as solid organ transplant recipients. Approximately 50% of pregnant women with primary CMV infection transmit CMV to their infants. Measuring CMV IgG avidity can reliably distinguish primary infection from active latent infection during pregnancy. See reference laboratory’s <a href=" http://www.focusdx.com/techsheets/CM
Methodology	Enzyme Linked Immunosorbent Assay (ELISA)
Analytic Time	5 days upon receipt at reference laboratory

Cytomegalovirus Rapid Culture

Laboratory	Commercial Mail-out Laboratory
Order Code	CMVC
CPT Code	87254 Shell vial
Collection Medium	<table> <tr> <td align=center></td><td <td align=center><a href="javascript:larger_tube('994.jpg')"><img src="/p <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Chlamydia/Viral Transport Kit <td width="110" valign="top" align="center">Swab Kit Straight HSV--VZV/Vi <td width="110" valign="top" align="center">Sterile container</td> </tr> </table>
Minimum	Specimen source is required. Bronchoalveolar lavage, or urine in a sterile, leak-proof container. Tissue, colon biopsy, or throat swab in viral transport media.
Rejection Criteria:	Stool, rectal swab, and CSF samples. Whole blood, dry swabs, wood swabs, calcium alginate swabs, and frozen samples.
Reference Range	Culture negative for CMV by early antigen test.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Cytomegalovirus by PCR is a more sensitive method for the detection of CMV viremia and central nervous system infections, especially in the immunocompromised patient.
Methodology	Cell Culture/Immunofluorescence
Analytic Time	1-5 days upon receipt at reference laboratory.

Cytospin Morphology

See:	 Pathologist Cytospin Review, Body Fluid Pathologist Cytospin Review, CSF

D

D-Dimer

Laboratory	Chemistry
Order Code	DDI
CPT Code	85380
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or 1 microtainer for pediatric patients.
Reference Range	<0.50 mcg/mL Fibrinogen Equivalent Units (FEU)
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

D-Lactate

Laboratory	Commercial Mail-out Laboratory
Order Code	D-LAC
CPT Code	83605
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Gray top tube (Fluoride)</td> </tr> </table>
Minimum	1.0 mL
Reference Range	0.0-0.25 mmol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Enzymatic
Analytic Time	1 week upon receipt at reference laboratory

DALA

See:	 Aminolevulinic Acid, Urine (24 hour or random)

DAZ/SRY Gene Analysis Common Deletions

Laboratory	Commercial Mail-out Laboratory
Order Code	YCM
CPT Code	81403
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	20 mL whole blood, suggest drawing THREE 6 mL pink K2EDTA tubes
Reference Range	Y Chromosome intact
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Contact Specimen Control 356-3527 for Y Chromosome Microdeletion Analysis information sheet required for referral laboratory. Draw Monday through Thursday only. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	<pre> Polymerase Chain Reaction Gel Electrophoresis</pre>
Analytic Time	2 weeks upon receipt at reference laboratory

Deamidated Gliadin Peptide IgA and IgG Antibody

Laboratory	Immunopathology
Order Code	GLDN
CPT Code	83520 (IgA and IgG)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL; red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	<pre> IgA and IgG (all ages) Negative: <20 units Weak Positive: 20-30 units Moderate to Strong Positive: >30 units</pre>
Comments	The results will be obtained with the INOVA QUANTA Lite™ ELISA. Assay values obtained with different manufacturers' methods may not be used interchangeably. The magnitude of the reported antibody levels can not be correlated to an endpoint titer.
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	1 week

7-Dehydrocholesterol

Laboratory	Commercial Mail-out Laboratory
Order Code	7DHCH
CPT Code	82541
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Alternate Collection Media:	Pink top tube
Minimum	<pre> Preferred minimum: 1 mL sodium heparin plasma from a fasting patient Absolute minimum: 0.2 mL</pre>
Reference Range	<pre> Negative (reported as positive or negative) Quantitative results are provided when positive</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The enzymatic tests for measuring plasma cholesterol quantitate all 3 hydroxysterols and are unreliable for diagnosis for SLO.
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Gas Chromatography-Mass Spectrometry (GC-MS)
Analytic Time	within 10 days upon receipt at reference laboratory

Dehydroepiandrosterone Sulfate

Laboratory	Chemistry
Order Code	DHEAS
CPT Code	82627
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers.
Reference Range	<pre>

Age	Male ug/dL	Female ug/dL
0-6 days	108-607	108-607
7-30 days	32-431	32-431
1-5 months	3-124	3-124
6-35 months	0-33	0-29
3-6 years	0-44	0-47
7-9 years	5-115	5-94
10-14 years	22-332	22-255
15-19 years	88-483	63-373
20-29 years	280-640	65-380
30-39 years	120-520	45-270
40-49 years	95-530	32-240
50-59 years	70-310	26-200
60-69 years	42-290	13-130
70 years and older	28-175	10-90
Tanner Stage I	7-209	7-126
Tanner Stage II	28-260	13-241
Tanner Stage III	39-390	32-446
Tanner Stage IV & V	81-488	65-371</pre>

Order Form:	A-1a General Lab or Epic Req
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Dehydroepiandrosterone

Laboratory	Commercial Mail-out Laboratory
Order Code	DHEA
CPT Code	82626
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	0.5 mL serum
Rejection Criteria:	Samples received in SST tubes.
Reference Range	DHEA (UOM ng/dL) Adult Reference Ranges for DHEA, Unconjugated, LC/MS/MS: Males: 61-1636 ng/dL Females: 102-1185 ng/dL Pediatric Reference Ranges for DHEA, Unconjugated, LC/MS/MS: <1 year: No Range Established For This Age Group 1-5 years: < or = 377 ng/dL 6-9 years: 19-592 ng/dL 10-13 years: 42-1067 ng/dL 14-17 years: 137-1489 ng/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	DHEA is a weakly androgenic steroid that is useful when congenital adrenal hyperplasia is suspected. It is also useful in determining the source of androgens in hyperandrogenic conditions, such as polycystic ovarian syndrome and adrenal tumors.
See:	 Dehydroepiandrosterone Sulfate, Plasma
Methodology	Liquid Chromatography/Tandem Mass Spectrometry (LCMSMS)
Analytic Time	4 working days upon receipt at reference laboratory

Delta Aminolevulinic Acid

See:	 Aminolevulinic Acid, Urine (24 hour or random)

Delta Od 450

See:	 Amniotic Fluid Bilirubin (Delta Abs 450)

Dengue Fever Virus Ab, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	DENG
CPT Code	86790
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Adult Minimum: 1.0 mL serum Absolute Adult Minimum: 0.2 mL serum</pre>
Rejection Criteria:	Severely lipemic, contaminated, heat-inactivated, or hemolyzed specimens.
Reference Range	<pre> 1.64 IV or less: Negative - No significant level of detectable dengue fever virus IgG antibody. 1.65-2.84 IV: Equivocal - Questionable presence of antibodies. Repeat testing in 10-14 days may be helpful. 2.85 IV or greater: Positive - IgG antibody to dengue fever virus detected, which may indicate a current or past infection. </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Acute and convalescent specimens must be labeled as such paralled testing is preferred and convalescent sample must be received within 30 days of acute.
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	2 weeks upon receipt at reference laboratory

Dengue Fever Virus Ab, IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	DENM
CPT Code	86790
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 1.0 mL serum Absolute Adult Minimum: 0.2 mL serum</pre>
Rejection Criteria:	Severely lipemic, contaminated, heat-inactivated, or hemolyzed specimens.
Reference Range	<pre> 1.64 IV or less: Negative - No significant level of detectable dengue fever virus IgM antibody. 1.65-2.84 IV: Equivocal - Questionable presence of antibodies. Repeat testing in 10-14 days may be helpful. 2.85 IV or greater: Positive - IgM antibody to dengue fever virus detected, which may indicate a current or recent infection. However, low levels of IgM antibodies may occasionally persist for more than 12 months post-infection. </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Acute and convalescent specimens must be labeled as such; parallel testing preferred. Convalescent sample must be received within 30 ays of acute.
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	2 weeks upon receipt at reference laboratory

Dengue Fever Virus Antibodies, IgG & IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	DENGUE
CPT Code	86790(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 1 mL serum Adult Absolute Minimum: 0.3 mL serum Pediatric Minimum: 0.1 mL serum</pre>
Rejection Criteria:	Severely lipemic, contaminated, heat-inactivated, or hemolyzed specimens.
Reference Range	<pre> Dengue Fever Virus Antibody, IgG 1.64 IV or less: Negative - No significant level of detectable dengue fever virus IgG antibody. 1.65-2.84 IV: Equivocal - Questionable presence of antibodies. Repeat testing in 10-14 days may be helpful. 2.85 IV or greater: Positive - IgG antibody to dengue fever virus detected, which may indicate a current or past infection. Dengue Fever Virus Antibody, IgM 1.64 IV or less: Negative - No significant level of detectable dengue fever virus IgM antibody. 1.65-2.84 IV: Equivocal - Questionable presence of antibodies. Repeat testing in 10-14 days may be helpful. 2.85 IV or greater: Positive - IgM antibody to dengue fever virus detected, which may indicate a current or recent infection. However, low levels of IgM antibodies may occasionally persist for more than 12 months post-infection. </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Acute anc convalescent specimens must be labeled as such paralled testing is preferred and convalescent sample must be received within 30 days of acute.
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	2 weeks upon receipt at reference laboratory

Deoxycorticosterone (DOC)

Laboratory	Commercial Mail-out Laboratory
Order Code	DOC
CPT Code	82633
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.25 mL serum (allows for one run only at reference lab).
Rejection Criteria:	Hemolysis, gross lipemia, serum separator tubes, gross icteria, animal specimen
Reference Range	<pre> Male ≥18 Years ≤15 ng/dL Female-Phase of Menstrual Cycle Mid Follicular ≤18 ng/dL Surge ≤23 ng/dL Mid Luteal ≤19 ng/dL Pediatric 16-17 Years ≤35 ng/dL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Clinical Significance Deoxycorticosterone (DOC) is a weak mineralocorticoid derived from 21-hydroxylation of progesterone in the adrenal cortex.
Methodology	Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)
Analytic Time	Sets up 3 days a week at reference laboratory; reports within 4-7 days from set-up.

11-Deoxycortisol Quantitative

Laboratory	Commercial Mail-out Laboratory
Order Code	SCOMPS
CPT Code	82634
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.3 mL serum; does not allow repeat testing
Rejection Criteria:	Grossly hemolyzed specimens.
Reference Range	<u>Females</u> Premature (26-28 weeks): 110-1376 ng/dL Premature (29-36 weeks): 70-455 ng/dL Full Term (1-5 months): 10-200 ng/dL 6-11 months: 10-276 ng/dL 1-3 years: 7-247 ng/dL 4-6 years: 8-291 ng/dL 7-9 years: Less than or equal to 94 ng/dL 10-12 years: Less than or equal to 123 ng/dL 13-15 years: Less than or equal to 107 ng/dL 16-17 years: Less than or equal to 47 ng/dL 18 years and older: Less than 33 ng/dL Tanner Stage I: Less than or equal to 94 ng/dL Tanner Stage II: Less than or equal to 136 ng/dL Tanner Stage III: Less than or equal to 99 ng/dL Tanner Stage IV & V: Less than or equal to 50 ng/dL After metyrapone stimulation: Greater than 8000 ng/dL <u>Males</u> Premature (26-28 weeks): 110-1376 ng/dL Premature (29-36 weeks): 70-455 ng/dL Full Term (1-5 months): 10-200 ng/dL 6-11 months: 10-276 ng/dL 1-3 years: 7-202 ng/dL 4-6 years: 8-235 ng/dL 7-9 years: Less than or equal to 120 ng/dL 10-12 years: Less than or equal to 92 ng/dL 13-15 years: Less than or equal to 95 ng/dL 16-17 years: Less than or equal to 106 ng/dL 18 years and older: Less than 50 ng/dL Tanner Stage I: Less than or equal to 105 ng/dL Tanner Stage II: Less than or equal to 108 ng/dL Tanner Stage III: Less than or equal to 111 ng/dL Tanner Stage IV & V: Less than or equal to 83 ng/dL After metyrapone stimulation: Greater than 8000 ng/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Also known as Specific Compound S.
Methodology	Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-4 days upon receipt at reference laboratory

Depakene

See:	 Valproic Acid, Free & Total Drug Level, Serum Valproic Acid, Plasma

Depakote

See:	 Valproic Acid, Plasma

Dermatitis Herpetiformis (DH)/Celiac Disease Panel

See:	 Tissue Transglutaminase, Serum

Dermatopathology Consultation

Laboratory	Surgical Pathology Laboratory
Order Code	CONDERM
CPT Code	88304, 88305, 88312, 88313, 88321, 88342
Collection Medium	Miscellaneous container; contact laboratory
Minimum	<pre> Skin biopsy or excision is required. The requisition must contain: patient name, medical record number, biopsy date, tissue source, biopsy site, question(s) to be answered, differential diagnosis, and complete patient history and findings. Place tissue in 10% neutral buffered formalin. Label container with the patient name, medical record number, and tissue source.</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1a Dermatopathology Consultation Request or Epic Req
Methodology	Light Microscopy
Analytic Time	2-3 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Desalkylamiodarone

See:	 Amiodarone & Metabolite Drug Level, Serum

11-Desoxycortisol

See:	 11-Deoxycortisol Quantitative, Serum

Desyrel

See:	 Trazodone Drug Level, Serum

Dexamethasone Drug level

Laboratory	Commercial Mail-out Laboratory
Order Code	DEXA
CPT Code	83789
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum from red top tube Absolute Minimum: 0.5 mL serum from red top tube</pre>
Rejection Criteria:	Room temperature specimens
Reference Range	Adults baseline: Less than 50 ng/dL 8:00 AM draw following 1 mg dexamethasone between 11:00 pm and 12:00 am the previous evening: 140-295 ng/dL 8:00 AM draw following 8 mg dexamethasone (4x2 mg doses) between 11:00 pm and 12:00 am the previous evening: 1600-2850 ng/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	6 days upon receipt at reference laboratory

DGP

See:	 Deamidated Gliadin Peptide IgA and IgG Antibody, Serum

DHEA-S

See:	 Dehydroepiandrosterone Sulfate, Plasma

Di George‘s Syndrome

See:	 Immunodeficiency Evaluations; Adult and Pediatric, Peripheral Blood

Diazepam Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	DZP
CPT Code	80154(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum (Adults and Pediatrics)
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Dose-Related Range Diazepam 0.2 - 1.0 mcg/mL Based on normal dosages Nordiazepam 0.06- 1.80 mcg/mL Based on normal dosages Toxic > 2.50 mcg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Gas Chromatography
Analytic Time	2 working days upon receipt at reference laboratory

DIC Screen

Comments	Screen no longer available. It is recommended the following assays be ordered to screen for DIC: Platelet Count, PT, APTT, Fibrinogen, Thrombin Time, FDP.

Differential

See:	 CBC with Automated Differential, Whole Blood

Differential and Cell Count

See:	 Body Fluid Cell Count and Differential, Miscellaneous Body Fluids CBC with Automated Differential, Whole Blood

Differential, Automated

Laboratory	Hematology
Order Code	ADIF
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Comments	An automated differential cannot be ordered as an independent order, it must be ordered in conjunction with a CBC either as an add-on or at the same time.
See:	 CBC with Automated Differential, Whole Blood

Digitalis

See:	 Digoxin, Plasma

Digoxin

Laboratory	Chemistry
Order Code	DIG
CPT Code	80162
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers. Do not draw before 6 hours after dose.
Reference Range	<pre> Therapeutic: <2.1 ng/mL at 6 hours after dose in adults. Critical value: >2.1 ng/mL (adults)</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	<pre> Digibind (fab fragment) interferes with digoxin assay. Call lab for details.</pre>
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Competition Principle
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Dilantin

See:	 Phenytoin, Free, Plasma Phenytoin, Plasma

Dilute Russell Viper Venom Time

See:	 Lupus Anticoagulant, Citrated Whole Blood

Diphenylhydantoin

See:	 Phenytoin, Plasma

Diphtheria Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	DIPTH
CPT Code	86317
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Adult/Pediatric Preferred Minimum: 1.0 mL serum
Rejection Criteria:	Plasma or other body fluids.
Reference Range	<pre>Antibody concentration of > 0.1 IU/mL is usually considered protective. Responder status is determined according to the ratio of a one-month, post-vaccination sample to pre-vaccination concentration of Diphtheria IgG Abs as follows: 1. If the post-vaccination concentration is less than 1.0 IU/mL, the patient is considered a nonresponder. 2. If the post-vaccination concentration is greater than or equal to 1.0 IU/mL, a patient with a ratio of less than 1.5 is a nonresponder, a ratio of 1.5 to less than 3.0, is a weak responder, and a ratio of 3.0 or greater, is a good responder. 3. IF the pre-vaccination concentraiton is greaer than 1.0 IU/mL, it may be difficult to assess the response based on a ratio alone. A post-vaccination concentration above 2.5 IU in this case is usually adequate.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Include patient immunization status on requisition. Pre and post specimens submitted. Post sample should be drawn 30 days after immunization and must be received within 60 days of pre sample.</pre>
Methodology	Multi-Analyte Fluorescent Detection
Analytic Time	2 days upon receipt at reference laboratory

Direct Antiglobulin Test

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	DC
CPT Code	86880
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Adults - 2 mL Pediatrics - 1 mL or EDTA microtainer
Rejection Criteria:	Specimen must be labeled with patient's first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Reference Range	Negative result means that no antibodies were detected on the patient's red cells using polyspecific antiglobulin technique.
Order Form:	DeGowin Blood Center Requisition
Comments	Monospecific testing for IgG and C3 complement is automatically performed when the polyspecific test is positive. Elution performed per pathologist recommendation or clinician order. Only monospecific testing of IgG will be performed on cord samples when mothers are alloimmunized, when mothers antibody status is unknown, or on samples from patients < 4 months old.
Methodology	Tube test
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Disaccharidase Analysis

Laboratory	Commercial Mail-out Laboratory
Order Code	DISAC
CPT Code	82945 (x4)
Collection Medium	Miscellaneous container; contact laboratory
Minimum	5 mg of small bowel
Reference Range	<pre> Units = uM/min/gram protein Abnormal Range Lactase 16.5 - 32.5 < 15.0 Sucrase 25.0 - 79.8 < 25.0 Maltase 100.0 - 223.6 < 100.0 Palatinase 5.0 - 17.6 < 5.0</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Determination of disaccharidase activities plays an important role in the diagnosis of patients suffering with chronic diarrhea, abdominal pain, or failure to thrive. Please print, complete and submit the <a href= "http://www.jolidiagnostic from JOLI Diagnostics to the lab, with the specimen and the A-1a Miscellaneous Request.
Methodology	Clinical Chemistry through Spectrophotometry
Analytic Time	3 days upon receipt at reference laboratory

Disease Correlation-HLA-A, B, C, DR, DQ Single Antigen Typing (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	See individual HLA typing test.
Minimum	One 10 mL yellow top (ACD) tube.
Comments	All HLA Testing is ordered through the University of Iowa Epic System.
See:	 HLA Genotyping A, B or C Class I - Intermediate Resolution (VAMC), Whole Blood HLA Genotyping DRB1, DRB3, 4, 5, DP Alpha Beta or DQ Alpha Beta Intermediate Resolution (VAMC), Whole Blood
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction(PCR) Sequence Specific Oligonucleotide primers (SSO)
Analytic Time	Resulted in Epic by 5 working days.
Testing Schedule	Test performed twice weekly.

Disopyramide Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	DISO
CPT Code	80299
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Red top tube</td></tr></table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre>2.0 - 5.0 mcg/mL Toxic: > 7.0 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Methodology	Quantitative Immunoassay
Analytic Time	2 working days upon receipt at reference laboratory

Diuretic Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	DIUR
CPT Code	82486
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Yellow top conical tube (no a</td></tr></table>
Minimum	<pre>Preferred minimum: 10 mL random urine collected in TWO Yellow top conical tubes (no additive) Absolute minimum: 1.2 mL random urine</pre>
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Qualitative diuretic screen includes: benzthiazide, bumetanide, chlorothiazide, chlorthalidone, furosemide, hydrochlorothiazide, hydroflumethiazide, and metolazone.
Methodology	Qualitative High Performance Liquid Chromatography/Ultraviolet Detection
Analytic Time	5-14 days upon receipt at reference laboratory

DMD Gene Analysis Dup/Delet Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	DBMD
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	THREE 8.5 mL (Yellow top ACD tubes) for each participant
Reference Range	Not detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the <a href= "http://www.genome.utah.e Testing Consent Form for (DBMD) from University of Utah Genome Center with the appropriate signatures, the correct sample type and the A-1a Miscellaneous Request. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Deletion/Duplication MLPA
Analytic Time	6 weeks

DMD Gene Analysis Full Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	DBMDSEQ
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	THREE 8.5 mL (Yellow top ACD tubes) for each participant
Reference Range	Not detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the <a href= "http://www.genome.utah.e Testing Consent Form for (DBMD) from University of Utah Genome Center with the appropriate signatures, the correct sample type and the A-1a Miscellaneous Request. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Direct sequencing analysis of the entire dystrophin gene.
Analytic Time	6 weeks

DMD Gene Analysis Known Familial Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	DBMDKNM
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	THREE 8.5 mL (Yellow top ACD tubes) for each participant
Reference Range	Not detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the <a href= "http://www.genome.utah.e Testing Consent Form for (DBMD) from University of Utah Genome Center with the appropriate signatures, the correct sample type and the A-1a Miscellaneous Request. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Sequencing of single exon
Analytic Time	6 weeks

DMPK Detection of Abnormal Alleles with Interpretation

Laboratory	Molecular Pathology
Order Code	MYD
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults - 3 mL whole blood in lavender top tube (EDTA) Children - 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Reference Range	<pre> Normal: <35 CTG repeats Indeterminate: 35-49 CTG repeats Carrier: 50-99 CTG repeats Full mutation (affected): >99 CTG repeats</pre>
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Methodology	Polymerase Chain Reaction (PCR) and Southern Blot
Analytic Time	21 days
Testing Schedule	Weekly

Dnase B Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	DNASE
CPT Code	86215
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 1.0 mL serum Adult Absolute Minimum: 0.5 mL serum Pediatric Minimum: 0.35 mL serum</pre>
Rejection Criteria:	Hemolyzed specimens.
Reference Range	<pre> Age Group Reference Interval 1-6 years: 0-70 U/mL 7-17 years: 0-170 U/mL 18 years and over: 0-120 U/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Nephelometry
Analytic Time	4 working days upon receipt at reference laboratory

Donath-Landsteiner Test

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	DL
CPT Code	86941
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	10 mL red top tube
Rejection Criteria:	Specimen must be labeled with patient’s first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Reference Range	Positive result is diagnostic for paroxysmal cold hemoglobinuria.
Order Form:	DeGowin Blood Center Requisition
Methodology	Biphasic test for hemolysis
Analytic Time	Specimens analyzed on day received
Testing Schedule	0700-1400 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Double Stranded DNA Antibody

Laboratory	Chemistry
Order Code	DSDNA
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers
Reference Range	Negative: 4 IU/mL or less Indeterminate: 5-9 IU/mL Positive: 10 IU/mL or greater
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 25, 2013. All first-time positive results are confirmed by Crithidia immunofluorescence assay (IFA).
See:	 Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum RNP Antibody, Plasma Smith Antibody, Plasma
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

DPH

See:	 Phenytoin, Plasma

DPYD Gene Analysis IVS14+1GA Variant

Laboratory	Commercial Mail-out Laboratory
Order Code	DPD
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Yellow top tube (ACD solution A), Light Green top tube (Lithium Heparin),
Minimum	Preferred Minimum: 5 mL whole blood collected in TW0 3 mL EDTA (lavender-top) tubes. Absolute Minimum: 3 mL whole blood
Rejection Criteria:	Received frozen.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Polymerase Chain Reaction (PCR), Single Nucleotide primer Extension
Analytic Time	2 weeks upon receipt at reference laboratory

Drug Screen

See:	 Drugs of Abuse-Urine, Urine

Drugs of Abuse - Meconium

Laboratory	Commercial Mail-out Laboratory
Order Code	MEC9
CPT Code	80101 x9 Screen; if positive add appropriate CPT code for drug confirmed: 82542 Marijuana; 82520 Cocaine; 83925 Opiates; 83992 Phencyclidine; 82145 Amphetamines; 82205 Barbiturates; 83840 Methadone; 80154 Benzodiazepine; 83925 Propoxyphene
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Meconium</td> </tr> </table>
Minimum	Meconium. All meconium (blackish material) excreted until milk/formula based stool (yellow-green) appears. Preferred Minimum: 4 g or 3/4 ince cube on each side Absolute Minimum: 2 g or 3/4 inch cube on each side
Reference Range	<pre> Drugs Covered and Cutoff Concentrations

Drug	Screen	Confirmation
Marijuana	30 ng/g	5 ng/g
Cocaine	30 ng/g	20 ng/g
Opiates	30 ng/g	20 ng/g
Phencyclidine	15 ng/g	10 ng/g
Amphetamines	30 ng/g	20 ng/g
Barbiturates	75 ng/g	50 ng/g
Methadone	40 ng/g	10 ng/g
Benzodiazepines	75 ng/g	20 ng/g
Propoxyphene	75 ng/g	10 ng/g</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme-Linked Immunoassay/Gas Chromatography-Mass Spectrometry/Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	<pre> Within 4 days Negative: 1-2 days; Positive: 2-4 days </pre>

Drugs of Abuse - Umbilical Cord

Laboratory	Commercial Mail-out Laboratory
Order Code	UCDAU
CPT Code	80100 x2
Collection Medium	Sterile container
Minimum	Preferred: Collect at least 8 inches of umbilical cord. Premature infants: Send as much as possible - ability to perform full panel of testing related to weight of specimen.
Rejection Criteria:	Cords soaking in blood. Tissue that is obviously decomposed.
Reference Range	<pre>The drugs covered by this testing and the cutoff concentrations are listed in the table below.

Drugs/Drug Classes	Range of Cutoff Concentrations
Opioids: buprenorphine, codeine, fentanyl, heroin (6-acetylmorphine; unique metabolite of heroin), dihydrocodeine, hydrocodone, hydromorphone, meperidine, methadone, morphine, naloxone, naltrexone, oxycodone, oxymorphone, propoxyphene, tapentadol, tramadol	1-10 ng/g
Stimulants: amphetamine, cocaine, methamphetamine, MDMA (Ecstasy), MDEA (Eve), MDA, phentermine	8 ng/g
Sedatives-hypnotics: alprazolam, amobarbital, butalbital, clonazepam, diazepam, flunitrazepam, flurazepam, lorazepam, midazolam, nitrazepam, nordiazepam, oxazepam, phenobarbital, secobarbital, temazepam, triazolam, zolpidem	5-40 ng/g
Cannabinoids (11-nor-9-carboxy-THC)	150 pg/g
Phencyclidine (PCP)	4 ng/g</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Qualitative Liquid Chromatography-Time of Flight Mass Spectrometry/Qualitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-5 days upon receipt at reference laboratory

Drugs of Abuse Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	DRUGSCR
CPT Code	80101 x9 Screen; if positive, add appropriate code for drug confirmed: 82542 Marijuana; 82520 Cocaine; 83925 Opiates; 83992 Phencyclidine; 82145 Amphetamines; 82205 Barbiturates; 80154 Benzodiazepines; 83840 Methadone; 83925 Propoxyphene
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 4 mL plasma Absolute Minimum: 3 mL plasma
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles. Separator tubes and plasma or whole blood from lt. blue (sodium citrate).
Reference Range	<pre>Effective November 19, 2012

Drugs/Drug Classes	Screen
Amphetamines	30 ng/mL
Methamphetamine	30 ng/mL
Barbiturates	75 ng/mL
Benzodiazepines	75 ng/mL
Cocaine	30 ng/mL
Marijuana	30 ng/mL
Methadone and metabolite	40 ng/mL
Opiates	30 ng/mL
Oxycodone	30 ng/mL
Phencyclidine	15 ng/mL
Propoxyphene and metabolite	75 ng/mL</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Note: Screen-positive specimens are automatically confirmed by GC/MS and/or LC-MS/MS; additional charges may apply.
Methodology	Enzyme Immunoassay/Gas Chromatography-Mass Spectrometry/Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	Screen: 1-2 days upon receipt at reference laboratory Confirmation: 1-4 days upon receipt at reference laboratory

Drugs of Abuse-Urine

Laboratory	Chemistry
Order Code	DAU
CPT Code	80101 x5
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Urine (Random)-BD Vacutainer, no additive yellow top
Minimum	5 mL random urine
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre>

Screen includes amphetamines, benzodiazepines, cocaine, opiates, and oxycodone/oxymorphone. A presumptive positive result for any of the tested drugs indicates the possible presence of the drug or metabolites in the urine, but does not measure the level of intoxication.

If confirmation is needed for amphetamines, benzodiazepines, cocaine, opiates, or oxycodone/oxymorphone, call the Laboratory at 356-3527. Allow up to seven days for confirmatory results. Confirmation is at an additional charge.

The drug of abuse-urine panel was changed April 12, 2010 by the addition of the oxycodone screen and no longer including a screen for THC. If testing for THC is desired, see "THC, Urine Screen" or "THC, Urine Screen + Reflex Confirmation. The drug of abuse panel was further changed August 30, 2010 by no longer including a screen for barbiturates. If testing for barbiturates is desired, see "Barbiturates, Urine Screen". The individual components of the drug of abuse-urine screen can also be ordered individually, if desired (see links at end).

Test Cut-off Concentrations (ng/mL)

Amphetamines	1,000
Benzodiazepine	100
Cocaine	300
Opiate	300
Oxycodone	300

Additional information on approximate cut-offs for individual drugs or drug metabolites in the specific assays

AMPHETAMINES ASSAY

Drug	Approximate cut-off for amphetamines assay (ng/mL)
d-Amphetamine	981
d-Methamphetamine	1,000
d-Pseudoephedrine*	261,000
Ephedrine*	308,000
MBDB	1,175
MDA	771
MDEA	1,553
MDMA ("Ecstasy")	509
Phendimetrazine*	138,000
Phentermine*	239,000

Abbreviations for the "designer" amphetamine and methamphetamine derivatives:
- MBDB - methylbenzodioxolylbutanamine ("Eden")
- MDA - 3,4-methylenedioxyamphetamine
- MDEA - 3,4-methylenedioxy-N-ethylamphetamine ("Eve")
- MDMA - 3,4-methylenedioxymethamphetamine ("Ecstasy")

* The concentrations of these compounds needed to trigger a positive amphetamines screen are very high and likely only achievable in large overdose.

New amphetamines assay instituted 7/7/10. Unlike th
to 7/7/10, the new assay has very good cross-reactiv
(Ecstasy) and other designer amphetamines (MDA, MBDB
assay did not cross-react well with amphetamines oth
and methamphetamine. The new assay has low cross-rea
amphetamine drugs (ephedrine, pseudoephedrine, phent

Patients on labetalol can have a false positive amph
to a metabolite of labetalol structurally resembling
these cases, confirmatory testing will be negative.

BENZODIAZEPINES ASSAY

Drug	Approximate cut-off for benzodiazepines assay (ng
Alprazolam*	108
Chlordiazepoxide	146
Clobazam	123
Clonazepam*	148
Clorazepate	124
Demoxepam	92
Diazepam	106
Flunitrazepam	142
Flurazepam	165
Lorazepam*	163
Midazolam	168
Oxazepam	122
Temazepam	145
Triazolam	115

*In patients taking typical therapeutic doses of thes
benzodiazepines for medical purposes, the benzodiaz
screen can often be negative due to the low concent
of these drugs and their metabolites excreted in ur
relative to the cut-offs.

COCAINE ASSAY

Drug or drug metabolite	Approximate cut-off for cocaine assay (ng/mL)
Benzoylecgonine (metabolite)	300
Cocaine	21,200
Ecgonine methyl ester (metabolite)	326,000
Lidocaine	No cross-reactivity*
Procaine	No cross-reactivity*

*In general, local anesthetics do not cross-react wi
cocaine immunoassay.

OPIATES ASSAY

Drug or drug metabolite	Approximate cut-off for opiates assay (ng/mL)
Buprenorphine	No cross-reactivity
Codeine	224
6-Acetylmorphine (heroin metabolite)	386
Fentanyl	No cross-reactivity
Heroin	366

Hydrocodone	1,086
Hydromorphone	1,425
Meperidine	> 100,000
Methadone	No cross-reactivity
Morphine	300
Oxycodone	> 75,000*

*Therapeutic use of oxycodone in the absence of any
opiates is unlikely to result in a positive opiates

OXYCODONE ASSAY*

Drug	Approximate cut-off for oxycodone assay (ng/mL)
Oxycodone	300
Oxymorphone	291

*The oxycodone assay does not cross-react with opiat
oxycodone or oxymorphone (e.g., codeine, heroin, hy
hydromorphone, morphine) or with synthetic opioids
meperidine, methadone, propoxyphene).

References:

Belson MG, Simon HK, Sullivan K, Geller RJ. The Uti
Analysis in Children with Suspected Ingestion. Pedi
1999;15:383-387.

Bast RP, Helmer SD, Henderson SR, Rogers MA, Shapiro
Limited Utility of Routine Drug Screening in Trauma
Med J 2000;93:397-399.

Hammett-Stabler CA, Pesce AJ, Cannon DJ. Urine Drug
Medical Setting. Clinica Chimica Acta 2002;315:125-

Schiller MJ, Shumway M, Batki SL. Utility of Routin
a Psychiatric Emergency Setting. Psychiatric Servic

Sugarman JM, Rodgers GC, Paul RI. Utility of Toxico
Pediatric Emergency Department. Pediatric Emergency
Emergency Care 1997;13(3):194-197.</pre>

See:
Amphetamines-Urine Screen, Urine

Benzodiazepine, Urine, Conf, Random Urine

Benzodiazepines-Urine Screen, Urine

Cocaine Confirmation, Random Urine

Cocaine-Urine Screen, Urine

Drugs of Abuse-Urine + Confirm, Urine

Opiate, Urine Confirmation, Random Urine

Opiates-Urine Screen, Urine

Oxycodone-Urine Screen, Urine, Random

THC (Marijuana) Confirmation, Random Urine

THC, Urine Screen + Reflexed Confirmation, Uri

THC-Urine Screen, Urine, Random

See Appendix See Additional Information:
Cross Reacting Drugs

Methodology All assays except oxycodone are based on the kinetic
microparticles in a solution (KIMS) as measured by c

	transmission. The oxycodone screen is based on the a drug labeled with glucose-6-phosphate dehydrogenas drug from the urine sample for a fixed amount of spe binding sites. In the absence of free drug from the specific antibody binds the drug labeled with G6PDH decrease in enzyme activity. This phenomenon create relationship between the drug concentration in urine activity. The enzyme activity is determined spectro 340 nm by measuring the conversion of nicotinamide a (NAD) to NADH.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Drugs of Abuse-Urine + Confirm

Laboratory	Chemistry
Order Code	DAUR
CPT Code	80101 x5
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Urine (Random)-BD Vacutainer, no additive yellow top
Minimum	5 mL random urine
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre>

Screen includes amphetamines, benzodiazepines, cocaine, opiates, and oxycodone/oxymorphone. A presumptive positive result for any of the tested drugs indicates the possible presence of the drug or metabolites in the urine, but does not measure the level of intoxication.

Confirmation is automatically sent to a commercial laboratory for amphetamines, cocaine, opiates, and oxycodone/oxymorphone, except for patients in the ETC. Confirmation for benzodiazepines and opiates and oxycodone/oxymorphone is also NOT automatic for any inpatient units due to the high prevalence of use of benzodiazepines and opiates in the inpatient and ETC setting.

Confirmation of any test is accomplished by the ordering physician calling Specimen Control at 356-3527, upon receipt of a positive screening result. The samples are maintained in the laboratory frozen for 30 days post screening. The drug of abuse-urine panel was changed April 12, 2010 by the addition of the oxycodone screen and no longer including a screen for THC. If testing for THC is desired, see "THC, Urine Screen" or "THC, Urine Screen + Reflex Confirmation". The drug of abuse panel was further changed August 30, 2010 by no longer including a screen for barbiturates. If testing for barbiturates is desired, see "Barbiturates, Urine Screen". The individual components of the drug of abuse-urine screen can also be ordered individually, if desired (see links at end).

Confirmation is at an additional charge.

Test Cut-off Concentrations (ng/mL)

Amphetamines	1,000
Benzodiazepine	100
Cocaine	300
Opiate	300
Oxycodone	300

Additional information on approximate cut-offs for individual drugs or drug metabolites in the specific assays.

AMPHETAMINES ASSAY

Drug	Approximate cut-off for amphetamines assay (ng/mL)
d-Amphetamine	981
d-Methamphetamine	1,000
d-Pseudoephedrine*	261,000
Ephedrine*	308,000
MBDB	1,175
MDA	771
MDEA	1,553
MDMA ("Ecstasy")	509
Phendimetrazine*	138,000
Phentermine*	239,000

Abbreviations for the "designer" amphetamine and methamphetamine derivatives:

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- MDA - 3,4-methylenedioxyamphetamine
- MDEA - 3,4-methylenedioxy-N-ethylamphetamine ("Eve")

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* The concentrations of these compounds needed to tr
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overdose.

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Patients on labetalol can have a false positive amph
to a metabolite of labetalol structurally resembling
these cases, confirmatory testing will be negative.

BENZODIAZEPINES ASSAY

Drug	Approximate cut-off for benzodiazepines assay (ng
Alprazolam*	108
Chlordiazepoxide	146
Clobazam	123
Clonazepam*	148
Clorazepate	124
Demoxepam	92
Diazepam	106
Flunitrazepam	142
Flurazepam	165
Lorazepam*	163
Midazolam	168
Oxazepam	122
Temazepam	145
Triazolam	115

*In patients taking typical therapeutic doses of thes
benzodiazepines for medical purposes, the benzodiaz
screen can often be negative due to the low concent
of these drugs and their metabolites excreted in ur
relative to the cut-offs.

COCAINE ASSAY

Drug or drug metabolite	Approximate cut-off for cocaine assay (ng/mL)
Benzoylecgonine (metabolite)	300
Cocaine	21,200
Ecgonine methyl ester (metabolite)	326,000
Lidocaine	No cross-reactivity*
Procaine	No cross-reactivity*

*In general, local anesthetics do not cross-react wi
cocaine immunoassay.

OPIATES ASSAY

Drug or drug metabolite	Approximate cut-off for opiates assay (ng/mL)

Buprenorphine	No cross-reactivity
Codeine	224
6-Acetylmorphine (heroin metabolite)	386
Fentanyl	No cross-reactivity
Heroin	366
Hydrocodone	1,086
Hydromorphone	1,425
Meperidine	> 100,000
Methadone	No cross-reactivity
Morphine	300
Oxycodone	> 75,000*

*Therapeutic use of oxycodone in the absence of any
opiates is unlikely to result in a positive opiates

OXYCODONE ASSAY*

Drug	Approximate cut-off for oxycodone assay (ng/mL)
Oxycodone	300
Oxymorphone	291

*The oxycodone assay does not cross-react with opiat
oxycodone or oxymorphone (e.g., codeine, heroin, hy
hydromorphone, morphine) or with synthetic opioids
meperidine, methadone, propoxyphene).

References:

Belson MG, Simon HK, Sullivan K, Geller RJ. The Uti
Analysis in Children with Suspected Ingestion. Pedi
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Sugarman JM, Rodgers GC, Paul RI. Utility of Toxico
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See:
Amphetamines-Urine Screen, Urine

Benzodiazepine, Urine, Conf, Random Urine

Benzodiazepines-Urine Screen, Urine

Cocaine Confirmation, Random Urine

Cocaine-Urine Screen, Urine

Drugs of Abuse-Urine, Urine

Opiate, Urine Confirmation, Random Urine

Opiates-Urine Screen, Urine

Oxycodone-Urine Screen, Urine, Random

THC (Marijuana) Confirmation, Random Urine

	 THC, Urine Screen + Reflexed Confirmation, Uri THC-Urine Screen, Urine, Random
See Appendix	See Additional Information: Cross Reacting Drugs
Methodology	All assays except oxycodone are based on the kinetic microparticles in a solution (KIMS) as measured by cl transmission. The oxycodone screen is based on the co a drug labeled with glucose-6-phosphate dehydrogenase drug from the urine sample for a fixed amount of spe binding sites. In the absence of free drug from the specific antibody binds the drug labeled with G6PDH a decrease in enzyme activity. This phenomenon creates relationship between the drug concentration in urine activity. The enzyme activity is determined spectroph 340 nm by measuring the conversion of nicotinamide ad (NAD) to NADH.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

DTT (Dithiothreitol) Antibody Titration

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	DTT
CPT Code	Rh 86901, 86977
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	A filled 6 ml tube
Reference Range	Not applicable
Order Form:	DeGowin Blood Center Requisition
Comments	<pre> Contact Pathology resident at pager 131-3404 for emergent needs. A blood type (back typing; BT) will be performed on the plasma if no previous blood type is available on the patient.</pre>
Methodology	Serial dilution tube test
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0700-1400 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Duchenne/Becker Muscular Dystrophy

Laboratory	Histopathology
CPT Code	<pre> 88305 Muscle Biopsy (technical and professional) 88346x Number of Immunofluorescent Stains (technical and professional) 88331 Frozen Section H&E (technical and professional)</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Methodology	Immunofluorescence
Analytic Time	1 week
Testing Schedule	0800-1700 Monday through Friday. For additional services, contact the Histopathology Laboratory at 356-2140 or contact Dr. Steve Moore at pager #5197.

Dysferlin (DYSF) Full Gene Sequence with Interpretation

Laboratory	Molecular Pathology
Order Code	DYSF
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult Minimum: 6 mL whole blood in ONE pink top tube or TWO lavender top (EDTA) tubes. Children Minimum: 3 mL whole blood in lavender top (EDTA) tube. Optional specimen type: Formalin Fixed paraffin embedded tissue; Fresh Frozen tissue. Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing.</pre>
Rejection Criteria:	Testing requires a dedicated collection tube.
Reference Range	Normal
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Methodology	PCR followed by sequence analysis.
Analytic Time	21 days
Testing Schedule	Weekly

Dystrophin

See:	 Duchenne/Becker Muscular Dystrophy, Muscle Biopsy

E

E. coli 0157

See:
Bacterial Culture

E. Coli Shiga toxin by EIA

Laboratory	Microbiology
Order Code	C EHEC
CPT Code	87427
Collection Medium	Sterile container
Minimum	Submit 10-20 g stool in sterile container.
Reference Range	No Shiga-toxin-detected.
Order Form:	A-1a Clinical Microbiology Laboratory
Comments	This assay is a rapid in vitro microwell EIA for the detection of Shiga toxins I and II (verotoxins) in stool specimens. The test is intended for use as an aid in the diagnosis of enterohemorrhagic Escherichia coli (EHEC) infection. Shiga toxin testing of stool specimens provides better sensitivity than standard culture methods for the E. coli O157:H7 serotype and non-O157 serotypes. Testing of broth cultures, rather than the stool specimens themselves, is performed because the amount of free fecal Shiga toxin in stools is often low. All Shiga toxin positive broths (or presumptive E. coli O157:H7 isolates) will be forwarded to the University Hygienic Laboratory for confirmatory testing and genetic characterization. Shiga toxin testing is included in routine stool cultures as recommended by <a href= http://www.cdc.gov/m Disease Control (CDC).
See Appendix	See Additional Information: Microbiology Specimen Collection and Transport
Methodology	Enzyme Immunoassay
Testing Schedule	0700-2200, 7 days a week, including holidays.

E. Histolytica Antibody (IgG)

See:
Entamoeba Histolytica Antibody, IgG, Serum

E2

See:
Estradiol (E2), Plasma

EBA Antibody

See:
Pemphigus/Pemphigoid/EBA Antibodies Screen, Titer and Interpretation, Serum

EBER, EBV

See:
Epstein-Barr Virus Encoded RNA (EBER) by in situ Hybridization, Formalin Fixed Paraffin-embedded Tissue

EBV Heterophile Antibody ("Monospot")

Laboratory	Chemistry
Order Code	EBVHET
CPT Code	86308
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Pink top tube, Red top tube
Minimum	3.0 mL whole blood or TWO microtainers.
Reference Range	Negative
Order Form:	A-1a General Lab or Epic Req
Comments	Methodology changed from latex agglutination to multiplex flow immunoassay 2/5/2013.
Methodology	Multiplex Flow Immunoassay
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Echinococcus Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	ECHINO
CPT Code	86682
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 1 mL serum Adult Absolute Minimum: 0.15 mL serum</pre>
Rejection Criteria:	Severely lipemic or contaminated specimens.
Reference Range	<pre> 0.00-0.89 IV Negative - No significant level of Echinococcus IgG antibody detected. 0.90-1.09 IV Equivocal - Questionable presence of Echinococcus IgG antibody detected. Repeat testing in 10-14 days may be helpful. 1.10 IV or greater Positive - Presence of IgG antibody to Echinococcus detected, suggestive of current or past infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-5 days upon receipt at reference laboratory

Echo Virus Ab

Laboratory	Commercial Mail-out Laboratory
Order Code	ECHO
CPT Code	86658 (x5)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 3 mL serum Absolute Minimum: 1 mL serum Pediatric Minimum: 0.25 mL serum</pre>
Rejection Criteria:	Plasma
Reference Range	<pre> Echovirus 6: Less than 1:10 Echovirus 7: Less than 1:10 Echovirus 9: Less than 1:10 Echovirus 11: Less than 1:10 Echovirus 30: Less than 1:10</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Serum Neutralization Assay
Analytic Time	within 10 days upon receipt at reference laboratory

Ecstasy

See:	 Amphetamines, Urine Confirmation, Urine

Effusions

See:	 Cytologic Evaluation, Body Fluid

EGFR Gene Analysis with Interpretation

Laboratory	Molecular Pathology
Order Code	EGFR
Minimum	Tumor cells more than 50% of the total tissue and greater than 10mm² in surface area on the block
Rejection Criteria:	Specimens fixed in B5 fixative or that have been decalcified will not be accepted. Tumor specimens containing less than 50% tumor cells or are less than 10mm² in area may be unacceptable.
Reference Range	Negative
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Methodology	PCR followed by DNA Sequencing
Analytic Time	7-10 working days
Testing Schedule	Weekly

Ehlers-Danlos Syndrome Type 6

Laboratory	Commercial Mail-out Laboratory
Order Code	EDS6
CPT Code	82492
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 4 mL first-morning void or random urine Absolute Minimum: 3 mL first-morning void orrandom urine
Reference Range	<pre>

Age	PYR	DPYR	Ratio DPYR/PYR
0-11 months	Not applicable	Not applicable	0.13-0.20
1-3 years	Not applicable	Not applicable	0.18-0.24
4-9 years	Not applicable	Not applicable	0.19-0.25
10-14 years	Not applicable	Not applicable	0.17-0.27
15-19 years	Not applicable	Not applicable	0.20-0.26
20 years and older	Not applicable	Not applicable	0.23-0.29</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	High Performance Liquid Chromatography (HPLC)
Analytic Time	2 weeks upon receipt at reference laboratory

Ehrlichia Antibody Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	EHRLICHP
CPT Code	86666(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	0.5 mL serum
Rejection Criteria:	Heat-inactivated and hemolyzed specimens.
Reference Range	<1:64
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> This profile includes two tests: Anaplasma phagocytophilum (HGE) Ab, IgG,S Ehrlichia chaffeensis (HME) Ab, IgG</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Immunoflourescense Assay (IFA)
Analytic Time	1 week upon receipt at reference laboratory

Ehrlichia chaffeensis Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	HME
CPT Code	86666
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	0.5 mL serum in a red top tube
Rejection Criteria:	Heat-inactivated and hemolyzed specimens.
Reference Range	<1:64
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Immunofluorescence Assay (IFA)
Analytic Time	1 week upon receipt at reference laboratory

ELA2 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	ELA2
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	1-5 mL whole blood in EDTA top tube
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the following forms to the lab, with the specimen and the A-1a Miscellaneous Request: Informed Consent for DNA Testing and the Sample Submission Form - Testing Services for Rare Mendelian Disorders from GeneDx DNA Diagnostic Experts. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Analysis is performed by bi-directional sequencing of the coding regions and splice sites of exons 1-5 of the ELA2 gene. Mutations found in the first person of a family to be tested are confirmed by repeat analysis using sequencing, restriction fragment analysis, or another appropriate method.
Analytic Time	6 weeks

Elastase, Monoclonal

See:	 Pancreatic Elastase, Monoclonal, Formed Stool (Random)

Elastase

See:	 Pancreatic Elastase, Fecal

Electrolyte Balance

Comments	The anion gap or electrolyte balance is calculated by the formula Na - (Cl +HCO3). In normal individuals most of the anion gap is due to protein. When an unmeasured anion such as ketones, lactate, formate, or oxalate is present an elevated anion gap results. While the values for the anion gap are method dependent, there is agreement that an anion gap > 16 is considered elevated. The reasons for a decreased anion gap are fewer and include low proteins, multiple myeloma (tend to be positively charged) and bromide ingestion (falsely counted as chloride). Patients may have a normal anion gap and still have acidosis. This is known as hyperchloremic acidosis where an elevated chloride compensates for the decreased bicarbonate.
See:	 Carbon Dioxide (CO2 Content), Plasma Chloride, Plasma Potassium, Plasma Sodium, Plasma

Electrolyte Panel

Laboratory	Chemistry
Order Code	E1
CPT Code	80051
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL of whole blood from light green top tube or ONE microtainer
Reference Range	Refer to individual components.
Comments	This panel includes Carbon Dioxide (CO2 Content), Chloride, Potassium, and Sodium.
See:	 Carbon Dioxide (CO2 Content), Plasma Chloride, Plasma Potassium, Plasma Sodium, Plasma
Methodology	Refer to individual components.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Electron Microscopy

Laboratory	Electron Microscopy Lab
Order Code	EM COM
CPT Code	88348
Minimum	Wet tissue is taken to Surgical Pathology Laboratory, 5804 JPP, fixed in 2.5% glutaraldehyde for delivery to the Electron Microscopy (EM) Laboratory.
Order Form:	H-1 Surgical Pathology or Epic Req
Methodology	Electron Microscopy/Light Microscopy
Analytic Time	1 week
Testing Schedule	0800-1700 Monday through Friday

Electrophoresis

See:	 Immunofixation Electrophoresis, Serum Protein Electrophoresis, Serum Urine Immunofixation Electrophoresis, Urine Urine Protein Electrophoresis, Urine

Electrophoresis, Immunofixation

See:	 Immunofixation Electrophoresis, Serum Urine Immunofixation Electrophoresis, Urine

Electrophoresis-Protein

See:	 Protein Electrophoresis, Serum Urine Protein Electrophoresis, Urine

Electrophoresis

See:	 Hemoglobin Evaluation, Quantitation with Interpretation, Blood

Emery-Dreifuss Muscular Dystrophy, autosomal dominant, EDMD2

See:
Lamin (LMNA) Full Gene Sequence with Interpretation, Whole Blood

Emery-Dreifuss Muscular Dystrophy

Laboratory: Histopathology
CPT Code: <pre>
88305 Muscle Biopsy (technical and professional)
88346x Number of Immunofluorescent Stains (technical and professional)88331 Frozen Section H&E (technical and professional)</pre>
Reference Range: The pathologist will provide an interpretative report.
Order Form: H-1 Surgical Pathology or Epic Req
Methodology: Immunofluorescence
Analytic Time: 1 week
Testing Schedule: 0800-1700 Monday through Friday. For additional services, contact the Histopathology Laboratory at 356-2140 or contact Dr. Steve Moore at pager #5197.

Emery-Dreifuss Muscular Dystrophy, autosomal recessive, EDMD3

See:
Lamin (LMNA) Full Gene Sequence with Interpretation, Whole Blood

ENA

See:
SS-A Antibody, Plasma

SS-B Antibody, Plasma

Scl-70 Antibody, Serum

Endomysial IgA Antibody Screen with Reflex Titer and Interpretation

Laboratory: Immunopathology
Order Code: EMAIGA
CPT Code: <pre>
86255 Endomysial Antibody IgA screen
86255-26 Endomysial Antibody IgA screen interpretation
86256 Endomysial Antibody IgA titer
86256-26 Endomysial Antibody IgA titer interpretation</pre>
Collection Medium: <table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>

Minimum: Adult - 5 mL; red top tube
Pediatric - 2 mL; red top tube
Reference Range: <pre>
< 1:5 Titer

Endomysial IgA antibody is detected in 70-76% of patients with dermatitis herpetiformis and 90+% of patients with celiac disease who are on a gluten-containing diet. Occurrence of endomysial IgA antibody decreases significantly on gluten-free diets. Note: Selective IgA deficiencies affect 3-5% of celiac and dermatitis herpetiformis patients and this condition will cause a "false negative" test. If IgA deficiency is known, please note requisition and IgG anti-EMA test will be done instead of IgA.</pre>
Order Form: A-1a Immunopathology or Epic Req
Comments: Include relevant clinical information and consultation request.

Methodology: Indirect Immunofluorescence
Analytic Time: 1 week
Testing Schedule: Bi-weekly (Mon and Thurs) - Batch analysis performed twice weekly on Mondays and Thursdays excluding university holidays.

Endomysial IgG Antibody Screen with Reflex Titer and Interpretation

Laboratory	Immunopathology
Order Code	EMAIGG
CPT Code	<pre> 86255 Endomysial Antibody IgG screen 86255-26 Endomysial Antibody IgG screen interpretation 86256 Endomysial Antibody IgG titer 86256-26 Endomysial Antibody IgG titer interpretation</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL; red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	<pre> < 1:5 Titer; Endomysial IgG antibody is useful in screening for celiac disease or dermatitis herpetiformis in patients with selective IgA deficiency. Selective IgA deficiency affects 3-5% of celiac and dermatitis herpetiformis patients. Endomysial IgG testing is not 100% sensitive for detection of such patients and it is recommended that anti-tissue transglutaminase EIA also be ordered for best sensitivity. 70-76% of patients with dermatitis herpetiformis and 90+% of patients with celiac disease who are on a gluten-containing diet. Occurrence of endomysial IgA antibody decreases significantly on gluten-free diets. Note: Selective IgA deficiencies affects 10-15% of celiac and DH patients and this condition will cause a false negative test. If IgA deficiency is known, please note on the requisition and IgG anti-EMA test will be done instead of IgA.</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	Include relevant clinical information and consultation request.
Methodology	Indirect Immunofluorescence
Analytic Time	1 week
Testing Schedule	Bi-weekly (Mon and Thurs) - Batch analysis performed twice weekly on Mondays and Thursdays excluding university holidays.

Enoxaparin Assay

See:	 Heparin, Low Molecular Weight (Xa Inhibition), Citrated Plasma

Entamoeba histolytica Ag, EIA

Laboratory	Commercial Mail-out Laboratory
Order Code	AMOEBAFEC
CPT Code	87337
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Feces specimen, stool contain </tr> </table>
Minimum	5 g random stool
Rejection Criteria:	Refrigerated or ambient specimens. Specimens in preservative.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme Immunoassay
Analytic Time	4 days upon receipt at reference laboratory

Entamoeba Histolytica Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	AMOEAB
CPT Code	86753
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum Absolute Minimum: 0.1 mL serum
Rejection Criteria:	Contaminated, heat-inactivated, hemolyzed, or severely lipemic specimens.
Reference Range	<pre> 0.79 IV or less: Negative - No significant level of detectable E. histolytica IgG antibody. 0.80-1.19 IV: Equivocal - Repeat testing in 10-14 days may be helpful. 1.20 IV or greater: Positive - IgG antibody to E. histolytica detected, suggestive of a current or past infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-5 days upon receipt at reference laboratory.

Entamoeba Histolytica, IgG/IgM Classes

See:	 Entamoeba Histolytica Antibody, IgG, Serum

Enteric Pathogens Culture

See:	 Microbiology: Stool/GI Aspirate, Stool
See Appendix	See Additional Information: Normal (Indigenous) Flora of Human Body

Enterovirus Detection by RTPCR

Laboratory	Commercial Mail-out Laboratory
Order Code	EVPCR
CPT Code	87498
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube
Minimum	Preferred Minimum: 1 mL Plasma from 3 mL lavender (EDTA) or ONE 6 mL pink (K2EDTA).
Rejection Criteria:	Nonfrozen samples, samples exposed to repeated freeze/thaw cycles, nonsterile or leaking containers, heparinized samples, and hemolyzed samples.
Reference Range	<pre> Negative - Enterovirus nucleic acid not detected by RT-PCR Positive - Enterovirus nucleic acid detected by RT-PCR</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Reverse Transcription/Polymerase Chain Reaction
Analytic Time	1 week upon receipt at reference laboratory

Enterovirus Qualitative PCR Assay

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	ENTEROQAL
CPT Code	87498
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	0.5 mL
Reference Range	Not detected
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	The Xpert EV Assay is designed to detect enterovirus (EV) RNA (enterovirus genome 5' untranslated region between nucleotide 452 and 596) in CSF samples. The assay detects most enteroviruses, including echoviruses, coxsackie A viruses, and coxsackie B viruses. The assay does not distinguish between serotypes. Results from the Xpert EV assay should be interpreted in conjunction with other laboratory and clinical data. Positive enterovirus PCR results do not rule out other causes of meningitis, including bacteria, mycobacteria, other viruses (herpes family viruses, arboviruses, mumps virus, etc) and fungi. Rare occurrences of simultaneous mixed bacterial- viral meningitis have been reported in the literature. This test is only performed on CSF. For detection of enteroviruses in blood, order <a href=http://www.healthcare.uiowa.edu/path_handbook/handbo Enterovirus Detection by RTPCR .
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Real-time Reverse transcriptase Polymerase Chain Reaction (RT-PCR)
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Eosinophil Count

See:	 Eosinophils, Other Fluids Eosinophils, Urine

Eosinophils

Laboratory	Hematology
Order Code	EOSNO
CPT Code	89190
Collection Medium	Miscellaneous container; contact laboratory
Minimum	Nasal swab or sputum - specimen applied to slide X2
Order Form:	A-1a General Lab or Epic Req
Comments	Slide must be prepared.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Wright Stain
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Eosinophils

Laboratory	Hematology
Order Code	UEOSN
CPT Code	88108
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	10 mL urine; random sample
Rejection Criteria:	The first voided specimen is not acceptable for this test.
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Wright Stain
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 daily

Epidermolysis Bullosa Acquisita, Antibody

See:	 Pemphigus/Pemphigoid/EBA Antibodies Screen, Titer and Interpretation, Serum

Epinephrine

See:	 Catecholamines, Fractionated, 24 hr Urine Catecholamines, Fractionated, Plasma

Epstein Barr Virus (EBV) Quantitative PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	EBVQNT
CPT Code	87799
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	6 mL whole blood or 3 mL plasma. Testing requires a dedicated collection tube. Sample tube must remain sterile. EBV molecular testing cannot be added onto a previously opened vacutainer tube.
Reference Range	Negative
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	This test is only used as an aid in monitoring EBV-related disease. It is not appropriate for the diagnosis of mononucleosis; order serological testing Epstein-Barr Viral Ab Panel (LAB4584) instead. Specimens stored at 4°C will be accepted up to 72 hours after collection. If > 72 hours, centrifuge and freeze the plasma.
See:	 Epstein-Barr Virus Full Ab Panel, Plasma
Methodology	Quantitative Polymerase Chain Reaction
Analytic Time	Once per 7 days

Epstein Barr Virus (EBV) Quantitative PCR, CSF

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	EBVCSF
CPT Code	87799
Collection Medium	Sterile container
Minimum	1 mL CSF in sterile container.
Reference Range	Negative
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Analytical range in log10 values: 2.70 - 6.48 log IU/mL (500-3,000,000 IU/mL) Positive results less than 2.70 log10 IU/mL (500 IU/mL) will be reported as "POS <2.70 LOG IU" ("POS <500 LOG IU"). Negative results will be reported as "Not detected".
See:	 Epstein Barr Virus (EBV) Quantitative PCR, Blood
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative Polymerase Chain Reaction
Analytic Time	24 hours (upon receipt in laboratory)

Epstein Barr Virus (EBV) Quantitative PCR

Laboratory	Microbiology
Order Code	EBVPCR
CPT Code	87799
Collection Medium	Sterile container
Minimum	2 mL CSF in sterile container.
Reference Range	Not detected.
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	The limit of quantification for this DNA assay is 2.6 log copies/mL (390 copies/mL). If the assay DID NOT DETECT the virus, the test result will be reported as "<2.6 log copies/mL (<390 copies/mL)." If the assay DETECTED the presence of the virus but was not able to accurately quantify the number of copies, the test result will be reported as "Not Quantified."
Methodology	Quantitative Polymerase Chain Reaction
Analytic Time	7 days

Epstein-Barr Virus Acute Panel

Laboratory	Chemistry
Order Code	EBVACUTE
CPT Code	86308 (Heterophile), 86665 (VCA IgM)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Pink top tube, Red top tube
Minimum	3.0 mL whole blood or TWO microtainers.
Reference Range	<pre> Reference range for both analytes (Heterophile IgM, VCA IgM): 0.8 AI or less: Negative 0.9-1.0 AI: Indeterminate 1.1 AI or greater: Positive</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	<u>Reference</u>: Klutts JS et al. Evidence-based approach for interpretation of Epstein- Barr virus serological patterns. J. Clin. Microbiol. 47(10): 3204-3210.
Methodology	Multiplex Flow Immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Epstein-Barr Virus Encoded RNA (EBER) by in situ Hybridization

Laboratory	Immunopathology
Order Code	EBER
Reference Range	Negative
Comments	Epstein-Barr Virus Encoded RNA (EBER) is intended for the detection of latent EBV infection by in situ hybridization on formalin fixed paraffin-embedded sections. The Epstein-Barr peptide nucleic acid (PNA) probe is complementary to the two nuclear EBER RNAs encoded by Epstein-Barr virus.
Methodology	In situ Hybridization
Analytic Time	Final results wihin 1 week.

Epstein-Barr Virus Full Ab Panel

Laboratory	Chemistry
Order Code	EBVPAN
CPT Code	86308 (Heterophile), 86664 (EBNA), 86665x2 (VCA IgG and IgM)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Pink top tube, Red top tube
Minimum	3.0 mL whole blood or TWO microtainers.
Reference Range	<pre> Reference ranges changed effective 12/11/2012. Reference range for all analytes (Heterophile IgM, VCA IgG, VCA IgM, EBNA): 0.8 AI or less: Negative 0.9-1.0 AI: Indeterminate 1.1 AI or greater: Positive</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	<u>Reference</u>: Klutts JS et al. Evidence-based approach for interpretation of Epstein- Barr virus serological patterns. J. Clin. Microbiol. 47(10): 3204-3210.
Methodology	Multiplex Flow Immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

ER

See:	 Estrogen Receptor, Tissue or FNA

Erythrocyte Folate

See:	 RBC Folate, Whole Blood

Erythrocyte Fragility

See:	 Osmotic Fragility, Erythrocyte, Whole Blood

Erythrocyte Porphyrin (EP)

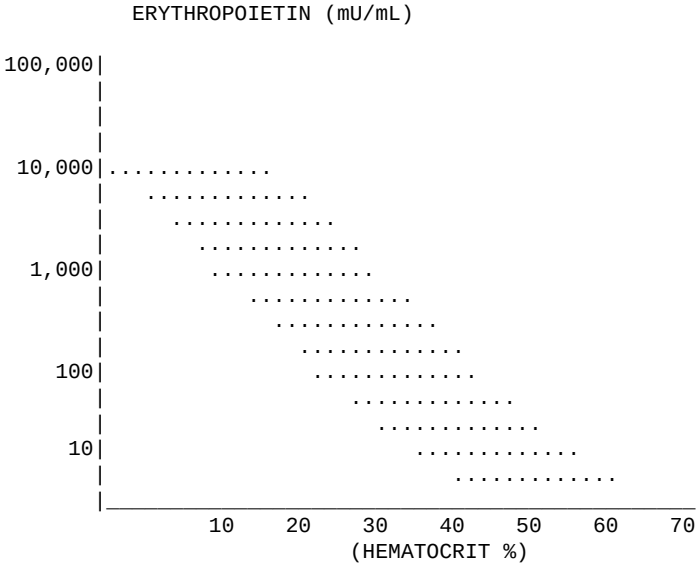
Laboratory	Commercial Mail-out Laboratory
Order Code	FEP
CPT Code	84202
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Recommended minimum: 1.0 mL whole blood from lavender top tube Absolute minimum: 0.5 mL whole blood from lavender top tube</pre>
Rejection Criteria:	Specimens not collected in EDTA. Clotted specimens.
Reference Range	0 - 35 mcg/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Extraction/Fluorometry
Analytic Time	5 days upon receipt at reference laboratory

Erythrocyte Sedimentation Rate

See:	 Sedimentation Rate (ESR), Whole Blood

Erythropoietin

Laboratory	Commercial Mail-out Laboratory
Order Code	EPO
CPT Code	82668
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Plasma Separator Tube, Call laboratory for additional acceptable specimen
Minimum	Preferred Minimum: 1.0 mL serum Call Specimen Control at 319-356-3527 for additional specimen types. If additional tests are going to be ordered, extra red top tubes may be needed. Please call the lab for consultation.
Rejection Criteria:	Bone Marrow aspirate. EDTA plasma specimens and hemolyzed specimens.
Reference Range	<pre> Normal serum concentrations of erythropoietin for 95% of individuals with normal hematocrits range from 4-27 mU/mL. As the hematocrit is lowered by iron deficiency, aplastic or hemolytic anemia, the concentration of erythropoietin increases as shown in the graph below. In the absence of anemia, elevated concentrations are seen in renal tumors, as a manifestation of renal transplant rejection, and in secondary polycythemia. Low values may be observed in hemochromatosis. Decreased erythropoietin concentrations with an elevated hematocrit are observed in patients with polycythemia rubra vera, and with a decreased hematocrit in patients with HIV infection who are receiving AZT. Patients on AZT who have anemia and erythropoietin concentrations of less than or equal to 500 mU/mL, may benefit from therapy with recombinant EPO (NEJM 322:1488-1493, 1990). EXPECTED ERYTHROPOIETIN CONCENTRATIONS IN PATIENTS WITH UNCOMPLICATED ANEMIA



	Source: Caro J and Erslev AJ. Erythropoietin assays and their use in the study of anemias. Contrib Nephrol 1988; 66:54-62. Review.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative Chemiluminescent Immunoassay
Analytic Time	4 working days upon receipt at reference laboratory

ESR

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See:  <br />Sedimentation Rate (ESR), Whole Blood
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Essential Fatty Acids

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Comments  <pre>
          Very Long Chain Fatty Acids will be performed by the Reference
          Laboratory in addition to Essential Fatty Acids.</pre>

     See:  <br />Very Long Chain Fatty Acids + Phytanic Acids, Plasma or Whole
          Blood
```

Estradiol (E2)

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Laboratory  Chemistry
Order Code  EDIOL
  CPT Code  82670
Collection Medium  <table>
                   <tr>
                   <td align=center></td></tr>
                   <tr>
                   <td width="110" valign="top" align="center">Plasma Separator Tube</td>
                   </tr>
                   </table>

Alternate Collection Media:  Call laboratory for additional acceptable specimen collection containers.
            Minimum  3 mL whole blood from light green top tube TWO microtainers
    Reference Range  <pre>
                     MALES                  7 - 42 pg/mL

                     FEMALES:
                       Follicular Phase    12 - 166 pg/mL
                       Ovulation Phase     85 - 498 pg/mL
                       Luteal Phase        43 - 211 pg/mL
                       Postmenopause       <5 - 54 pg/mL
                       Pregnancy
                         1st trimester    215 - 4300 pg/mL

                     CHILDREN (1-10 YEARS)
                         Boys              <5 - 20 pg/mL
                         Girls              6 - 27 pg/mL</pre>
       Order Form:  A-1a General Lab or Epic Req
          Comments  New analytical immunoassay with different reference ranges instituted
                    3/13/00 at 07:00.
      Methodology  Electrochemiluminescence
     Analytic Time  1 hour (upon receipt in laboratory)
    Testing Schedule  24 hrs/day, 7 days a week, including holidays.
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Estrogen

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See:  <br />Estradiol (E2), Plasma
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Estrogen Receptor

Laboratory	Immunopathology
Order Code	IERF
CPT Code	<pre> 88342 Estrogen Receptor 88342-26 Estrogen Receptor Professional Interpretation</pre>
Reference Range	The pathologist will provide an interpretive report.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	<pre> Please send a Surgical Pathology H-1 form to Immunopathology with this request. If ER studies are desired on previous surgical material, please send a requisition to Immunopathology, 5238 RCP. Provide the patient’s name, hospital number and surgical pathology specimen number. Estrogen Receptor (ER) expression status in breast carcinoma is an important prognostic and predictive biomarker according to recently published guidelines. ER status determination has become a part of the routine assessment of these tumors. About 60-70% of these tumors are ER positive, and this is associated with a more favorable prognosis than ER negative tumors. Immunohistochemical assessment of ER (as well as progesterone receptor) status has been recently documented to be superior to ligand binding assays in predicting response to hormonal manipulation in breast carcinoma. Immunohistochemical staining is performed on formalin-fixed, paraffin-embedded sections of tumor. An immunohistochemical (IHC) score is generated by the interpreting pathologist. A score of >2 has been used to define ER positivity.</pre>
See:	 Progesterone Receptor, Tissue or FNA
Methodology	Immunohistochemistry
Analytic Time	2 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Estrone

Laboratory	Commercial Mail-out Laboratory
Order Code	ESTR
CPT Code	82679
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult/Pediatric Minimum: 0.5 mL serum Absolute Minimum: 0.3 mL serum</pre>
Reference Range	<pre>Reference Intervals for Estrone-Children Tanner Stages: Males Females I less than 7 pg/mL less than 27 pg/mL II less than 11 pg/mL 1-39 pg/mL III 1-31 pg/mL 8-117 pg/mL IV and V 2-30 pg/mL 4-109 pg/mL Age Group Males Females 7-9 less than 7 pg/mL less than 20 pg/mL 10-12 less than 11 pg/mL 1-40 pg/mL 13-15 1-30 pg/mL 8-105 pg/mL 16-17 1-32 pg/mL 4-133 pg/mL Reference Intervals for Estrone-Adults Females 18 Years and Older Males 18 Years and Older Premenopausal: 9-36 pg/mL Early Follicular: less than 150 pg/mL Late Follicular: 100-250 pg/mL Luteal: less than 200 pg/mL Postmenopausal: 3-32 pg/mL </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	5 days upon receipt at reference laboratory

Ethanol, Urine

Laboratory	Chemistry
Order Code	UETOH
CPT Code	82055
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL random urine, no preservative
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> References: (1) Young DS. Effects of Drugs on Clinical Laboratory Tests. 3rd ed. Washington, DC: AACC Press; 1990. (2) Young DS. Effects of Preanalytical Variables on Clinical Laboratory Tests. Washington, DC: AACC Press; 19 93: 3-120, 3-121.</pre>
See:	 Ethanol/Volatiles Screen (EVS), Plasma
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Enzymatic (ethanol)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Ethanol/Volatiles Screen (EVS)

Laboratory	Chemistry
Order Code	EVS
CPT Code	82055
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers
Rejection Criteria:	Medico-legal specimens are not accepted.
Reference Range	<pre> None detected. Ethanol intoxication begins in the 50-100 mg/dL range. Critical value: >300 mg/dL</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Includes plasma ethanol by enzymatic analysis, plasma osmolality by freezing point depression osmometry and a calculated osmolality using plasma sodium, glucose and urea at no extra charge. See "Osmolality Gap - Calculation and Interpretation" for more detailed information. Samples with unexplained osmolar gap greater than 15 have "Ethylene glycol, plasma" (by immunoassay) run reflexively. For those samples, if the ethylene glycol plasma concentration does not account for the high osmolar gap, the pathology resident on-call is contacted. The resident will then investigate the case and contact the clinical service, if indicated. Elevated osmolar gaps may also be caused by methanol, isopropanol, propylene glycol, activated charcoal, mannitol, renal failure, and diabetic ketoacidosis, as well as by heavy ethanol consumption with high concentrations of ethanol metabolites (in some cases with little or no ethanol remaining) as may be seen in alcoholic ketoacidosis. Availability: as needed.
See:	 Alcohol, Plasma Ethylene Glycol, Plasma Glycols (Ethylene and Propylene), Plasma
See Appendix	See Additional Information: Chemistry Critical Lab Values Osmolality Gap - Calculation and Interpretation Osmolality Gap Calculator
Methodology	<pre> Enzymatic (ethanol); freezing point depression osmometry (osmolality); calculation (osmolality, calculated)</pre>
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Ethanol

Laboratory	Chemistry
Order Code	ETOH
CPT Code	82055
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers
Rejection Criteria:	Medico-legal specimens are not accepted.
Reference Range	None detected. Ethanol intoxication begins in the 50-100 mg/dL range. Critical value: >300 mg/dL
Order Form:	A-1a General Lab or Epic Req
Comments	Includes plasma ethanol by enzymatic analysis. For screening for substances other than ethanol, see "Ethanol/Volatile Screen (EVS)". Availability: as needed.
See:	 Alcohol, Plasma Ethanol/Volatiles Screen (EVS), Plasma Glycols (Ethylene and Propylene), Plasma
See Appendix	See Additional Information: Chemistry Critical Lab Values Osmolality Gap - Calculation and Interpretation Osmolality Gap Calculator
Methodology	Enzymatic (ethanol)
Analytic Time	1 hour (upon receipt in laboratory)

Ethosuximide Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	ETHOS
CPT Code	80168
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL of serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	40-100 μg/mL Toxic: >150 μg/mL
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Methodology	Enzyme ImmunoAssay
Analytic Time	2 working days upon receipt at reference laboratory

Ethyl Glucuronide Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	ETHYLG
CPT Code	80100
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	<pre> Preferred Minimum: 3 mL random urine Absolute Minimum: 2 mL random urine</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Purpose of test: Abuse Monitoring, Forensic Analysis, Compliance or Abuse Monitoring. If screen is positive, additional confirmation pricing will occur.</pre>
Methodology	Enzyme Immunoassay (EIA)
Analytic Time	7 working days upon receipt at reference laboratory

Ethylene Glycol

Laboratory	Chemistry
Order Code	EGLYC
CPT Code	82693
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Minimum	3 mL whole blood in light green top tube or ONE microtainer
Reference Range	Clinical toxicity may be seen with plasma concentrations of >10 mg/dL. Anion gap and arterial blood gas determinations may be useful in determining conversion of ethylene glycol to toxic metabolites. Critical value: Ethylene glycol 10 mg/dL or greater
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test uses an enzymatic assay for measurement of ethylene glycol (see Reference #3). Will be reflexively ordered after Ethanol/Volatiles Screen with an unexplained osmolar gap > 15. May also be directly ordered in cases of suspected ethylene glycol ingestion. This procedure individually quantitates ethylene glycol. This procedure is not suitable for the detection of other toxic alcohols including methanol and isopropanol. If methanol or isopropanol ingestion is suspected, see test "Alcohol, Plasma." Ethylene glycol is commonly found in many automobile antifreezes.
See:	 Alcohol, Plasma Ethanol/Volatiles Screen (EVS), Plasma Glycols (Ethylene and Propylene), Plasma
See Appendix	See Additional Information: Chemistry Critical Lab Values Osmolality Gap - Calculation and Interpretation Osmolality Gap Calculator
Methodology	Enzymatic Assay using glycerol dehydrogenase

Euglobulin Clot Lysis Time

Comments	"This test has been discontinued effective 2/21/05. Suggested replacement is listed at the link below."
See:	 Plasminogen, Plasma

Everolimus

Laboratory	Chemistry
Order Code	EVER
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Preferred Minimum: 3 mL whole blood in lavender (EDTA) tube or TWO lavender top (EDTA) microtubes for pediatric patients. Absolute Minimum: 0.3 mL whole blood in lavender (EDTA) tube or ONE lavender top (EDTA) microtube for pediatric patients.
Rejection Criteria:	Serum, plasma, clotted samples, and specimens ambient longer than 24 hours.
Reference Range	3.0 - 8.0 ng/mL
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	Everolimus (Zortress®, Certican®, Afinitor®) whole blood concentrations can be measured by either chromatographic or immunoassay methodologies. These two methodologies are not directly interchangeable, and the measured everolimus whole blood concentration depends upon the type of assay used. Sirolimus (rapamycin) cross-reacts significantly with the everolimus immunoassay. Everolimus blood concentrations cannot be determined reliably in patients whose blood has both sirolimus and everolimus. This can occur when patients are being transitioned from sirolimus to everolimus or everolimus to sirolimus. In transitioning patients from sirolimus to everolimus, the long therapeutic half-life of sirolimus (~2-3 days) should be kept in mind.
Methodology	Turbidimetric Immunoassay
Analytic Time	Results available 1200 daily.
Testing Schedule	One batch per day. Cutoff time for same day service is 0900.

EVS

See:	 Ethanol/Volatiles Screen (EVS), Plasma

Eye Pathology

Comments	Consult the FC Blodi Eye Pathology Laboratory website for details.

F

Factor Assay, Coagulation

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See:  <br />Factor II Assay, Plasma
      <br />Factor IX Assay, Plasma
      <br />Factor V Assay, Plasma
      <br />Factor VII Assay, Plasma
      <br />Factor VIII Assay, Plasma
      <br />Factor X Assay, Plasma
      <br />Factor XI Assay, Plasma
      <br />Factor XII Assay, Plasma
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Factor B Level

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Laboratory  Commercial Mail-out Laboratory
Order Code  FBL
CPT Code  86160
Collection Medium  <table>
                   <tr>
                   <td align=center></td></tr>
                   <tr>
                   <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA)
                   </tr>
                   </table>

Minimum  Preferred Minimum:  1 mL plasma in lavender top tube<br />
         Pediatric Minimum:  250 &#956;L plasma in lavender top tube
Rejection Criteria:  Thawed specimen.
Reference Range  Human Male: 127.6-278.5 mcg/mL<br />
                 Human Female: 127.6-278.5 mcg/mL
Order Form:  A-1a Miscellaneous Request or Epic Req
Comments  Please print, complete and submit the <a href="http://www.nationaljewish.
          lab, with
          the specimen and the A-1a Miscellaneous Request.

Methodology  Radial Immunodiffusion (RID)
```

Factor I Level

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Laboratory  Commercial Mail-out Laboratory
Order Code  FIL
CPT Code  86160
Collection Medium  <table>
                   <tr>
                   <td align=center></td></tr>
                   <tr>
                   <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA)
                   </tr>
                   </table>

Minimum  <pre>
         Preferred Minimum:  1 mL
         Absolute Minimum:  0.5 mL</pre>
Reference Range  29.3 - 58.5 mcg/mL
Order Form:  A-1a Miscellaneous Request or Epic Req
See Appendix  See Additional Information: <br />
              Specimens Requiring Immediate Delivery
Methodology  Radial Immuno Assay
Analytic Time  4 weeks
```

Factor II Assay

Laboratory	Hemostasis/Thrombosis
Order Code	FC2
CPT Code	85210
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	All factors are reported as greater than 50%.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Factor IX Assay

Laboratory	Hemostasis/Thrombosis
Order Code	FC9
CPT Code	85250
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	All factors are reported as greater than 50%.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Factor V

See:	 Factor II Assay, Plasma

Factor V Assay

Laboratory	Hemostasis/Thrombosis
Order Code	FC5
CPT Code	85220
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	All factors are reported as greater than 50%.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Factor VII Assay

Laboratory	Hemostasis/Thrombosis
Order Code	FC7
CPT Code	85230
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	All factors are reported as greater than 50%.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Factor VIII Assay

Laboratory	Hemostasis/Thrombosis
Order Code	FC8
CPT Code	85240
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	All factors are reported as greater than 50%.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Factor VIII Related Antigen

See:	 Von Willebrand Antigen Assay, Plasma

Factor X Assay

Laboratory	Hemostasis/Thrombosis
Order Code	FC10
CPT Code	85260
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	All factors are reported as greater than 50%.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Factor XI Assay

Laboratory	Hemostasis/Thrombosis
Order Code	FC11
CPT Code	85270
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	All factors are reported as greater than 50%.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Factor XII Assay

Laboratory	Hemostasis/Thrombosis
Order Code	FC12
CPT Code	85280
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	All factors are reported as greater than 50%.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Factor XIII Screen

Laboratory	Hemostasis/Thrombosis
Order Code	F13
CPT Code	85291
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	Normal
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw
Methodology	Visual detection.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Familial Medullary Thyroid Carcinoma (FMTC)

See:	 RET Gene Analysis Common Variants, Whole Blood

Familial Partial Lipodystrophy, Dunnigan Type, FPLD2

See:	 Lamin (LMNA) Full Gene Sequence with Interpretation, Whole Blood

Farmer‘s Lung Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	FARM
CPT Code	86003 x4 IgE specific allergens; 86331 x7 Gel Diffusion Qualitative; 86606 x5 Aspergillus
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: Two 2.5 mL aliquots of serum from red top tube Absolute Minimum: 1 mL serum from red top tube Pediatric Minimum: 1 mL serum from red top tube</pre>
Rejection Criteria:	Contaminated, hemolyzed, or severely lipemic specimens.
Reference Range	<pre>

Components	Reference Interval
A. fumigatus #1 Ab, Precipitin	None detected
A. fumigatus #6 Ab, Precipitin	None detected
A. pullulans Ab, Precipitin	None detected
Pigeon Serum, Ab, Precipitin	None detected
M. faeni Ab, Precipitin	None detected
T. vulgaris #1 Ab, Precipitin	None detected
A. flavus Ab, Precipitin	None detected
A. fumigatus #2 Ab, Precipitin	None detected
A. fumigatus #3 Ab, Precipitin	None detected
S. viridis Ab, Precipitin	None detected
T. candidus Ab, Precipitin	None detected
T. sacchari Ab, Precipitin	None detected
Allergen, Fungi & Molds, Phoma betae	Less than 0.10 kU/L: No significant level detected 0.10-0.34 kU/L: Clinical relevance undetermined 0.35-0.70 kU/L: Low 0.71-3.50 kU/L: Moderate 3.51-17.50 kU/L: High 17.51 kU/L or Greater: Very High
Allergen, Food, Beef	Less than 0.10 kU/L: No significant level detected 0.10-0.34 kU/L: Clinical relevance undetermined 0.35-0.70 kU/L: Low 0.71-3.50 kU/L: Moderate 3.51-17.50 kU/L: High 17.51 kU/L or Greater: Very High
Allergen, Food, Pork	Less than 0.10 kU/L: No significant level detected 0.10-0.34 kU/L: Clinical relevance undetermined 0.35-0.70 kU/L: Low 0.71-3.50 kU/L: Moderate 3.51-17.50 kU/L: High 17.51 kU/L or Greater: Very High
Allergen, Epidermals & Animal Proteins, Feather Mix</pre>	Negative

Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please include relevant clinical information on test order form. Testing includes antibodies directed at Aspergillus fumigatus #1, Aspergillus fumigatus #6, Aureobasidium pullulans, Micropolyspora faeni, Thermoactinomyces vulgaris #1, Aspergillus flavus, Aspergillus fumigatus #2, Aspergillus fumigatus #3, Saccharomonospora viridis, Thermoactinomyces candidus and Thermoactinomyces sacchari.
Methodology	Qualitative Immunodiffusion/Quantitative ImmunoCAP Fluorescent Enzyme

Immunoassay
Analytic Time 3-7 days upon receipt at reference laboratory

Farr Assay

See:
Double Stranded DNA Antibody, Plasma

Fasting Blood Sugar (FBS)

See:
Glucose, Plasma

Fat Pad Aspiration, for Amyloid

Laboratory: Cytopathology
CPT Code: 88170 and 88173 (technical and professional)
Minimum: Slides labeled with the patient name. 4-5 air dried slides and 1-2 slides fixed immediately with cell spray fixative (available on floors and in clinics). Deliver to the lab. After 1700 daily, weekends and holidays, deliver to Specimen Control (6240 RCP).
Reference Range: The pathologist will provide an interpretative report.
Order Form: H-2 Cytopathology or Epic Req
Comments: The requisition with complete patient history and specific request for identification of amyloid must accompany the specimen.

Analytic Time: 3 days

Fat

Laboratory: Commercial Mail-out Laboratory
Order Code: FATF
CPT Code: 82710
Collection Medium: <table>
<tr>
<td align=center></td></t
<tr>
<td width="110" valign="top" align="center">24, 48, 72 hour fecal specime
</tr>
</table>

Minimum: <pre>
Absolute minimum is 5 grams.
Prefer 48 hr or 72 hr collection (24 hr accepted)
All specimens required to be in special containers available from Specimen Control, 6240 RCP.
Specimen container should not be filled more than one-half full.
Do not freeze until collection is completed. Keep frozen until delivered to lab.</pre>
Rejection Criteria: Specimens in unapproved containers.
Reference Range: <pre>
Timed collection: > or =18 years: 2-7 g fat/24 hours
Reference values have not been established for patients who are <18 years of age.

Random collection: All ages: 0-19 % fat</pre>
Order Form: A-1a Miscellaneous Request or Epic Req
Comments: <pre>
Indicate length of collection period on requisition.
Barium interferes with test procedure; wait 48 hours after Barium procedure before starting collection.
For 3 days prior to and during the collection period:
A. Patient should be on a fat-controlled diet (100-150 g fat per day).
B. No laxatives (particularly mineral oil and castor oil).
C. No synthetic fat substitutes (eg, Olestra) or fat-blocking nutritional supplements.
Babies: Feces can be collected from diaper; small amounts of urine do not interfere.</pre>

Methodology: Nuclear Magnetic Resonance (NMR) Spectroscopy
Analytic Time: 1 week upon receipt at reference laboratory

Fat, Fecal Qualitative

Laboratory	Commercial Mail-out Laboratory
Order Code	EXFAT
CPT Code	82705
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Feces specimen, stool contain </tr> </table>
Minimum	Preferred Minimum: 5 g random stool Absolute Minimum: 1 g random stool
Rejection Criteria:	Diapers. Specimens in media or preservatives.
Reference Range	Normal
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Upon collection, sample must be frozen within 1 hour or refrigerated up to 36 hours.
Methodology	Qualitative Microscopic/Stain
Analytic Time	1-2 days upon receipt at reference laboratory

Fatty Acid Oxidation Probe

Laboratory	Commercial Mail-out Laboratory
Order Code	FATACIDP
CPT Code	82017, 80500
Collection Medium	Miscellaneous container; contact laboratory
Minimum	<pre> Fibroblasts: TWO T-25 flasks filled to neck with culture media Skin biopsy: 4-mm punch, submitted to Cytogenetics Laboratory for Fibroblast growth. Fibroblasts are submitted then to the reference laboratory.</pre>
Reference Range	By interpretive report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the following with the appropriate signatures and the correct sample type: Molecular Genetics - Congenital Inherited Diseases Patient Information Sheet and the Informed Consent for DNA Testing from Mayo Medical Laboratories with the A-1a Miscellaneous Request.
See:	 RBC Total Lipid Fatty Acid, Serum
Methodology	Fibroblasts incubated with Enriched Medium followed by Tandem Mass Spectrometry (MS-MS) for Acylcarnitines
Analytic Time	2 weeks upon receipt at reference laboratory

Fatty Acids, Very Long Chain

See:	 Very Long Chain Fatty Acids + Phytanic Acids, Plasma or Whole Blood

FB Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	FBMORL
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href= "http://www.healthcare.uic from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. <u>The reference laboratory offers a known familial variant test. If you want to order the known familial variant version of the test, please order LAB7837</u>.
Methodology	Oligonucleotide primers have been designed to amplify each exon of CFB. Because CFB contains many non-disease causing polymorphisms, it is sequenced directly using overlapping primer sets.
Analytic Time	3 months

FBN1 Gene Analysis Dup/Delet Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	FBNDD
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	4 mL whole blood from pink top (K2EDTA) tube
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Laboratory Test Requisition Form from Connective Tissue Gene Tests with the specimen and the A-1a Miscellaneous Request or Epic Req. FBN1 sequencing is done as a first step. If sequencing is negative the provided may move on to the DD-deletion/duplication test next.
See:	 FBN1 Gene Analysis Full Gene Sequence, Whole Blood
Analytic Time	2 weeks upon receipt at reference laboratory

FBN1 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	FBN1
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Adult minimum: 6 mL whole blood from pink top (EDTA) tube Pediatric minimum: 5 mL whole blood from pink top (EDTA) tube Infant minimum: 2-3 mL whole blood from pink top (EDTA) tube Alternate collection media: Tissue: frozen (preferred), Formalin-fixed, Paraffin embedded, CVS, fibroblasts, amniocytes, or extracted DNA.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Laboratory Test Requisition Form from Connective Tissue Gene Tests with the specimen and the A-1a Miscellaneous Request. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Analytic Time	2 weeks upon receipt at reference laboratory

5-FC (5-Fluorocytosine) Assay

Comments	Effective April 27, 2004, testing for 5-Fluorocytoseine will be mailed to a commercial laboratory. Contact 356-3527 for additional information.
See:	 5-Flucytosine, Antimicrobial Drug Level, Serum

FDP

See:	 Fibrin Degradation Products (FDP), Serum

Fecal Fat, Quantitative

See:	 Fat, Feces

Fecal Occult Blood - Immunochemical (Hemoccult ICT)

Laboratory	Chemistry
Order Code	FOBICT
CPT Code	82274
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Hemoccult ICT Collection Card </tr> </table>
Minimum	Submit two home stool samples on the respective spots on a Hemoccult ICT Slide for Home Application (#60068) available from Hospital Stores.
Rejection Criteria:	Samples not received within 14 days of collection. Fecal specimens not placed in the proper home application slides.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Testing should not be performed with actively bleeding hemorrhoids or during menstruation. It is strongly recommended not to use stool specimens obtained by digital rectal examination because of low sensitivity for detection of colorectal cancers or precursor lesions. Immunochemical methods are predominantly sensitive to lower gastrointestinal (GI) tract bleeding, particularly for screening for colorectal cancer lesions. Guaiac-based cards are preferred for detection of upper GI bleeding (e.g., workup of patient with apparent active GI bleeding).
Methodology	The fecal occult blood test detects the presence of human hemoglobin by an immunochemical method. Unlike guaiac-based cards, this immunochemical method is NOT subject to interferences by red meat, plants, and vitamin C (ascorbic acid).
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Fecal Occult Blood, Guaiac Screen

Laboratory	Chemistry
Order Code	GUAIAC
CPT Code	82270
Collection Medium	<table> <tr> <td align=center></ <tr> <td width="110" valign="top" align="center">Slides Hemoccult - Hospital S </tr> </table>
Minimum	Hemoccult card with specimen applied
Rejection Criteria:	The laboratory will only accept the Hemoccult card with the specimen applied. Stool specimens will not be accepted and will be returned to the sending area.
Reference Range	Negative
Order Form:	A-1a General Lab or Epic Req
Comments	The laboratory will not stock the card, only the reagents to perform the test.
Methodology	Guaiac
Analytic Time	20 minutes
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Felbamate Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	FBM
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Green top tube 4 mL (Na Heparin), Lavender top tube 3 mL (EDTA), Pink top
Minimum	<pre> Adult and Pediatrics Preferred Minimum: 1.0 mL serum Adult and Prediatrics Absolute Minimum: 0.5 mL serum</pre>
Rejection Criteria:	Gel separator tubes
Reference Range	Therapeutic Range: Not well established Toxic Level: Greater than 200 μg/mL
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Methodology	High Performance Liquid Chromatography (HPLC)
Analytic Time	1 week upon receipt at reference laboratory

Fentanyl and Metabolite

Laboratory	Commercial Mail-out Laboratory
Order Code	FENU
CPT Code	83925
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	<pre> Preferred Minimum: 4 mL urine (with no additives or preservatives) Absolute Minimum: 0.5 mL urine</pre>
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles.
Reference Range	By report
Methodology	LC-MS/MS
Analytic Time	5 days upon receipt at reference laboratory

FEP

See:	 Erythrocyte Porphyrin (EP), Whole Blood

Ferritin

Laboratory	Chemistry
Order Code	FRTN
CPT Code	82728
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers.
Reference Range	<pre> Manufacturer's reference range: Adult male 22 - 322 ng/mL Adult female 13 - 150 ng/mL See also: Am J Clin Path, 70: 79, 1978; Can Med Assoc J, 114: 417, 1976 Iron deficiency 0-20 ng/mL</pre>
Order Form:	A-1a General Lab or Epic Req
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Fetal Bleed Screen

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	FBST
CPT Code	86905
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	2 mL; maternal specimen
Rejection Criteria:	Specimen must be labeled with patient’s first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Reference Range	Negative result means no abnormal amount of fetal red blood cells has been detected in the maternal circulation.
Order Form:	DeGowin Blood Center Requisition
Comments	Fetal blood screening test will only be performed when fetus/infant has been typed as Rh-positive. Quantitative assay will automatically be ordered if the screen is positive.
Methodology	Indicator cell rosette test for fetomaternal hemorrhage
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Fetal Erythrocyte Quantitation

Laboratory	Flow Cytometry Service
Order Code	FHGB
CPT Code	88184
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	1 mL whole blood
Reference Range	<pre> Reference range is less than 0.45% Positive specimens reported as percent of maternal cells. Note: This reference range is established as the level at which greater than the usual 300 micrograms dose administered to Rh-negative women at delivery is required to prevent sensitization. The normal "Hemoglobin F value" for non-pregnant adults is less than 0.1%.</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	<pre> Please identify as MATERNAL or FETAL specimen. Screening test for fetal-maternal bleed. This test replaces the Kleihauer-Betke stain.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow Cytometry
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Fetal Fibronectin

Laboratory	Hematology
Order Code	FFN
CPT Code	82731
Collection Medium	Miscellaneous container; contact laboratory
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The Rapid FFN result should also be used in conjunction with information from clinical evaluation of the patient and other diagnostic procedures, such as cervical examination, cervical microbiological culture, assessment of uterine activity and evaluation of other risk factors.
Methodology	Specific monoclonal antibody
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Fetal Hemoglobin

See:	 Fetal Erythrocyte Quantitation, Peripheral Blood (maternal)

FH Autoantibody Dense Deposit Disease (Renal Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	FHDDD
CPT Code	83516 (x18)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 5 mL serum from whole blood Absolute Minimum: 2 mL serum from whole blood
Reference Range	Normal: <300 units Reported as negative or positive (if postive the titer will be in parenthesis)
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Special Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Enzyme Linked Immuno-Sorbent Assay (ELISA)
Analytic Time	1 month

Fiber Optic Bronchoscopy (FOB)

See:	 Bronchial Brush Cytology, Bronchial Brush Bronchial Wash Cytology, Bronchial Wash

Fibrin Degradation Products (FDP)

Laboratory	Hemostasis/Thrombosis
Order Code	FDP
CPT Code	85362
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Fibrin Degradation Product tu </tr> </table>
Minimum	2 mL; special FDP tube either soy trypsin or soy trypsin inhibitor/Bothrops Atrox venom
Reference Range	<10 mcg/mL
Order Form:	A-1a General Lab or Epic Req
Comments	Special FDP tube (924089) is filled with a maximum of 2 mL of whole blood. Mix tube quickly after filling and allow to clot. Values >80 mcg/mL can be titered on request by calling the Clinical Pathology Resident on call or obtaining a Hematology consult.
Methodology	Latex agglutination.
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Fibrin Split Products

See:	 Fibrin Degradation Products (FDP), Serum

Fibrinogen

Laboratory	Hemostasis/Thrombosis
Order Code	FIBG
CPT Code	85384
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 1.8 mL (N </tr> </table>
Minimum	Full draw; 1.8 mL light blue top (mix well). Tube must be at least 90% full.
Reference Range	180-400 mg/dL Critical value: <u><</u>80 mg/dL
Order Form:	A-1a General Lab or Epic Req
Comments	Fibrinogen may be performed on the same collection tube as Activated Partial Thromboplastin time (aPTT) and Prothrombin Time (PT).
See Appendix	See Additional Information: Hematology Critical Lab Values Phlebotomy Tubes and Order of Draw
Methodology	Activity by optical clot detection.
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Fibrinogen Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	FIBAG
CPT Code	85385
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	<pre> Adult preferred minimum: 2 mL platelet poor plasma Adult absolute minimum: 1 mL platelet poor plasma Pediatric preferred minimum: 1 mL platelet poor plasma Pediatric absolute Minimum: 0.5 mL platelet poor plasma</pre>
Rejection Criteria:	Serum; hemolyzed specimens
Reference Range	149-353 mg/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Radial Immunodiffusion
Analytic Time	1 week upon receipt at reference laboratory

Fibroblast Growth Factor 23

Laboratory	Commercial Mail-out Laboratory
Order Code	FGF23
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	1.5 mL Plasma to reference laboratory.
Rejection Criteria:	Grossly hemolyzed.
Reference Range	Results may be significantly elevated (ie, >900 RU/mL) in normal infants <3 months of age. 3 months-17 years: < or =230 RU/mL > or =18 years: < or =180 RU/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Fibroblast growth factor 23 (FGF23) is a major regulator of phosphate homeostasis. It may act in concert with several other less well characterized phosphate regulators. FGF23 is secreted primarily by bone, followed by thymus, heart, brain and, in low levels, by several other tissues. It is coexpressed with the X-linked phosphate-regulating endopeptides (PHEX). High serum phosphate levels stimulate FGF23 expression and secretion through as yet poorly understood mechanisms. PHEX appears to modulate this process, possibly in part through cleavage of FGF23. Only intact FGF23 is considered bioactive. It interacts with a specific receptor on renal tubular cells, decreasing expression of type IIa sodium/phosphate cotransporters, resulting in decreased phosphate reabsorption. In addition, gene transcription of 1-a-hydroxylase is downregulated, reducing bioactive 1,25-dihydroxy vitamin D (1,25-2OH-VitD), thereby further decreasing phosphate reabsorption. Eventually, falling serum phosphate levels lead to diminished FGF23 secretion, closing the feedback loop. Measurement of serum FGF23 can assist in diagnosis and management of disorders of phosphate and bone metabolism in patients with either normal or impaired renal function. When FGF23 levels are pathologically elevated in individuals with normal renal function, hypophosphatemia, with or without osteomalacia, ensues. This can occur with rare, usually benign, mixed connective tissue tumors that contain characteristic complex vascular structures, osteoclast-like giant cells, cartilaginous elements and dystrophic calcifications. These neoplasms secrete FGF23 ectopically and autonomously (oncogenic osteomalacia). In less than 1/4 of cases, a different benign or malignant, soft tissue tumor type, or, extremely rarely, a carcinoma, may be the cause of paraneoplastic FGF23 secretion. In either scenario, complete removal of the tumor cures the oncogenic osteomalacia. Hypophosphatemia and skeletal abnormalities are also observed in X-linked hypophosphatemia (XLH) and autosomal dominant hypophosphatemic rickets (ADHR). In XLH, mutations of PHEX reduce its negative modulatory effect on bioactive FGF23 secretion. In ADHR, FGF23 mutations render it resistant to proteolytic cleavage, thereby increasing FGF23 levels. However, not all FGF23 mutations increase renal phosphate secretions. Mutations that impair FGF23 signaling, rather than increase its protease resistance, are associated with the syndrome of familial tumoral calcinosis (ectopic calcifications) with hyperphosphatemia. In patients with renal failure, FGF23 contributes to renal osteodystrophy. The patient’s kidneys can no longer excrete sufficient amounts of phosphate. This leads to marked increases in FGF23 secretions in a futile compensatory response, aggravating the 1,25-2OH-VitD deficiency of renal failure and the consequent secondary hyperparathyroidism. <u>Useful for</u>: *Diagnosing and monitoring oncogenic osteomalacia

*Possible localization of occult neoplasms causing o
 osteomalacia
*Diagnosing X-linked hypophosphatemia or autosomal d
 hypophosphatemic rickets
*Diagnosing familial tumoral calcinosis with hyperph
*Predicting treatment response to calcitriol or vita
 in patients with renal failure

<u>Cautions</u>:
FGF23 levels must always be interpreted in conjuncti
phosphate measurements, as FGF23 will be elevated in
conditions that cause hyperphosphatemia in vivo. The
failure, severe catabolic states (eg, severe systemi
uncontrolled type I diabetes mellitus, severe starva
toxicity, intravenous phosphate treatment and very h
(eg, diets based largely on processed meats, process
dairy products), advanced malignancy (particular wit
crush or other significant muscle injury or destruct
some endocrine disorders, in particular hypoparathyr
acromegaly. With the exception of renal failure, FGF
will not contribute to diagnosis or patient manageme
situations.

Methodology	Immunometric Enzyme Assay
Analytic Time	1 day upon receipt at reference laboratory.
Testing Schedule	Test performed once a week on Tuesday.

FibroSpect II

Laboratory	Commercial Mail-out Laboratory
Order Code	FIBII
CPT Code	83883, 83520(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Adult Minimum: 2 mL serum Absolute Minimum: 1 mL serum Pediatric Absolute Minimum: 0.5 mL serum</pre>
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	By report
Analytic Time	1 week upon receipt at reference laboratory

Fine Needle Aspiration (FNA), Radiologic Guided

Laboratory	Cytopathology
CPT Code	<pre> 88172 (immediate evaluation of fine needle aspiration for adequacy - per pass) 88173 (interpretation and report)</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
Comments	The referring physician must complete a H-2 cytologic consultation form.
Analytic Time	24 to 72 hours, dependent upon adjunct studies required.
Testing Schedule	0800-1700 Monday through Friday. For additional services, contact the Cytopathology Fellow on-call at pager #3099.

Fine Needle Aspiration (FNA), Superficial

Laboratory	Fine Needle Aspiration Clinic
CPT Code	<pre> 10021 (FNA; without image guidance - professional) 88172 (FNA for adequacy per pass) 88173 (FNA interpretation and report)</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
Comments	Refer patient to FNA clinic located on the second floor of the Clinical Cancer Center, Suite 21503 (West addition). The referring physician must complete a H-2 cytologic consultation form which accompanies the patient. Patient history and site of aspiration must be provided on the form. Referring physician must include a pager number and/or telephone number where he/she can be reached. Same day turnaround on most cases.
Analytic Time	2 days
Testing Schedule	0800-1700 Monday through Friday. For additional services, contact the Cytopathology Fellow on-call at pager #4040.

FIP1L1-PDGFRA (Del(4q12))

Laboratory	Commercial Mail-out Laboratory
Order Code	FIP
CPT Code	88275, 88271 (x3)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	Absolute Minimum: 1 mL bone marrow or 3 mL whole blood
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	To order this test on a paraffin block, contact the Bone Marrow Lab in Core. Please call 356-2543 for assistance. The Bone Marrow Lab will work directly with the Mailout Lab to facilitate testing.
Methodology	Fluorescence in situ hybridization (FISH)
Analytic Time	10 days upon receipt
Testing Schedule	Reference laboratory sets this test up on Mondays. Reports 8-16 days after set-up.

FISH

See:	 Fluorescence In-Situ Hybridization (FISH-Aneuploidy Screening), Peripheral Blood (Newborn or Cord, and Others) Fluorescence In-Situ Hybridization (FISH-Bladder Carcinoma), Voided Urine, Bladder Wash Fluorescence In-Situ Hybridization (FISH-Bone Marrow), Bone Marrow Fluorescence In-Situ Hybridization (FISH-Hematological Blood), Peripheral Blood Fluorescence In-Situ Hybridization (FISH-Microdeletion), Peripheral Blood, Bone Marrow, Fibroblasts, Other Tissue Fluorescence In-Situ Hybridization (FISH-Prenatal-Aneuploidy/Microdeletion), Amniocytes, Chorionic Villi Fluorescence In-Situ Hybridization (FISH-Tumors), Tumor Tissue

FKRP Full Gene Sequence with Interpretation

Laboratory	Molecular Pathology
Order Code	FKRPSEQ
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults - 3 mL whole blood in lavender top tube (EDTA) Children - 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Reference Range	Normal
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Testing requires dedicated collection tube.
Methodology	Sequence analysis of the coding region of the FKRP gene.
Analytic Time	21 days
Testing Schedule	Weekly

FKTN

See:	 Fukutin (FKTN) Full Gene Sequence with Interpretation, Whole Blood Fukutin Retrotransposon Insertion Variant (FKTN) with Interpretation, Whole Blood

Flecainide Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	FLE
CPT Code	82486
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL serum Absolute Minimum: 0.5 mL serum
Rejection Criteria:	Gel separator tubes or gels of any kind; drug loss is immediate and no testing will be performed.
Reference Range	<pre> Therapeutic Range: 0.2 - 1.0 mcg/mL Toxic: > 1.5 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-2 days upon receipt at reference laboratory.

Flexeril

See:	 Cyclobenzaprine (Flexeril) Drug Level, Serum or Plasma

Flow Cytometry

See:	 Chronic Lymphocytic Leukemia, Various Immunodeficiency Evaluations; Adult and Pediatric, Peripheral Blood

FLT3/NPM1 Gene Analysis Order with Interpretation, Bone Marrow

Laboratory	Molecular Pathology
Order Code	FLT3BM
CPT Code	81245, 81310, 81479
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	3 mL bone marrow Specimens for which the AML blast count is at least 10% will be tested. Testing on smaller volumes may be attempted. However, this may compromise the ability to perform testing. Testing requires a dedicated collection tube.
Reference Range	<pre> Expected PCR fragment sizes for each DNA target are provided below for unaffected and affected samples. The vast majority of affected persons harboring one or more of these mutations are heterozygous, meaning both products are present at the diagnostic locus. Unaffected Affected (negative) (positive) FLT3-ITD: 330 bp >330 bp FLT3-D835: 67 bp 197 bp NPM1: 426 bp 430 bp</pre>
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	FLT3 and NPM1 Mutation Detection Assays test for two different mutations in the FLT3 gene and an insertion in exon 12 of the NPM1 gene, all of which are somatic mutations associated with acute myelogenous leukemia (AML). These molecular markers are useful in diagnosis and clinical stratification of AML patients. Detection of FLT3 in-frame internal tandem duplications (FLT3-ITD mutation) is performed as a mail-out test (sent to a reference laboratory), whereas the assays that detect FLT3 point mutations that alter the aspartic acid at position 835 (FLT3-D835) and the NPM1 mutations are performed in the University of Iowa Molecular Pathology Laboratory. To avoid confusion, the results for all 3 targets are reported together in a consolidated interpretation.
Methodology	Multiplex PCR followed by Eco RV digestion with fluorescent fragment analysis on the ABI 3130 (capillary electrophoresis).
Analytic Time	7 working days
Testing Schedule	0800-1700 Testing offered once per week excluding weekends and University holidays.

FLT3/NPM1 Gene Analysis with Interpretation

Laboratory	Molecular Pathology
Order Code	FLT3/NPM1
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	3 mL of peripheral blood or bone marrow aspirate. Specimens for which the AML blast count is at least 10% will be tested. Testing on smaller volumes may be attempted. However, this may compromise the ability to perform testing. Testing requires a dedicated collection tube.
Reference Range	<pre> Expected PCR fragment sizes for each DNA target are provided below for unaffected and affected samples. The vast majority of affected persons harboring one or more of these mutations are heterozygous, meaning both products are present at the diagnostic locus. Unaffected (negative) / Affected (positive) FLT3-ITD: 330 bp / >330 bp FLT3-D835: 67 bp / 197 bp NPM1: 426 bp / 430 bp</pre>
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	FLT3 and NPM1 Mutation Detection Assays test for two different mutations in the FLT3 gene and an insertion in exon 12 of the NPM1 gene, all of which are somatic mutations associated with acute myelogenous leukemia (AML). These molecular markers are useful in diagnosis and clinical stratification of AML patients. Detection of FLT3 in-frame internal tandem duplications (FLT3-ITD mutation) is performed as a mail-out test (sent to a reference laboratory), whereas the assays that detect FLT3 point mutations that alter the aspartic acid at position 835 (FLT3-D835) and the NPM1 mutations are performed in the University of Iowa Molecular Pathology Laboratory. To avoid confusion, the results for all 3 targets are reported together in a consolidated interpretation.
Methodology	Multiplex PCR followed by Eco RV digestion with fluorescent fragment analysis on the ABI 3130 (capillary electrophoresis).
Analytic Time	7 working days
Testing Schedule	0800-1700 Testing offered once per week excluding weekends and University holidays.

5-Flucytosine, Antimicrobial Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	5FLUC
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Serum - Draw blood in a plain, red-top tube(s). Send 1 mL Serum for a peak (1-2 hr after oral dose, 30 min after intravenous infusion). (Absolute Serum Minimum: 0.3 mL) Trough samples should be drawn immediately prior to next scheduled dose.</pre>
Rejection Criteria:	Gel separator tubes.
Reference Range	<pre> SERUM Peak: >25.0 mcg/mL Toxic: >100.0 mcg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Serum is the only acceptable sample.
Methodology	Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)
Analytic Time	2 working days upon receipt at reference laboratory

Fluid Differential

See:	 Body Fluid Cell Count and Differential, Miscellaneous Body Fluids

Flunitrazepam + Metabolites, Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	FLUNITS
CPT Code	80101; if positive add 80154.
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Collect TWO full 6 mL red top tubes. Preferred Minimum: 4 mL serum from red top tubes. Absolute Minimum: 1.4 mL serum from red top tubes.</pre>
Rejection Criteria:	Gel separator tubes
Reference Range	By report.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	All positive screens will be confirmed by reference laboratory.
Methodology	Qualitative High Performance Liquid Chromatography-Tandem Mass Spectrometry/Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	Testing varies; usually reports within 3-9 days upon receipt at reference laboratory.

Fluorescence In Situ Hybridization for Her-2/neu

Laboratory	Immunopathology
Order Code	FCERB
CPT Code	88368
Minimum	Only breast tissue, 10% formalin fixed paraffin blocks are accepted. Total time of tissue in formalin is required information and must be recorded on the requisition. If IHC Her2Neu results are available please send results, and corresponding slides if possible.
Reference Range	<pre> The results are reported as a ratio of HER2 signals to chromosome 17 centromere signals. 1) A ratio >2.2 is consistent with amplification of the HER2 gene sequence 2) A ratio of 1.8-2.2 is a borderline finding and requires further testing. 3) A ratio of <1.8 is considered not amplified.</pre>
Methodology	Fluorescence In Situ Hybridization (FISH)
Analytic Time	Final results within 1 week

Fluorescence In-Situ Hybridization (FISH-Aneuploidy Screening)

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88271 x5, 88275 x5, 88291
Minimum	2 cc of infants venous blood collected in a green-top vacutainer with sodium heparin. Invert tube to mix well. Label the tube with patient name and medical record number. DO NOT FREEZE OR CENTRIFUGE.
Reference Range	<pre> Male: X and Y probe signals Female: two X probe signals The reference range for autosomes varies for each probe, call lab for information.</pre>
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Methodology	Fluorescence In-Situ Hybridization (FISH)
Analytic Time	Preliminary results are given for STAT cases within 48 hours. Suitable for interphase and metaphase analysis. Allow 2-5 days for final results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Fluorescence In-Situ Hybridization (FISH-Bladder Carcinoma)

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88120, 88291
Minimum	Specimen obtained by referring staff physician. Collect specimen using sterile technique. DO NOT FREEZE OR CENTRIFUGE THE SPECIMEN, BUT DO REFRIGERATE THE SPECIMEN. Label the tube with patient name and medical record number. This analysis is done on interphase nuclei. Contact the Cytogenetics Lab for details.
Reference Range	For autosomes, the reference range for each probe varies.
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	This test can be used for monitoring the recurrence of carcinoma and for aneuploidy of chromosomes 3, 7, 17, and deletion of 9p21 region. Suitable for interphase analysis only. This analysis is done on interphase nuclei. Contact the Cytogenetics Lab for details. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Methodology	Fluorescence In-Situ Hybridization (FISH)
Analytic Time	Allow 4-8 days for final results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Fluorescence In-Situ Hybridization (FISH-Bone Marrow)

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88271 x # of probes 88275 x # of probes, 88291
Minimum	1-2 cc of bone marrow collected in a bone marrow media tube available from our lab or in a green-top vacutainer with sodium heparin. Invert tube to mix well. Label the tube with patient name and medical record number. DO NOT FREEZE OR CENTRIFUGE.
Reference Range	Varies for each probe (set). Unique sequence probes labeled with fluorochrome. Contact lab for details.
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	This test can be used as an adjunct to chromosomal analysis for detection of residual disease. Suitable for interphase and metaphase analysis. Probes currently available include: ALK [2p23], AML1/ETO [t(8;21)], BCR/ABL [t(9;22)], CBFB [inv (16)], Cep7/D7S522[-7 and del(7q31)]*, Cep8 [trisomy 8], Cep12 [trisomy 12], CepX/Y[transplants], CLL probe panel, D13S319[del(13q)], D13S25[del(13q)], EGR1[del(5q31)], IgH/BCL-2[t(14;18)], IgH/BCL-2, IgH/CCND1[t(11;14)], IgH/MYC[t(8;14)], MLL [del(11)(q23)], N-MYC [2p24.1] or for amplification 2p24.1], p53 [del(17)(p13.1)], PML/RARA [t(15;17)], Rb1 [del(13)(q14)], TEL/AML1 [t(12;21)]. If the desired FISH probe is not listed, call the laboratory. *CEP = centromere enumeration probe Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Methodology	Fluorescence In-Situ Hybridization (FISH)
Analytic Time	Allow 3-5 days for final results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Fluorescence In-Situ Hybridization (FISH-Hematological Blood)

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88271 x # of probes 88275 x # of probes, 88291
Minimum	5-10 cc adult, 2 cc infants of venous blood collected in a green-top vacutainer with sodium heparin. Invert tube to mix well. Label the tube with patient name and medical record number. DO NOT FREEZE OR CENTRIFUGE.
Reference Range	Varies for each probe (set). Unique sequence probes labeled with fluorochrome. Contact lab for details.
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	This test can be used as an adjunct to chromosomal analysis for detection of residual disease. Suitable for interphase and metaphase analysis. Probes currently available include: ALK [2p23], AML1/ETO [t(8;21)], BCR/ABL [t(9;22)], CBFB [inv (16)], Cep7/D7S522[-7 and del(7q31)], Cep8 [trisomy 8], Cep12 [trisomy 12], CepX/Y[transplants], CLL probe panel, D13S319[del(13q)], D13S25[del(13q)], EGR1[del(5q31)], IgH/BCL-2[t(14;18)], IgH/CCND1[t(11;14)], IgH/MYC[t(8;14)], MLL [del(11)(q23)], N-MYC [2p24.1 or for amplification 2p24.1], p53 [del(17)(p13.1)], PML/RARA [t(15;17)], Rb1 [del(13)(q14)], TEL/AML1 [t(12;21)]. If the desired FISH probe is not listed, call the laboratory. *CEP = centromere enumeration probe Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Methodology	Fluorescence In-Situ Hybridization (FISH)
Analytic Time	Allow 3-5 days for final results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Fluorescence In-Situ Hybridization (FISH-Microdeletion)

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88271 x # of probes 88273 x # of probes, 88291
Minimum	5-10 cc adult, 2 cc infants of venous blood collected in a green-top vacutainer with sodium heparin. Invert tube to mix well. Label the tube with patient name and medical record number. DO NOT FREEZE OR CENTRIFUGE.
Reference Range	Varies for each probe (set). Unique sequence probes labeled with fluorochrome. Contact lab for details.
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	This test can be used as an adjunct to chromosomal analysis for detection of submicroscopic/cryptic rearrangements in certain congenital disorders. Suitable for metaphase analysis only. Probes currently available include: Angelman syndrome, AneuVysion (prenatal screening for aneuploidy), Cri-du-chat, Deletion 22q syndromes, Miller-Dieker syndrome, Prader-Willi syndrome, Smith-Magenis syndrome, SRY(Yp11.3), STS[del(Xp22.3)], Subtelomere probe panel, Williams syndrome, Wolf-Hirschhorn syndrome. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Methodology	Fluorescence In-Situ Hybridization (FISH)
Analytic Time	Allow 5-7 days for final results.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Fluorescence In-Situ Hybridization (FISH-Paraffin Embedded Tumor)

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88271 x # of probes 88275 x # of probes, 88291
Minimum	4 unstained slides on charged slide, 1 H&E slide with tumor marked. All slides from the same block cut sequentially.
Reference Range	<pre> Male: X and Y probe signals Female: two X probe signals For autosomes, the reference range varies for each probe (set). Suitable for interphase and metaphase analysis. Call lab for information.</pre>
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	This test can be used for screening of sex chromosomes, for monosomies in cases such as glioma (eg.1p, 5, 7,19q, etc.), for trisomies (eg., +4, +8, +11, +12, +13, +14, +18, +19, +21, +22, etc.) or for detection of the gene fusion resulting from Translocations (such as IgH/MYC, BCR/ABL, Igh/CCND1, IgH/BCL2) in solid tumors. If the desired FISH probe is not listed, call the laboratory. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Analytic Time	Final results within 1 week.
Testing Schedule	<pre> Specimens are accepted Monday - Friday, 0800-1700. Provide details of clinical information. If the specimen is collected over the weekend, please page the technologist on call by dialing 1-888-533-0186. When it stops ringing, enter your phone number, the '#' sign, and hang up.</pre>

Fluorescence In-Situ Hybridization (FISH-Prenatal-Aneuploidy/Microdeletion)

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88271 x # of probes 88273 x # of probes 88275 x # enumeration probes< br /> 88291
Minimum	Specimen obtained by referring staff physician. Collect specimen using sterile technique. DO NOT FREEZE OR CENTRIFUGE THE SPECIMEN. Contact the Cytogenetics lab with questions. Label tubes with patient name and medical record number.
Reference Range	<pre> Male: X and Y probe signals Female: two X probe signals The reference range varies for each probe (set).</pre>
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	This test can be used as an adjunct to chromosomal analysis for aneuploidy screening on interphase nuclei and on chromosomes for detection of submicroscopic/cryptic rearrangements in certain congenital disorders. Probes currently available include: Aneuvysion (aneuploidy screening for 21,18,13,X and Y), TUPLE 1 (del 22q for CHD). Call laboratory for additional information or requests. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See:	 Chromosomal Analysis, Amniotic Fluid
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Methodology	Fluorescence In-Situ Hybridization (FISH)
Analytic Time	Preliminary results will be reported within two-three days and the final written report in five days for the aneuploidy screening. For submicroscopic rearrangement, preliminary results will be reported in eight days and the final written report will be available in two weeks.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Fluorescence In-Situ Hybridization (FISH-Tumors)

Laboratory	Shivanand R. Patil Cytogenetics & Molecular Laboratory (Dept. of Pediatri
CPT Code	88271 x # of probes 88275 x # of probes, 88291
Minimum	Specimen obtained aseptically according to your protocol. Collect specimen using sterile technique. DO NOT FREEZE OR CENTRIFUGE THE SPECIMEN. This analysis can be done on interphase nuclei or on metaphase cells. Contact the Cytogenetics Lab with questions.
Reference Range	<pre> Male: X and Y probe signals Female: two X probe signals For autosomes, the reference range varies for each probe (set). Suitable for interphase and metaphase analysis. Call lab for information.</pre>
Order Form:	C-12 Cytogenetics Request or Epic Req
Comments	This test can be used for screening of sex chromosomes, for monosomies (eg., 5, 7, etc.), for trisomies (eg., +4, +8, +11, +12, +13, +14, +18, +19, +21, +22, etc.) or for detection of the gene fusion resulting from translocations in solid tumors. If the desired FISH probe is not listed, call the laboratory. Shivanand R. Patil Cytogenetics & Molecular Laboratory Website
See:	 Chromosomal Analysis, Bone Marrow (for acquired and constitutional abnormalities)
See Appendix	See Additional Information: Cytogenetics and Molecular Testing
Methodology	Fluorescence In-Situ Hybridization (FISH)
Analytic Time	Preliminary results will be reported within 2-3 days and final results within 1-2 weeks.
Testing Schedule	Specimens accepted in the lab Monday-Friday, 0800-1700. After hours specimens should be taken to specimen control and a message left on the lab voice mail. In the case of an emergency, follow the instructions on the lab voice mail.

Fluoride

Laboratory	Commercial Mail-out Laboratory
Order Code	FLUORIDE
CPT Code	82735
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL plasma Absolute Minimum: 1 mL plasma
Rejection Criteria:	Gray (potassium oxaluate/sodium fluoride) or separator tubes.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This is a quantitative assay.
Methodology	Quantitative Ion Chromatography (Ion Exchange Chromatography)
Analytic Time	3-9 days upon receipt at reference laboratory

Fluoxetine and Norfluoxetine Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	FLUOX
CPT Code	82491(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Fluoxetine Dose-Related Range 50 - 480 ng/mL Norfluoxetine Dose-Related Range 50 - 450 ng/mL Dose-related ranges for fluoxetine/norfluoextin are based on a 20 to 60 mg dose/day.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	High Performance Liquid Chromatography
Analytic Time	1 week upon receipt at reference laboratory

Fluphenazine Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	FLUP
CPT Code	84022
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Therapeutic Range: 0.2 - 2.0 ng/mL With levels greater than 2.8 ng/mL, a dosage reduction should be considered.</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	5 working days upon receipt at reference laboratory

FMR1 Gene Analysis Characterization of Alleles with Interpretation

Laboratory	Molecular Pathology
Order Code	FX
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult minimum: 3 mL whole blood in lavender top tube (EDTA) Children minimum: 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Reference Range	<pre> Normal: < or = to 44 CGG repeats Indeterminate: 45-55 CGG repeats Pre mutation (carrier): 56-199 CGG repeats Full mutation (affected): > or = to 200 CGG repeats</pre>
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Methodology	Polymerase Chain Reaction (PCR) and Southern Blot
Analytic Time	21 days
Testing Schedule	Weekly

FNA

See:	 Fine Needle Aspiration (FNA), Radiologic Guided Fine Needle Aspiration (FNA), Superficial

Folate

Laboratory	Chemistry
Order Code	FOLC
CPT Code	82746
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL; red top or TWO microtainers.
Rejection Criteria:	Hemolyzed and plasma samples are NOT acceptable.
Reference Range	<pre> Normal: > 4.1 ng/mL Indeterminate: 2.2 - 4.1 ng/mL Deficient: < 2.2 ng/mL All enriched grains have been fortified with folic acid in the U.S. since 1998 and therefore the prevalence of folate deficiency is low (1%). Testing for folate deficiency is strongly discouraged unless profound malnutrition is suspected and other causes of anemia have been excluded.</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 RBC Folate, Whole Blood
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Folate/B12 Deficiency

See:	 Folate, Serum Homocysteine, Plasma Methylmalonic Acid, Blood Methylmalonic Acid, Urine (24 hr or random) Vitamin B12, Plasma Vitamin B12, Reflexive, Serum

Folic Acid

See:
Folate, Serum

RBC Folate, Whole Blood

Follicle Stimulating Hormone (FSH)

Laboratory: Chemistry
Order Code: FSH
CPT Code: 83001
Collection Medium:
<table>
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<tr>
<td width="110" valign="top" align="center">Plasma Separator Tube</td>
</tr>
</table>

Alternate Collection Media: Call laboratory for additional acceptable specimen collection containers.
Minimum: 3 mL in light green top tube or TWO microtainers
Reference Range:
<pre>
FEMALES - menstruating:
  Follicular phase 3.5 - 12.5 mIU/mL
  Ovulation phase 4.7 - 21.5 mIU/mL
  Luteal phase 1.7 - 7.7 mIU/mL
  Postmenopause 25.8 - 134.8 mIU/mL
MALES: 1.5 - 12.4 mIU/mL

    AGE MALE FEMALE
1 - 3 years 0.2-1.5 mIU/mL 1.2-5.7 mIU/mL
4 - 8 years 0.5-1.6 mIU/mL 0.8-3.0 mIU/mL
Tanner I 0.7-3.1 mIU/mL 0.5-5.1 mIU/mL
Tanner II 1.1-6.9 mIU/mL 2.4-8.7 mIU/mL
Tanner III 1.8-6.2 mIU/mL 3.8-8.1 mIU/mL
Tanner IV 1.8-4.8 mIU/mL 1.1-9.6 mIU/mL
Tanner V 1.4-6.8 mIU/mL 2.0-7.6 mIU/mL</pre>
Order Form: A-1a General Lab or Epic Req
Comments: New immunoassay method instituted 3/21/00 at 0900.

Methodology: Electrochemiluminescence Immunoassay
Analytic Time: 1 hour (upon receipt in laboratory)
Testing Schedule: 24 hrs/day, 7 days a week, including holidays.

Fosphenytoin

See:
Phenytoin, Free, Plasma

Phenytoin, Plasma

Francisella tularensis Ab

Laboratory	Commercial Mail-out Laboratory
Order Code	FTGM
CPT Code	86668 x2
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum in red top tube Absolute Minimum: 0.3 mL serum in red top tube
Rejection Criteria:	Contaminated, heat-inactivated, or turbid specimens.
Reference Range	<pre> Francisella tularensis Antibody, IgG 9 U/mL or less Negative - No significant level of IgG antibody to Francisella tularensis detected. 10-15 U/mL Equivocal Questionable presence of IgG antibody to Francisella tularensis. Repeat testing in 10-14 days may be helpful. 16 U/mL or greater Positive - Presence of IgG antibody to Francisella tularensis detected, suggestive of current or past exposure/immunization. Francisella tularensis Antibody, IgM 9 U/mL or less Negative - No significant level of IgM antibody to Francisella tularensis detected. 10-15 U/mL Equivocal - Questionable presence of IgM antibody to Francisella tularensis. Repeat testing in 10-14 days may be helpful. 16 U/mL or greater Positive - Presence of IgM antibody to Francisella tularensis detected, suggestive of current or recent exposure/immunization.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-6 days upon receipt at reference laboratory

Free Cortisol

See:	 Cortisol, Urinary Free (HPLC), Urine

Free Fatty Acids

Laboratory	Commercial Mail-out Laboratory
Order Code	FFA
CPT Code	82725
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum
Reference Range	<0.73 mmol/L
Comments	<pre> Evaluation of metabolic status of persons with endocrinopathies. Detection of pheochromocytoma and of glucagon-, thyrotropin-, and adrenocorticotropin-secreting tumors.</pre>
Methodology	Enzymatic Colorimetric

Free Phenytoin

See:
Phenytoin, Free, Plasma

Free T3

See:
Triiodothyronine - Free (T-3), Plasma

Free T4

See:
Free Thyroxine, Plasma

Free Testosterone

See:
Testosterone, Free and Total, Adult, Plasma

Free Thyroxine

Laboratory: Chemistry
Order Code: FT4
CPT Code: 84439
Collection Medium:
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<table>
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<tr>
<td width="110" valign="top" align="center">Plasma Separator Tube</td>
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Alternate Collection Media: Call laboratory for additional acceptable specimen collection containers.
Minimum: 3 mL whole blood in light green top tube or TWO microtainers
Reference Range:
```
<pre>
AGE                 MALES/FEMALES
< 12 months         0.8-2.7 ng/dL
1 - 5 years         0.8-1.75 ng/dL
> 5 years - adults  0.92-1.57 ng/dL</pre>
```
Order Form: A-1a General Lab or Epic Req
Comments: New analytical immunoassay with different reference range instituted 4/24/00 at 1000.

Methodology: Electrochemiluminescence Immunoassay
Analytic Time: 1 hour (upon receipt in laboratory)
Testing Schedule: 24 hrs/day, 7 days a week, including holidays.

Frozen Sections

Comments: Contact Surgical Pathology lab 356-1859 for information.

Fructosamine

Laboratory: Commercial Mail-out Laboratory
Order Code: FSAM
CPT Code: 82985
Collection Medium:
```
<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>
```

Minimum: Preferred Minimum: 0.5 mL serum
Rejection Criteria: Hemolyzed specimens (may cause falsely elevated results).
Reference Range: Nondiabetic: 170-285 μmol/L
Order Form: A-1a Miscellaneous Request or Epic Req
Comments: Hemolysis may cause falsely elevated results. Allow specimen to clot completely at room temperature before centrifuging.

Methodology: Quantitative Spectrophotometry
Analytic Time: 24 hours upon receipt at reference laboratory

FSF (Fibrin Stabilizing Factor)

See:
Factor XIII Screen, Plasma

FSH

See:
Follicle Stimulating Hormone (FSH), Plasma

FSHD

See:
FSHMD1A Detection of Abnormal Alleles with Interpretation, Whole Blood

FSHD, Prenatal

See:	 FSHMD1A Prenatal Detection of Abnormal Alleles with Interpretation, Fetal Sample (Amniotic or Chorionic Villus), Parental Samples (Whole Blood)

FSHMD1A Characterization of Haplotypes Chromosome 4A and 4B with Interpretation

Laboratory	Molecular Pathology
Order Code	FSHDAB
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Adult minimum: 6 mL whole blood in pink top tube (K2-EDTA) Children minimum: 6 mL whole blood in pink top tube (K2-EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
See Appendix	See Additional Information: FSHD Supplemental Testing for 4qA and 4qB
Methodology	Southern Blot
Analytic Time	21 days
Testing Schedule	Weekly

FSHMD1A Detection of Abnormal Alleles with Interpretation

Laboratory	Molecular Pathology
Order Code	FSHD
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Adult minimum: 6 mL whole blood in pink top tube (K2-EDTA) Children minimum: 6 mL whole blood in pink top tube (K2-EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
See Appendix	See Additional Information: FSHD Supplemental Testing for 4qA and 4qB
Methodology	Southern Blot
Analytic Time	21 days
Testing Schedule	Weekly

FSHMD1A Prenatal Detection of Abnormal Alleles with Interpretation

Laboratory	Molecular Pathology
Order Code	FSHDPRE
CPT Code	81404
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <td align=center><a href="javascript:larger_tube('960.jpg')"><img src="/p <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">T25 Flask</td> </tr> </table>
Minimum	<pre> Fetal Sample Collection: Amniotic Fluid (AF) 1 mL per week gestational age Chorionic Villus (CV) 10 mg clean villus NOTE: We require SIX-T25 Flasks of cultured fetal cells for testing. Parental Sample(s) 6 mL whole blood in EDTA tube</pre>
Reference Range	Normal
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Fetal Sample: Amniotic Fluid and Chorionic Villi samples must remain at room temperature at all times and be sent immediately after collection. Place Amniotic Fluid in a sterile centrifuge tube. Place Chorionic Villi Samples in transport tube containing enough tissue culture medium to cover the entire sample. Do not allow tissue to become dry. Fetal samples are to be delivered to the Cytogentics Laboratory, W101 GH immediately after collection. Parental samples are delivered to the Molecular Diagnostic laboratory BT 6004 GH.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Southern Blot
Analytic Time	Turnaround time for results is 4 to 7 weeks.
Testing Schedule	Test is performed once a week on Friday. Specimens should be received no later than Thursday to initiate testing on Fridays.

Fukutin (FKTN) Full Gene Sequence with Interpretation

Laboratory	Molecular Pathology
Order Code	FCMD
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult minimum: 3 mL whole blood in lavender top (EDTA) tube. Children minimum: 2 mL whole blood in lavender top (EDTA) tube. Optional specimen type: Formalin Fixed paraffin embedded tissue; Fresh Frozen tissue. Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing.</pre>
Rejection Criteria:	Testing requires a dedicated collection tube.
Reference Range	Normal
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Mutations in the fukutin gene (FCMD, OMIM #607440) cause disorders in the dystroglycanopathy spectrum, all with autosomal recessive inheritance. FCMD mutations are known to cause Walker-Warburg syndrome at the severe end of the spectrum, and limb-girdle muscular dystrophy type 2L (LGMD2L) at the mild end of the spectrum. Fukuyama congenital muscular dystrophy is an intermediate phenotype and is the second most common muscular dystrophy among Japanese people.
Methodology	Sequence Analysis of the coding region of the FCMD gene.
Analytic Time	21 days
Testing Schedule	Weekly

Fukutin Retrotransposon Insertion Variant (FKTN) with Interpretation

Laboratory	Molecular Pathology
Order Code	FCMDPCR
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	2 mL
Reference Range	Normal
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Methodology	Polymerase Chain Reaction (PCR)
Analytic Time	21 days
Testing Schedule	Weekly

Fukuyama Congenital Muscular Dystrophy (CMD)

See:	 Fukutin (FKTN) Full Gene Sequence with Interpretation, Whole Blood Fukutin Retrotransposon Insertion Variant (FKTN) with Interpretation, Whole Blood

Fungal Battery

See:	 Fungal Serology, Serum

Fungal Culture

Laboratory	Microbiology
Order Code	C FUNG
CPT Code	87102
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> A fungal smear (KOH/Calcofluor) is automatically performed with each culture request. Cultures held for 4-6 weeks. A. Blood - Cleanse skin with ChloraPrep® one-step 1.5 mL Frepp® Applicator (907672). Collect 8-10 mL of blood for adult (1.5 mL for child) and inoculate into an Isolator tube (Adult=922848; Pediatric=923003). Collect in addition to bacterial blood culture bottles. Cultures held for 4 weeks. B. See Bacterial Culture for collection and transport of all other specimen types.</pre>
See:	 Bacterial Culture
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Standard tube media
Analytic Time	See comments
Testing Schedule	0700-1630, 7 days a week, including holidays.

Fungal Isolator Blood Culture

See:	 Isolator Blood Culture, Whole Blood

Fungal Serology

Laboratory	Commercial Mail-out Laboratory
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: Two 1.0 mL aliquots of serum Adult Absolute Minimum: 0.5 mL serum Pediatric Minimum: 0.3 mL serum</pre>
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Effective December 18, 2009, Fungal Serology is tested by individual components. See links to individual components below. See also: components of panel-Fungal Serology 1) ASPERG 2) BLASTO 3) COCCI 4) HISTOPAN Additional fungal testing, not a part of Fungal Serology panel but available to providers who need CSF testing: COCCICSF</pre>
See:	 Aspergillus spp. Antibody Immunodiffusion, Serum Blastomyces Dermatitidis Abs ID, Serum Coccidioides Antibody, CF/ID, CSF Coccidioides Antibody, CF/ID, Serum Histoplasma Antibodies CF/ID, Serum
Analytic Time	1 week upon receipt at reference laboratory

Fungal Susceptibility Testing

See:	 Antimicrobial Susceptibility Profile MIC, (Per Organism)

Fungitell

See:	 Beta D Glucan (Fungitell), Serum

FXN Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	FRIED
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Adult Minimum: 4 mL whole blood from lavender top (EDTA) tube Infant Minimum: 2-3 mL whole blood from lavender top (EDTA) tube
Rejection Criteria:	Do NOT collect before a holiday.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the following form with the appropriate signatures, the correct sample type and the A-1a Miscellaneous Request: Molecular Diagnostic Requisition from Baylor College of Medicine (BCM) Medical Genetics Laboratories. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Analytic Time	3 weeks upon receipt at reference laboratory
Testing Schedule	Sample must arrive in lab by 1500.

G

G-1-P

See:	 Galactose-1-Phosphate, RBC, Blood

Gabapentin (Neurontin) Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	GBPT
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	Therapeutic Range: 2-20 μg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-3 working days upon receipt at reference laboratory.

Gabitril

See:	 Tiagabine (Gabitril(R)) Drug Level, Serum

Galactitol

Laboratory	Commercial Mail-out Laboratory
Order Code	GALACU
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	5-10 mL collected in TWO Yellow top conical tubes (no additive)
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Analytic Time	1 week upon receipt at reference laboratory

Galactokinase

Laboratory	Commercial Mail-out Laboratory
Order Code	GALKINASE
CPT Code	82759
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Minimum	<pre> Preferred minimum: 5 mL heparinized whole blood from fasting patient Absolute minimum: 2 mL heparinized whole blood from fasting patient</pre>
Rejection Criteria:	Sample must be received at reference laboratory within 48 hours of collection, collect Monday through Thursday only; do not collect on Fridays, holidays, day before a holiday, or weekends. Specimen cannot be frozen.
Reference Range	<pre> <2 years: 20.1-79.8 mU/g Hemoglobin Greater than or equal to 2 years: 12.1-39.7 mU/g Hemoglobin</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Whole blood to be washed at reference laboratory. If specimen cannot arrive within 48 hours, please send washed erythrocytes. Draw blood in a green top (heparin) tubes(s) from a fasting patient (4 hour preferred, nonfasting acceptable), and send 5.0 mL of heparinized whole blood refrigerated. Clinical information: Three clinically important inborn errors of galactose metabolism that result in galactosemia have been described. The genetic disturbance is expressed as a deficiency of galactokinase, galactose-1-phosphate uridyltransferase, or UDP galactose-4-epimerase, the enzymes catalyzing the reactions in converting galactose to glucose. The transferase deficiency is the most common. Galactokinase deficiency results in a milder variant of galactosemia than that which results from GALT deficiency. The epimerase deficiency is like the kinase deficiency and is much more rare than the transferase deficiency. Useful for: Diagnosis of the second most common cause of galactosemia (ie, galactokinase deficiency). Interpretation: Values <20.1 mU/g of hemoglobin suggest galactokinase deficiency.</pre>
Methodology	Radioisotopic
Analytic Time	2 weeks upon receipt at reference laboratory
Testing Schedule	Testing performed on Tuesdays.

Galactomannan

See:	 Aspergillus Galactomannan Antigen Assay, Serum

Galactose-1-Phosphate Uridyltransferase Pheno

Laboratory	Commercial Mail-out Laboratory
Order Code	GAL1P
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 5.0 mL whole blood from 6 mL pink top (K2 EDTA) tube. Collect specimen from a fasting patient. Adult/Pediatric Absolute minimum: 2.0 mL whole blood from 6 mL pink top (K2 EDTA) tube. Collect specimen from a fasting patient.</pre>
Rejection Criteria:	Specimen cannot be frozen.
Reference Range	Descriptive report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> This assay is useful for determining the likely genotype when quantitative galactose-1-phosphate uridyltransferase (GALT) data suggests a GG or DG genotype (a patient with a GG genotype must be on a galactose-free diet). Useful for: 1) Determining the exact biochemical phenotype when quantitative GALT (galactose-1-phosphate uridyltransferase (GALT) deficiency suggests a GG or DG phenotype 2) A quantitative GALT level is used in addition to the isoelectric focusing for accurate interpretation 3) Determining biochemical phenotypes of siblings, when parental specimens are co-run for both quantitative and isoelectric focusing banding data There are a variety of biochemical phenotypes in galactosemia and quantitative data is only suggestive of the phenotype for a particular individual. An interpretive report is provided. CAUTIONS: The phenotype of a neonate can be arrived at with greater confidence when the parents' phenotypes are also established. Since transfusion results in replacement of significant number of red cells, the assay should be deferred for 90 days post-transfusion.</pre>
See:	 Galactosemia Confirmation with Reflex to Galt Gene Analysis, Whole Blood
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Isoelectric Focusing
Analytic Time	1 week upon receipt at reference laboratory

Galactose-1-Phosphate, RBC

Laboratory	Commercial Mail-out Laboratory
Order Code	GAL1PHOS
CPT Code	84378
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Minimum	Preferred Minimum: 5 mL heparinized whole blood Absolute Minimum: 2 mL heparinized whole blood
Reference Range	<1.0 mg/dL (non-galactosemic) 1.0-4.0 mg/dL (galactosemic on galactose restricted diet) >4.0 mg/dL (galactosemic on unrestricted diet)
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Three types of enzymatic deficiencies, galactokinase, galactose-1-phosphate uridyltransferase (GPUT), and uridine diphosphate (UDP) galactose-4-epimerase are responsible for galactosemia, an autosomal recessive inborn error of galactose metabolism. Clinical Information: The most common form of galactosemia (classic galactosemia) is caused by homozygous inheritance of abnormal GPUT phenotypic designation (GG) and results in absence of GPUT activity and accumulation of galactose-1-phosphate (G-1-P) in erythrocytes. Classic galactosemia is characterized by failure to thrive, vomiting, liver disease, cataracts, and developmental delay. Useful for: Monitoring dietary therapy for classic galactosemia (total GPUT deficiency), galactosemia-Duarte (GD) patients, or rarely, patients with UDP galactose-4-epimerase deficiency. Interpretation: The reference values provided are for nongalactosemics and for galactosemic patients on a galactose-restricted diet. The goal of treatment of a galactosemic patient is to have G-1-P levels as low as possible, but no higher than 125 mcg/g of hemoglobin. Cautions: Not a screening test for galactosemia</pre>
Methodology	<pre> Ultraviolet, Enzymatic This assay is a quantitative measure of the galactose-1-phosphate and is useful for monitoring the dietary management of galactosemics. This assay should not be used for the diagnosis of galactosemia.</pre>
Analytic Time	2 weeks upon receipt at reference laboratory
Testing Schedule	Testing performed on Tuesdays and Thursdays.

Galactosemia Confirmation with Reflex to Galt Gene Analysis

Laboratory	Commercial Mail-out Laboratory
Order Code	GALCON
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 5.0 mL whole blood in a pink top (EDTA) tube. Absolute Minimum: 2.0 mL whole blood in a pink top (EDTA) tube.
Rejection Criteria:	Specimen cannot be frozen.
Reference Range	> or = 18.5 U/g of hemoglobin
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Patient’s age is required on request form for processing. Useful for: 1) Diagnosis, carrier detection, and determination of genotype of GALT deficiency, the most common case of galactosemia 2) Differentiating D/G mixed heterozygotes from classical galactosemia 3) Confirming results of new born screening programs Preferred test to evaluate for possible diagnosis of galactosemia, routine carrier screening, and follow-up of abnormal newborn screening results. Comprehensive reflex test begins with quantitative galactose-1- phosphate uridyltransferase (GALT) enzyme analysis. If quantitative GALT enzyme value is consistent with a diagnosis of or carrier status for galactosemia, DNA analysis of the GALT gene is performed to detect the 4 most frequently encountered classic galactosemia alleles (Q188R, S135L, K285N, and L195P) in addition to the N314D (Duarte) and L218L (Los Angeles) variants.</pre>
See:	 Galactose-1-Phosphate Uridyltransferase Pheno, Whole Blood
Methodology	Galactose-1-phosphate uridyltransferase converts uridine diphosphoglucose (UDPG) to UDP-galactose. The amount of UDPG consumed is measured by oxidizing UDPG with concomitant generation of NADPH from NADP (UDPG-dehydrogenase), which is measured at 340 nm. (Beutler E, Baluda MC: Improved method for measuring galactose-1-phosphate uridyl transferase activity of erythrocytes. Clin Chim Acta 1966 March;13 [3]:369-379) A real-time PCR-based assay using the LightCycler detects 6 alterations: Q188R, L195P, S135L, K285N, L218L, and N314D. (Dobrowolski SF, Banas RA, Suzow JG, et al: Analysis of common mutations in the galactose-1-phosphate uridyl transferase gene. J Mol Diagn 2003;5:42-47)
Analytic Time	3 days upon receipt at reference laboratory

Galt Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	GALGENE
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube
Minimum	<pre> Specimen must arrive reference laboratory within 96 hours of collection. Collect blood in a lavender top (EDTA) tube(s), and send 4.0 mL of EDTA whole blood in original VACUTAINER(S). Invert several times to mix blood. Forward unprocessed whole blood promptly at ambient temperature. Preferred minimum: 3.0 mL whole blood Absolute minimum: 0.5 mL whole blood Please call the Clinical Pathology Core Laboratory at 356-3527 for other specimen types.</pre>
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Direct Mutation Analysis by Polymerase Chain Reaction (PCR)
Analytic Time	1 week upon receipt at reference laboratory

Galt Gene Analysis Known Mutation Familial Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	GALACMUT
CPT Code	81403
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Submit 1 of the following specimens: Draw blood in a lavender-top (EDTA) tube(s), and send 3.0 mL of EDTA whole blood in original VACUTAINER(S). Invert several times to mix blood. Forward unprocessed whole blood promptly at ambient temperature. Prenatal Specimens - All prenatal specimens must be accompanied by a maternal blood specimen. Due to the complexity of prenatal testing, consultation with the laboratory is required for all prenatal testing. Amniotic Fluid (min vol: 0.5 mL) Obtain 20 mL of amniotic fluid. Transfer specimen to 2 screw-capped, sterile centrifuge tubes. Send specimen refrigerated. Specimen cannot be frozen. Chorionic Villus (min vol: 5 mg) Obtain 20 mg of chorionic villus specimen. Send specimen refrigerated in transport media in 15-mL centrifuge tube. Specimen cannot be frozen.</pre>
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Direct Mutation Analysis by Polymerase Chain Reaction (PCR)
Analytic Time	2 weeks upon receipt at reference laboratory

Gamma-glutamyl transpeptidase

Laboratory	Chemistry
Order Code	GGT
CPT Code	82977
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients
Reference Range	<pre> Male 8-61 u/l Female 5-36 u/l</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Elevated by drugs such as Phenobarbital and Dilantin. See reference range change.
See:	 Gamma-glutamyl transpeptidase-Other, Body Fluid
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Gamma-glutamyl transpeptidase-Other

Laboratory	Chemistry
Order Code	GGTO
CPT Code	82977
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Gamma-glutamyl transpeptidase, Plasma
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Gamma-Hydroxybutyric Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	GHB
CPT Code	80100; if positive add 82542
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 6.0 mL random urine Adult/Pediatrics Absolute Minimum: 2.5 mL random urine</pre>
Reference Range	<pre> By report. All positive screens will be confirmed and billed appropriately. Reporting Limit: 2.0 mcg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Qualitative Gas Chromatography-Mass Spectrometry/Quantitative Gas Chromatography-Mass Spectrometry
Analytic Time	3-10 days upon receipt at reference laboratory

Gastrin

Laboratory	Commercial Mail-out Laboratory
Order Code	GAST
CPT Code	82941
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL red top or THREE 0.4 microtubes
Rejection Criteria:	Plasma, tissue, or urine. Non-frozen specimens. Grossly hemolyzed or lipemic specimens.
Reference Range	0 - 100 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Serum must be separated from cells within 1 hour of collecting sample. Test cannot be added on to a sample greater than 2 hours.
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Quantitative Chemiluminescent Immunoassay
Analytic Time	2 working days upon receipt at reference laboratory

Gastrin Releasing Peptide

Laboratory	Commercial Mail-out Laboratory
Order Code	GRP
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">GI preservative collection tu </tr> </table>
Minimum	1 mL plasma from a Special GI preservative collection tube obtained from reference laboratory. Mailouts has these tubes, call 356-8593.
Reference Range	10 - 80 pg/ml
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Contact Commercial Mailouts at 356-8593 to obtain collection tubes for this testing. No other specimen collection container is acceptable by the reference laboratory. Patients should be fasting for 10-12 hours prior to specimen collection. Antacid medications or medications that affect intestinal motility should be discontinued, if possible, for at least 48 hours prior to collection.</pre>
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Direct Radioimmunoassay
Analytic Time	1 week upon receipt at reference laboratory

Gastroccult

Laboratory	Chemistry
Order Code	GCPOC
CPT Code	82271
Collection Medium	Miscellaneous container; contact laboratory
Minimum	0.5 mL
Reference Range	Occult blood - negative
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	<pre> pH = hydrogen ion concentration occult blood = guaiac A rapid screening test that detects the presence of occult blood and measures the pH of the specimen.</pre>
Analytic Time	Within 30 minutes.
Testing Schedule	24 hrs/day, 7 days a week, including holidays. Samples should be tested within a few minutes after collection; testing is performed in the main Clinical Pathology Core Lab.

Genotyping, Red Cell Antigen, Parental

Laboratory	Commercial Mail-out Laboratory
CPT Code	<pre> Possible CPT codes, based on antigen tested: Duffy Antigen Genotyping (Fya and Fyb):83891, 83894, 83898(x4), 86905(x2) Kidd Antigen Genotyping (Jka and Jkb):83891, 83894, 83898(x2), 86905(x2) Kell and Cellano Antigen Genotyping (K1 and K2):83891, 83894, 83898(x2), 86905(x2) Rh C and Rh c Antigen Genotyping:83891, 83894, 83898(x2), 86905(x2) Rh D Antigen Genotyping:83891, 83894, 83898(x2), 86901 Rh E and Rh e Antigen Genotyping:83891, 83894, 83898(x2), 86905(x2) M Antigen Genotyping:83891, 83894, 83898, 86905</pre>
Minimum	5 - 10 mL lavender top EDTA whole Blood from both mother and father
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the <a href="http://www.bcw.edu/cs/gro Requisition from the Blood Center of Wisconsin with the specimen and the A-1a Miscellaneous Request. Parental genotyping for Red Blood Cell (RBC) antigens used in studies for hemolytic disease of the newborn (HDN). Parental testing is performed only on whole blood from the mother and the father.
See:	 Genotyping, Red Cell Antigen, Prenatal, Amniotic Fluid RBC Antigen Testing Per Antigen, Blood
Methodology	Allel-specific Polymerase Chain Reaction (PCR)
Analytic Time	1 week upon receipt at referral laboratory

Genotyping, Red Cell Antigen, Prenatal

Laboratory	Commercial Mail-out Laboratory
CPT Code	<pre> Possible CPT codes, based on antigen tested: Duffy Antigen Genotyping (Fya and Fyb):83891, 83894, 83898(x4) Kidd Antigen Genotyping (Jka and Jkb):83891, 83894, 83898(x2) Kell and Cellano Antigen Genotyping (K1 and K2):83891, 83894, 83898(x2) Rh C and Rh c Antigen Genotyping:83891, 83894, 83898(x2) Rh D Antigen Genotyping:83891, 83894, 83898(x2) Rh E and Rh e Antigen Genotyping:83891, 83894, 83898(x2) M Antigen Genotyping:83891, 83894, 83898</pre>
Minimum	7-15 mL amniotic fluid or cultured amniotic cells (2x10⁶) cells minimum
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the <a href="http://www.bcw.edu/cs/gro Requisition from the Blood Center of Wisconsin with the specimen and the A-1a Miscellaneous Request or Epic order. Prenatal genotyping for Red Blood Cell (RBC) antigens used in studies for hemolytic disease of the newborn (HDN). Prenatal testing can be performed on amniotic fluid.
See:	 Genotyping, Red Cell Antigen, Parental, Whole Blood RBC Antigen Testing Per Antigen, Blood
Methodology	Allel-specific Polymerase Chain Reaction (PCR)
Analytic Time	2 weeks upon receipt at reference laboratory

Gentamicin

Laboratory	Chemistry
Order Code	GENT
CPT Code	80170
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL plasma from light green top tube or ONE microtainer
Reference Range	<pre> Peak 5-8 mcg/mL; trough 1-2 mcg/mL. Peak levels: 45-75 min. After I.M. Dose, 15-30 min. After I.V. Dose. Trough levels: Not more than 30 min. Before next dose. Critical value: >15 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	Clinical staff must draw accurately timed peak and trough specimens.
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	EIA (Enzymatic Immunoassay)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

GGT

See:	 Gamma-glutamyl transpeptidase, Plasma

GGT-other

See:	 Gamma-glutamyl transpeptidase-Other, Body Fluid

GH

See:	 Growth Hormone, Plasma

GHB

See:	 Gamma-Hydroxybutyric Acid, Urine

Giardia Immunofluorescent Detection

See:	 Cryptosporidium/Giardia, Stool

GJB2 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	GJB2
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. <u>The reference laboratory offers a known familial variant test. If you want to order the known familial variant version of the test, please order LAB7847</u>.
Methodology	Over 97% of the identified mutations at the DFNB1 locus occur in exon 2 of GJB2 (Van Camp, et al 2005). We have adopted a tiered screening process focusing first on exon 2 of GJB2 and the two GJB6-containing deletions. The finding of two deafness-causing mutations is consistent with the diagnosis of hearing loss at the DFNB1 locus. If one only mutation is found, mutation screening for the splice site mutation in exon 1 of GJB2 (IVS1 + 1 G>A) is completed. If no deafness-causing mutations are found, the diagnosis of hearing loss at the DFNB1 locus is excluded based on today´s standards. (GJB2 mutation screening is performed by amplification of oligonucleotide primers that flank each exon followed by bi-directional sequencing. Screening for the del(GJB6-D13S1830) and del(GJB6-D13S1854) mutations is completed by PCR amplification of oligonucleotide primers flanking and within the deletion breakpoints. Products are run on agarose gel and sized to determine presence or absence of a deletion.)
Analytic Time	8 weeks

GJB6 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	GJB6
CPT Code	81252 81403 (known familial variant)
Collection Medium	<table><tr><td align=center></td><td rowspan=2 width=20 align=center>and</td><td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt<tr><td width="110" valign="top" align="center">Pink top tube</td><td width="110" valign="top" align="center">Pink top tube</td></tr></table>
Minimum	<pre>Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. <u>The reference laboratory offers a known familial variant test. If you want to order the known familial variant version of the test, please order LAB7849</u>.
Methodology	Over 97% of the identified mutations at the DFNB1 locus occur in exon 2 of GJB2 (Van Camp, et al 2005). We have adopted a tiered screening process focusing first on exon 2 of GJB2 and the two GJB6-containing deletions. The finding of two deafness-causing mutations is consistent with the diagnosis of hearing loss at the DFNB1 locus. If one only mutation is found, mutation screening for the splice site mutation in exon 1 of GJB2 (IVS1 + 1 G>A) is completed. If no deafness-causing mutations are found, the diagnosis of hearing loss at the DFNB1 locus is excluded based on today´s standards. (GJB2 mutation screening is performed by amplification of oligonucleotide primers that flank each exon followed by bi-directional sequencing. Screening for the del(GJB6-D13S1830) and del(GJB6-D13S1854) mutations is completed by PCR amplification of oligonucleotide primers flanking and within the deletion breakpoints. Products are run on agarose gel and sized to determine presence or absence of a deletion.)
Analytic Time	8 weeks

Glomerular Basement Membrane Antibodies, IgG

Laboratory	Chemistry
Order Code	GBM
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL; red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	Negative: < 0.4 antibody index (AI) Equivocal: 0.4-0.9 Positive: 1.0 AI or greater
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 5, 2013. <u>References</u>: Pusey CD. Anti-glomerular basement membrane disease. Kidney Int 2003; 64:1535-1550.
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Glucagon

Laboratory	Commercial Mail-out Laboratory
Order Code	GLUN
CPT Code	82943
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL plasma Absolute Minimum: 0.5 mL plasma
Reference Range	< or =6 hours: 100-650 pg/mL 1-2 days: 70-450 pg/mL 2-4 days: 100-650 pg/mL 4-14 days: declining gradually to adult levels >14 days: < or =80 pg/mL (range based on 95% confidence limits) Glucagon levels are inversely related to blood glucose levels at all ages. This is particularly pronounced at birth and shortly thereafter, until regular feeding patterns are established. This explains the higher levels immediately after birth, which then first fall as the glucagon release mobilizes the infants glucose stores, then rise again as stores are depleted, finally normalizing towards adult levels as regular feeding patterns are established.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Useful for diagnosis and follow-up of glucagonomas and other glucagon-producing tumors. Assessing diabetic patients with problematic hyper- or hypoglycemic episodes (extremely limited utility). Glucagon is routinely measured along with serum glucose, insulin, and C- peptide levels, during the mixed-meal test employed in the diagnostic workup of suspected postprandial hypoglycemia. However, it plays only a minor role in the interpretation of this test. <u>Cautions</u>: Results obtained with different glucagon assays can differ substantially. This can be caused by use of different calibration standards. Different glucagon assays may also exhibit variable cross-reactivity with different isoforms of glucagon, not all of which are biologically active. Some assays, including this one, remove biologically inactive isoforms before measurement, while others do not. All these factors contribute to the differences between different assays. Serial measurements should, therefore, always be performed using the same assay. Precise reference ranges for appropriate glucagon responses for given blood glucose ranges are not well established and vary widely from assay to assay. Expert advice should be sought when interpreting inappropriately low glucagon levels or when interpreting glucagon, insulin, and C-peptide levels obtained during mixed-meal testing. Tumor marker tests, including glucagon, are not specific for malignancy. All immunometric assays can, on rare occasions, be subject to hooking at extremely high analyte concentrations (false-low results), heterophilic antibody interference (false-high results), or autoantibody interference (unpredictable effects). If the laboratory result does not fit the clinical picture, these possibilities should be considered.
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Immunoassay Following Extraction
Analytic Time	4 working days upon receipt at reference laboratory

Glucose Tolerance Test-2 HR

Laboratory	Chemistry
Order Code	GT20
CPT Code	See comments
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Gray top tube (Fluoride)</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	2 mL; gray (sodium fluoride) top (or ONE microtube for pediatric patients) per specimen.
Reference Range	The criteria proposed by the Fourth International Workshop-Conference on Gestational Diabetes Mellitus (GDM) defines GDM as present if two or more of the following plasma glucose values are met or exceeded: Fasting plasma glucose concentration > 95 mg/dL (5.3 mmol/L) One-hour plasma glucose concentration > 180 mg/dL (10 mmol/L) Two-hour plasma glucose concentration > 155 mg/dL (8.6 mmol/L) Three-hour plasma glucose concentration > 140 mg/dL (7.8 mmol/L) American Diabetes Association (ADA) guidelines define a 2 hr plasma glucose concentration of 200 mg/dL or greater following a 75 gram oral glucose load as one of the criteria for diagnosing diabetes mellitus. References: (1) Carpenter MW, Coustan DR. Criteria for screening tests for gestational diabetes. Am J Obstet Gynecol 1982; 144:768; (2) Diabetes Care 34(Suppl 1): S62-S69, 2011.
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> Collect all specimens in gray top tube on patient care area and hold (sodium fluoride anticoagulant). Deliver all specimens simultaneously. Microtube specimens must be scheduled with the lab in advance and delivered immediately after drawing. Two hour Glucose Tolerance Test should include the following specimens: Fasting glucose 1 hour post glucose 2 hour post glucose CPT code is 82947 x number of specimens CPT code = 82947 x number of glucose performed</pre>
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Hexokinase/UV Test
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Glucose

Laboratory	Chemistry
Order Code	CFGL
CPT Code	82945
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	0.5 mL
Reference Range	40-75 mg/dL (CSF)
Order Form:	A-1a General Lab or Epic Req
Methodology	Hexokinase/UV Test
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Glucose-6-Phosphate Dehydrogenase

Laboratory	Commercial Mail-out Laboratory
Order Code	G6PDA
CPT Code	82955
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Yellow top tube (ACD solution A), Light Green top tube (Lithium Heparin),
Minimum	<pre> Preferred minimum: 3 mL whole blood Absolute minimum: 1.5 mL whole blood</pre>
Rejection Criteria:	Frozen or hemolyzed specimens are unacceptable.
Reference Range	7.0-20.5 U/g Hb
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Enzyme is most stable in acid citrate dextrose (yellow ACD).
Methodology	Enzymatic
Analytic Time	2 working days upon receipt at reference laboratory

Glucose-Urine, Random

Laboratory	Chemistry
Order Code	URGL
CPT Code	82945
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL urine, random specimen
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Hexokinase/UV Test
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Glucose

Laboratory	Chemistry
Order Code	UGL
CPT Code	82945
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> 24 hr collection; no preservative. Collections other than 24 hr will not be calculated for G/24 hr.</pre>
Reference Range	<0.5 g/24 hr
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Hexokinase/UV Test
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Glucose Tolerance Test-3 HR

Laboratory	Chemistry
Order Code	GT30
CPT Code	See comments
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Gray top tube (Fluoride)</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	2 mL; gray (sodium fluoride) top (or ONE microtube for pediatric patients) per specimen.
Reference Range	The criteria proposed by the Fourth International Workshop-Conference on Gestational Diabetes Mellitus (GDM) defines GDM as present if two or more of the following plasma glucose values are met or exceeded: Fasting plasma glucose concentration > 95 mg/dL (5.3 mmol/L) One-hour plasma glucose concentration > 180 mg/dL (10 mmol/L) Two-hour plasma glucose concentration > 155 mg/dL (8.6 mmol/L) Three-hour plasma glucose concentration > 140 mg/dL (7.8 mmol/L) Reference: Carpenter MW, Coustan DR. Criteria for screening tests for gestational diabetes. Am J Obstet Gynecol 1982; 144:768.
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> Collect all specimens in gray top tube on patient care area and hold (sodium fluoride anticoagulant). Deliver all specimens simultaneously. Microtube specimens must be scheduled with the lab in advance and delivered immediately after drawing. Three hour Glucose Tolerance Test should include the following specimens: Fasting glucose 1 hour post glucose 2 hour post glucose 3 hour post glucose CPT code is 82947 x number of specimens CPT code = 82947 x number of glucose performed</pre>
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Hexokinase/UV Test
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Glucose Tolerance Test-Additional Specimens

Laboratory	Chemistry
Order Code	GT05
CPT Code	See comments
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Gray top tube (Fluoride)</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood for extra specimen (added to GTT series)
Order Form:	A-1a General Lab or Epic Req
Comments	CPT code = 82947
Methodology	Hexokinase/UV Test
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Glucose-Other

Laboratory	Chemistry
Order Code	GLUO
CPT Code	82945
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Glucose, Plasma
Methodology	Hexokinase/UV
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Glucose

Laboratory	Chemistry
Order Code	GLU
CPT Code	82947
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL in light green top tube or 1 microtainer
Reference Range	<pre> 65-99 mg/dL Critical value (1 month-adults): <50 mg/dL and >450 The Expert Committee on the Diagnosis and Classification of Diabetes has defined impaired fasting glucose as greater than or equal to 100 mg/dL but less than 126 mg/dL. (Diabetes Care 28 (Suppl 1) S41, 2005) Pediatric Reference Ranges: Age Range Units 0-1 month 40-99 mg/dL 1 month-adult 65-99 mg/dL Critical value (0-1 month): <40 mg/dL and >300</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Fasting for at least 8 hours prior to collection is recommended. Falsely low values may occur in specimens which are not separated promptly from RBC’s.
See:	 Glucose-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Critical Lab Values Chemistry Pediatric Reference Ranges Fasting Specimen Requirements
Methodology	Hexokinase/UV test
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Glucose

Laboratory	Critical Care Laboratory
Order Code	GLC
CPT Code	82947
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Heparinized syringe or Green </tr> </table>
Minimum	0.5 mL in Lithium/Sodium Heparin syringes
Reference Range	<pre> Fasting Peds (0 - 1 month): 40 - 99 mg/dL Fasting Adult (1 month and older): 65 - 99 mg/dL See Additional Information for Pediatric Normal Range Critical Care Critical Value Adults: <50mg/dL and >450 Peds: <40mg/dL and >300 Special Care Nurseries Critical Value: <50mg/dL and >200</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required); all needles must be removed from the syringe before delivery.
See Appendix	See Additional Information: Chemistry Pediatric Reference Ranges Critical Care Critical Lab Values Special Care Nurseries Critical Lab Values
Methodology	Ion Selective Electrode
Analytic Time	10 minutes (upon receipt in laboratory)

Glutamic Acid Decarboxylase Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	GAD
CPT Code	83516
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL
Rejection Criteria:	Plasma. Grossly hemolyzed specimens.
Reference Range	0.0-5.0 IU/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	3 working days upon receipt at reference laboratory

Glutamic Oxaloacetic Transaminase (GOT)

See:	 Aspartate Aminotransferase (AST), Plasma

Glutamic Pyruvic Transaminase

See:	 Alanine Aminotransferase (ALT), Plasma

Glutamine

See:	 Amino Acids, Quantitative, Plasma Amino Acids, Quantitative, Random Urine

Glycine

See:	 Amino Acids, Quantitative, Plasma Amino Acids, Quantitative, Random Urine

Glycohemoglobin

See:	 Hemoglobin A1C, Whole Blood

Glycols (Ethylene and Propylene)

Laboratory	Chemistry
Order Code	GLYCOL
CPT Code	84600
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers for pediatric patients
Rejection Criteria:	Medico-legal specimens are not accepted.
Reference Range	Ethylene glycol toxicity usually >50 mg/dL Clinical toxicity: >10 mg/dL Propylene glycol toxicity range not well defined but clinical toxicity more likely if plasma concentration exceed 100 mg/dL. Critical values: Ethylene glycol 10 mg/dL or greater Propylene glycol 100 mg/dL or greater
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test requires approval of Clinical Pathology Resident on-call (pager #3404). Note that the "Ethylene Glycol, Plasma" provides more rapid determination of ethylene glycol plasma concentrations. The "Ethylene Glycol, Plasma" test is reflexively ordered if the unexplained osmolar gap is greater than 15 and may also be directly ordered in cases of suspected ethylene glycol ingestion or for monitoring ethylene glycol plasma concentrations in patients receiving treatment for ethylene glycol ingestion. This procedure individually quantitates ethylene glycol. The glycols by gas chromatography tests may be ordered if there is an interference with the "Ethylene Glycol, Plasma" test or if quantitation of propylene glycol is needed. This procedure individually quantitates ethylene glycol and propylene glycol. Ethylene glycol is commonly found in many automobile antifreezes. Propylene glycol is found in some intravenous drug formulations as a solvent/diluent (e.g., diazepam, lorazepam, etomidate, and phenytoin) and is also found in a small number of automobile antifreezes (e.g., Sierra). References: Wilson KC, Reardon C, Theodore AC, and Farber HW. Propylene glycol toxicity: a severe iatrogenic illness in ICU patients receiving IV benzodiazepines: a case series and prospective, observation l pilot study. Chest 128: 1674-1681, 2005. Eder AF et al. Ethylene glycol poisoning: toxicokinetic and analytical factors affecting laboratory diagnosis. Clin Chem 44: 168-177, 1998. Profile result codes: GLYC, PGLY
See:	 Alcohol, Plasma Ethanol/Volatiles Screen (EVS), Plasma Ethylene Glycol, Plasma
See Appendix	See Additional Information: Chemistry Critical Lab Values Osmolality Gap - Calculation and Interpretation Osmolality Gap Calculator
Methodology	Gas Chromatography
Analytic Time	4 hours (upon receipt in laboratory)
Testing Schedule	0700-1530 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

GM1 Ganglioside Antibodies IgG/M

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                  Laboratory  Commercial Mail-out Laboratory
                  Order Code  GM1
                    CPT Code  83516 (x6)
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Red top tube</td>
                               </tr>
                               </table>

                     Minimum  <pre>
                               Pediatrics: 0.25 ml
                               Adults:  1 ml (absolute minimum:  0.5 ml)
                                 If MAG Ab is ordered on the same patient, submit two 1 ml
                               aliquots.</pre>
          Rejection Criteria:  Ambient and refrigerated specimens. Plasma and other body fluids. Heat-
                               inactivated, severely lipemic, contaminated, or hemolyzed specimens.
              Reference Range  <pre>
                               Ganglioside (asialo-GM1) Antibody, IgG/IgM
                                 29 IV or less: Negative
                                 30-50 IV: Equivocal
                                 51-100 IV: Positive
                                 101 IV or greater: Strong Positive

                               Ganglioside (GM1) Antibody, IgG/IgM
                                 29 IV or less: Negative
                                 30-50 IV: Equivocal
                                 51-100 IV: Positive
                                 101 IV or greater: Strong Positive

                               Ganglioside (GM2) Antibody, IgG/IgM
                                 29 IV or less: Negative
                                 30-50 IV: Equivocal
                                 51-100 IV: Positive
                                 101 IV or greater: Strong Positive

                               Ganglioside (GD1a) Antibody, IgG/IgM
                                 29 IV or less: Negative
                                 30-50 IV: Equivocal
                                 51-100 IV: Positive
                                 101 IV or greater: Strong Positive

                               Ganglioside (GD1b) Antibody, IgG/IgM
                                 29 IV or less: Negative
                                 30-50 IV: Equivocal
                                 51-100 IV: Positive
                                 101 IV or greater: Strong Positive

                               Ganglioside (GQ1b) Antibody, IgG/IgM
                                 29 IV or less: Negative
                                 30-50 IV: Equivocal
                                 51-100 IV: Positive
                                 101 IV or greater: Strong Positive</pre>
                Order Form:  A-1a Miscellaneous Request or Epic Req
                Methodology  Enzyme-Linked Immunosorbent Assay (ELISA)
              Analytic Time  4 working days upon receipt at reference laboratory
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Gonadotropins

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                       See:  <br />Follicle Stimulating Hormone (FSH), Plasma
                             <br />HCG, Quant-Hum Chor Gon, Plasma
                             <br />Luteinizing Hormone (LH), Plasma
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GOT (Glutamic Oxaloacetic Transaminase)

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                       See:  <br />Aspartate Aminotransferase (AST), Plasma
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Gram Stain

Laboratory	Microbiology
Order Code	C GS
CPT Code	87205
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> Test is automatically included with selected culture requests, but may be requested as a single test without ordering a culture. Will not be done on blood cultures and requires laboratory approval if requested on urine.</pre>
Methodology	Microscopic slide examination
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Group A Rapid Strep Screen Panel

Laboratory	Chemistry
Order Code	RSPOC
CPT Code	87880
Collection Medium	<table> <tr> <td align=center></td><t <td align=center><a href="javascript:larger_tube('74.jpg')"><img src="/pa <tr> <td width="110" valign="top" align="center">ESwab Collection & Transport <td width="110" valign="top" align="center">Aerobic Culturette</td> </tr> </table>
Minimum	Collect: ONE ESwab (Product #74541) and ONE throat Swab (Aerobic Culturette, Product #922349) Send the ESwab and requisition for Group A Strep Culture to Microbiology and send the throat swab (Aerobic Culturette) and requisition for Group A Rapid Strep Screen to Specimen Control.
Comments	The panel includes culture confirmation of negative Group A Streptococcal (GAS) rapid antigen tests. The GAS culture will not be performed if the rapid test is positive. This panel is available only in Epic. For children and adolescents, a negative rapid GAS antigen detection test should be confirmed with a throat culture. A negative rapid antigen test without culture confirmation is considered an acceptable practice for adults because of the lower incidence of GAS pharyngitis and minimal risk of rheumatic fever. Practice guidelines for the diagnosis of GAS pharyngitis are available at Infectious Diseases Society of America (IDSA) (Clin Infect Dis 2002; 35:113-25) and Circulation (Circulation 2009; 119:1541-1551).
See:	 Group A Strep Screen, Throat Swab

Group A Strep Screen

Laboratory	Microbiology
Order Code	C GPA
CPT Code	87081
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">ESwab Collection & Transport </tr> </table>
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	For children and adolescents, a negative rapid GAS antigen detection test should be confirmed with a throat culture. A negative rapid antigen test without culture confirmation is considered an acceptable practice for adults because of the lower incidence of GAS pharyngitis and minimal risk of rheumatic fever. Practice guidelines for the diagnosis of GAS pharyngitis are available at Infectious Diseases Society of America (IDSA) (Clin Infect Dis 2002; 35:113-25) and Circulation (Circulation 2009; 119:1541-1551).
See:	 Bacterial Culture
Testing Schedule	0700-2200, 7 days a week, including holidays. Cultures are completed within 2-3 days.

Group B Strep Antigen

Laboratory	Microbiology
Order Code	C BAG
CPT Code	86403
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	5 ml; red top or 0.5 ml; CSF
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Test done daily. Test is performed primarily on neonates. Requests on patients >6 months of age require laboratory approval.
Methodology	Latex agglutination - antigen detction
Analytic Time	6 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Group B Strep Culture

See:	 Culture-Group B Strep Screen

Growth Assessment Test Group 6

See:	 Insulin Like Growth Factor Binding Protein III (IGFBP-3), Serum Insulin-Like Growth Factor I, Serum Insulin-Like Growth Factor II, Serum

Growth Hormone

Laboratory	Chemistry
Order Code	HGH
CPT Code	83003
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers.
Reference Range	<pre> Male: 0-6 years: 0.10-8.80 ng/mL 7-17 years: 0.03-14.90 ng/mL 18 years and older: 0.01-1.00 ng/mL Female: 0-6 years: 0.10-8.80 ng/mL 7-17 years: 0.06-23.80 ng/mL 18 years and older: 0.03-10.00 ng/mL</pre>
Order Form:	A-1a General Lab or Epic Req
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Guaiac Screen, Fecal Occult Blood

See:	 Fecal Occult Blood, Guaiac Screen, Fecal

Guanidinoacetic Acid + Creatine

Laboratory	Commercial Mail-out Laboratory
Order Code	GUANU
CPT Code	82544
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	2 mL random urine (Fasting urine is preferred).
Reference Range	By Report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the <a href= "http://www.kennedykrieger Biochemical Genetics Requisition to the lab, with the specimen and the A-1a Miscellaneous Request.
Analytic Time	2 weeks upon receipt at reference laboratory
Testing Schedule	Monday - Thursday collection, no Saturday delivery.

Guanidinoacetic Acid + Creatine

Laboratory	Commercial Mail-out Laboratory
Order Code	GUANB
CPT Code	82544
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	3 mL whole blood EDTA tube
Reference Range	By Report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the <a href= "http://www.kennedykrieger Biochemical Genetics Requisition to the lab, with the specimen and the A-1a Miscellaneous Request.
Analytic Time	2 weeks upon receipt at reference laboratory
Testing Schedule	Monday - Thursday collection, no Saturday delivery.

Guthrie Test

See:	 Phenylalanine, Screen (Guthrie Test)

H

H. influenza IgG Ab.

Laboratory	Commercial Mail-out Laboratory
Order Code	HFLU
CPT Code	86317
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult preferred minimum: 1 mL serum Adult absolute minimum: 0.5 mL serum Pediatric minimum: 0.15 mL serum</pre>
Reference Range	<pre> < 1.0 ug/mL = Antibody concentration not protective. Is greater than or equal to 1.0 ug/mL = Antibody to H. influenzae b detected. Suggestive of protection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Recommend testing of pre/post vaccination sera when clinically indicated. "Pre" and 30-day "post" Haemophilus influenzae b vaccination samples should be submitted together for testing. "Post" sample should be drawn 30 days after immunization and must be received within 60 days of "pre" sample. Please clearly mark samples "pre-vaccine" or "post-vaccine" so that samples will be saved and tested simultaneously.</pre>
Methodology	Multi-Analyte Fluorescent Detection
Analytic Time	4 working days upon receipt at reference laboratory

H. pylori Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	HPYSTOOL
CPT Code	87338
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Feces specimen, stool contain </tr> </table>
Minimum	<pre> Preferred minimum: 5 g stool in clean unpreserved stool container Absoluate minimum: 1 g stool in clean unpreserved stool container</pre>
Rejection Criteria:	Tissue, gastric specimens. Stool in Ecofix™, formalin, MIF, Protofix™, PVA, Total-fix™, Unifix™, or any other preservative.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

H. pylori Breath Test

Laboratory	Commercial Mail-out Laboratory
Order Code	UBT
CPT Code	83013
Collection Medium	Miscellaneous container; contact laboratory
Rejection Criteria:	Bags not fully inflated or only one of the two bags submitted; breath collected in tubes; refrigerated or frozen specimens; collect Monday through Thursday only; do not collect on Fridays, holidays, day before a holiday, or weekends. Pediatric specimens from persons 17 years or younger.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Testing kits are available from Specimen Control, 6240 RCP. Patient preparation: The patient should fast and abstain from smoking for 1 hour prior to test administration The patient should not have taken antibiotics, proton pump inhibitors or bismuth preparations within the previous 14 days. These include: Prilosec, Prevacid, Aciphex, Nexium, and Pepto-Bismol. When used to monitor treatment, the test should be performed four weeks after cessation of definitive therapy. The patient should be informed that the Pranactin-Citric drink that will be administered contains phenylalanine. Phenylketonurics restrict dietary phenylalanine. Test administration: 1) Label breath collection bags with patient name, MRN, date and time of collection, and designate Pre (blue) or Post (pink). 2) Collect the baseline breath sample: a) Remove cap from collection bag (blue). b) Have patient take a deep breath, pause momentarily then exhale into the mouthpiece of the bag filling it completely. c) Replace cap on the bag. 3) Prepare Pranactin-Citric solution: a) Empty packet from test kit into the cup provided. b) Add drinking water up to the fill line (raised ridge). c) Replace lid; swirl for up to two minutes until completely dissolved. Solution should be clear. The solution is stable up to 60 minutes at room temperature. 4) Instruct patient to drink the solution without stopping using the straw provided. Advise the patient not to "rinse" the mouth with the solution before swallowing. 5) Set timer for 15 minutes. Start timer as soon as the patient has completed drinking. Patient should sit quietly without eating, drinking, or smoking. 6) Prepare the post sample collection (pink) bag. At exactly 15 minutes, have the patient take a deep breath, pause momentarily and then exhale to fill the second sample collection bag (pink). Note: for a valid result, the post sample must be collected within 13 to 18 minutes after administration of the Pranactin-Citric Solution. Return kit to Specimen Control, 6240 RCP. Sample stability: 1 week only-must reach reference laboratory within a week of collection. Critical ambient.</pre>
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Infrared Spectrophotometric
Analytic Time	1-4 days upon receipt at reference laboratory

H2A-H2B Histone Antibody

See:	 Histone Antibody, IgG, Serum

Hairy Cell Leukemia

See:	 Chronic Lymphocytic Leukemia, Various

Haloperidol Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	HALO
CPT Code	80173
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Therapeutic Range 2.0 - 15.0 ng/mL No range for children is available.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-5 days upon receipt at reference laboratory.

Ham‘s Acid Hemolysin

See:	 Paroxysmal Nocturnal Hemoglobinuria (PNH) Screen, Peripheral Blood

Ham‘s Test

See:	 Paroxysmal Nocturnal Hemoglobinuria (PNH) Screen, Peripheral Blood

Haptoglobin

Laboratory	Chemistry
Order Code	HAPT
CPT Code	83010
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or ONE microtainer
Reference Range	30-200 mg/dL
Order Form:	A-1a General Lab or Epic Req
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

HBA1/HBA2 Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	GLOBGENE
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Draw 3.0 mL whole blood in a lavender-top (EDTA) tube. Absolute Minimum: 1.0 mL whole blood
Rejection Criteria:	Samples greater than 96 hours of age.
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful For</u>: •Diagnosis of alpha-thalassemia •Prenatal diagnosis of deletional alpha-thalassemia •Carrier screening for individuals from high-risk populations <u>Cautions</u>: In addition to disease-related probes, the multiplex ligation-dependent probe amplification technique utilizes probes localized to other chromosomal regions as internal controls. In certain circumstances, these control probes may detect other diseases or conditions for which this test was not specifically intended. Results of the control probes are not normally reported. However, in cases where clinically relevant information is identified, the ordering physician will be informed of the result and provided with recommendations for any appropriate follow- up testing. Rare polymorphisms exist that could lead to false-negative or false-positive results. If results obtained do not match the clinical findings, additional testing should be considered. A previous bone marrow transplant from an allogenic donor will interfere with testing. Test results should be interpreted in the context of clinical findings, family history, and other laboratory data. Errors in our interpretation of results may occur if information given is inaccurate or incomplete. This assay cannot be performed on chorionic villus specimens. Non-deletion types of alpha-thalassemia will not be detected by this assay. This test is not useful for diagnosis or confirmation of beta-thalassemia or hemoglobinopathies. Hemoglobin electrophoresis should usually be done prior to this test to exclude other diagnoses or to identify non deletion types of alpha-thalassemia. Please print, complete, and submit the following with the appropriate signatures and the correct sample type: <a href="http://www.mayoreferenc Congenital Inherited Diseases Patient Information Sheet and the Informed Consent for DNA Testing from Mayo Medical Laboratories with the A-1a Miscellaneous Request. Blood is sample of choice. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Dosage Analysis by Polymerase Chain Reaction (PCR), Multiplex Ligation-Dependent Probe Amplification (MLPA) and Luminex Technology. (PCR is

utilized pursuant to a license agreement with Roche
Inc.)
Analytic Time 12 working days

HbA1C

See:
Hemoglobin A1C, Whole Blood

HBSAG

See:
Hepatitis B Surface Antigen, Plasma

HCG

See:
HCG, Quant-Hum Chor Gon, Plasma

Pregnancy Test, Qualitative, Plasma

HCG, Quant-Hum Chor Gon

Laboratory: Chemistry
Order Code: HCG
CPT Code: 84702
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Plasma Separator Tube</td>
</tr>
</table>

Alternate Collection Media: Call laboratory for additional acceptable specimen collection containers.
Minimum: 3 mL whole blood from light green top tube or TWO microtainers
Reference Range:

<pre>
Non-Pregnant Females: < 3.0 mIU/mL
Males: < 2.0 mIU/mL
Healthy non-pregnant peri-menopausal and post-menopausal females may
have HCG values up to 8 mIU/mL

Data are given only for the week of gestation for which the case
numbers (n) were greater than 10.
</pre>

Weeks of gestation	N	HCG mIU/mL Median	5th-95th percentile
3	25	17.5	5.8 - 71.2
4	43	141	9.5 - 750
5	23	1,398	217 - 7,138
6	19	3,339	158 - 31,795
7	13	39,759	3,697 - 163,563
8	23	90,084	32,065 - 149,571
9	23	106,257	63,803 - 151,410
10	20	85,172	46,509 - 186,977
12	17	66,676	27,832 - 210,612
14	67	34,440	13,950 - 62,530
15	666	28,962	12,039 - 70,971
16	766	23,930	9,040 - 56,451
17	190	20,860	8,175 - 55,868
18	64	19,817	8,009 - 58,176

Order Form: A-1a General Lab or Epic Req
Comments: Heterophile antibodies present in the serum of some patients may cause a false positive result in this assay. Before making the diagnosis of malignancy based on an elevated serum HCG, confirm with a urine HCG.

Methodology: Electrochemiluminescent Immunoassay
Analytic Time: 1 hour (upon receipt in laboratory)
Testing Schedule: 24 hrs/day, 7 days a week, including holidays.

HCG-Other

Laboratory	Chemistry
Order Code	HCGO
CPT Code	84702
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 HCG, Quant-Hum Chor Gon, Plasma
Methodology	Electrochemiluminescent Assay
Analytic Time	2 days
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

HCV

See:	 Hepatitis C Recombinant Immunoblot Hepatitis C Virus Antibody, Plasma Hepatitis C Virus Genotyping, Plasma Hepatitis C Virus; Quantitative PCR, Plasma

HCV EIA

See:	 Hepatitis C Virus Antibody, Plasma

HCV RIBA

See:	 Hepatitis C Recombinant Immunoblot

HE4

See:	 Human Epididymis Protein 4, Serum

Heat Shock Protein 70 (68 kDa), IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	HSP
CPT Code	84182
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.2 mL serum Pediatric Minimum: 0.1 mL serum</pre>
Rejection Criteria:	Hemolyzed or lipemic specimens. Specimens with large clots present or bacterial growth. Specimens collected with anticoagulants or preservatives.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Western Blot
Analytic Time	within 10 days upon receipt at reference laboratory

Heavy Metal Screen

```
                 Laboratory  Commercial Mail-out Laboratory
                 Order Code  HMSB
                   CPT Code  82175 Arsenic, 83655 Lead, 83825 Mercury
           Collection Medium  <table>
                              <tr>
                              <td align=center></td></tr>
                              <tr>
                              <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td>
                              </tr>
                              </table>

                    Minimum  <pre>
                              Preferred Minimum:  7 mL whole blood
                              Adult/Pediatrics Absolute Minimum:  1.5 mL whole blood

                              Mercury is volatile; concentration may reduce after seven or more days
                              of storage.  If the specimen is drawn and stored in the appropriate
                              container, the arsenic and lead values do not change with time. </pre>
         Rejection Criteria:  Heparin anticoagulant
             Reference Range  <pre>
                              Components             Reference Interval
                              Arsenic, Blood         0.0-13.0 ug/L
                              Mercury, Whole Blood   0-10 ug/L
                              Lead, Blood (Venous)   By report</pre>
                 Order Form:  A-1a Miscellaneous Request or Epic Req
                    Comments  Includes Arsenic, Lead and Mercury.

                 Methodology  Atomic Absorption/Inductively Coupled Plasma-Mass Spectrometry
               Analytic Time  5 days upon receipt at reference laboratory
```

Heavy Metals

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                        See:  <br />Arsenic, Urine
                              <br />Lead, Urine
                              <br />Mercury, Urine
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Helicobacter pylori Antibody, IgA

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                 Laboratory  Commercial Mail-out Laboratory
                 Order Code  HPYLORIA
                   CPT Code  86677
           Collection Medium  <table>
                              <tr>
                              <td align=center></td></tr>
                              <tr>
                              <td width="110" valign="top" align="center">Red top tube</td>
                              </tr>
                              </table>

                    Minimum  <pre>
                              Adult preferred minimum:  .5 mL serum
                              Adult absolute minimum:  0.3 mL serum
                              Pediatric minimum:  0.1 mL serum</pre>
         Rejection Criteria:  Severely lipemic, contaminated, heat-inactivated, or hemolyzed
                              specimens.
             Reference Range  <pre>
                              1.7 EV or less: Negative - No significant level of IgA antibody to H.
                              pylori detected.

                              1.8-2.2 EV: Equivocal - Repeat testing in 10-14 days may be helpful.

                              2.3 EV or greater: Positive - IgA antibody to H. pylori detected,
                              suggestive of active infection.</pre>
                 Order Form:  A-1a Miscellaneous Request or Epic Req
                 Methodology  Enzyme Immunoassay
               Analytic Time  1 week upon receipt at reference laboratory
```

Helicobacter pylori Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	HELI
CPT Code	86677
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	0.5 mL serum
Rejection Criteria:	Contaminated, heat-inactivated, hemolyzed, or severely lipemic specimens.
Reference Range	1.7 EV or less: Negative - No significant level of IgG antibody toH. pylori detected. 1.8-2.2 EV: Equivocal - Repeat testing in 10-14 days may be helpful. 2.3 EV or greater: Positive - IgG antibody to H. pylori detected, suggestive of previous exposure or active infection.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme Immunoassay
Analytic Time	Within 24 hours upon receipt at reference laboratory

Hematocrit

Laboratory	Hematology
Order Code	HCTF
CPT Code	85013
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	2.0 mL fluid
Reference Range	No blood, none detected, <1 %
Order Form:	A-1a General Lab or Epic Req
See:	 Body Fluid Cell Count and Differential, Miscellaneous Body Fluids
Methodology	Manual spun microhematocrit
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hematocrit (Packed Cell Volume-PCV)

Laboratory	Hematology
Order Code	HCT
CPT Code	85014
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range	<pre>

	Males	Females
18 years+	40-52%	35-47%
11 years - <18 years	37-48%	34-44%
5 years - <11 years	35-44%	35-44%
1 year - <5 years	31-44%	31-44%
6 months - <1 year	31-41%	31-41%
3 months - <6 months*	29-41%	29-41%
2 months - <3 months*	28-41%	28-41%
31 days - <2 months*	33-54%	33-54%
0 - <31 days*	42-64%	42-64%

* values refer to full term infants.

Critical value: <u><</u>18% and <u>></u>55% (adult)</pre>

Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Hematology Critical Lab Values Hematology Pediatric Reference Ranges
Methodology	Automated - Flow Cytometry
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hemoccult

See:	 Fecal Occult Blood, Guaiac Screen, Fecal

Hemoglobin A

See:	 Hemoglobin Evaluation, Quantitation Only, Blood Hemoglobin Evaluation, Quantitation with Interpretation, Blood

Hemoglobin A1C

Laboratory	Chemistry
Order Code	A1C
CPT Code	83036
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL; lavender top or 2 lavender microtubes for pediatrics
Reference Range	4.8 - 6.0% <pre> Glycemic control guidelines: Non-diabetic <6% Goal <7% Therapeutic action >8%</pre>
Order Form:	A-1a General Lab or Epic Req
Methodology	Turbidimetric Immuno inhibition
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hemoglobin and Calculated Hematocrit

Laboratory	Critical Care Laboratory
Order Code	HBC
CPT Code	85018
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Heparinized syringe or Green </tr> </table>
Minimum	0.5 mL in Lithium/Sodium Heparin syringes
Reference Range	<pre> Critical Care Critical Value: Hemoglobin <6.0g/dL and >22.0g/dL Special Care Nurseries Critical Value: Hemoglobin <8.0g/dL and >22.0g/dL</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required); all needles must be removed from the syringe before delivery.
Methodology	Oximetric
Analytic Time	10 minutes (upon receipt in laboratory)

Hemoglobin Evaluation, Quantitation Only

Laboratory	Hematology
Order Code	AFSC
CPT Code	83020
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range	<pre> Hemoglobin A₂ 0-3.5% Hemoglobin F Birth-3 months: 50-80% 3 months-1 Year: 6% After 1 year: 2% or less Hemoglobin S 0%</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Ordinarily performed on patients over one year old. This assay quantitates Hemoglobin A, A2, F, and S levels using capillary electrophoresis. If a rapid screen for the presence of sickle hemoglobin is clinically indicated, then "Sickle Cell Screen" [LAB339] would be the appropriate order. For fetal erythrocyte quantitation in maternal blood (e.g., workup of possible feto-maternal hemorrhage), "Fetal Erythrocyte Quantitation" (LAB292) would be the appropriate order.
Methodology	Capillary Electrophoresis
Testing Schedule	Testing is performed on Wednesday only; sample should be in the lab by Tuesday.

Hemoglobin Evaluation, Quantitation with Interpretation

Laboratory	Hematology
Order Code	HEOP
CPT Code	83020
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range	Compatible with hemoglobin A, abnormal hemoglobins are quantitated by capillary electrophoresis
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This assay quantitates hemoglobin A, A2, F, and S levels using capillary electrophoresis and includes pathologist interpretation of hemoglobin electrophoresis pattern. This would be appropriate order for initial workup of patient hemoglobin phenotype. If quantitative Hb A, A2, F, and S levels alone are sufficient, "Hemoglobin Evaluation, Quantitation Only" (LAB7798) would be appropriate order and would have lower charges. For quantitation of fetal erythrocytes in maternal blood (e.g., workup of possible feto-maternal hemorrhage), "Fetal Erythrocyte Quantitation" (LAB292) would be appropriate order. This test is appropriate for routine screening. Pertinent clinical information should accompany the request and there should be a recent hematology profile. Path resident will interact with clinician on all quantitative hemoglobin orders. Peripheral smear morphology, RBC indicies, and electrophoretic results are correlated by the pathologist and a written narrative is reported by computer. Analysis cannot be done on patients transfused within the preceding 3 months since the presence of transfused cells may render the interpretation ambiguous.
Methodology	Capillary electrophoresis and Wright Stain
Testing Schedule	Testing performed on Wednesday only; sample should be in the lab by Tuesday. Results usually reported on Thursday.

Hemoglobin F

See:	 Fetal Erythrocyte Quantitation, Peripheral Blood (maternal) Hemoglobin Evaluation, Quantitation Only, Blood Hemoglobin Evaluation, Quantitation with Interpretation, Blood

Hemoglobin Oxygen Affinity

See:	 Oxygen Dissociation P50, RBC, Blood

Hemoglobin S

See:	 Hemoglobin Evaluation, Quantitation Only, Blood Hemoglobin Evaluation, Quantitation with Interpretation, Blood

Hemoglobin, Glycosylated

See:	 Hemoglobin A1C, Whole Blood

Hemoglobin, Oxygen Dissociation Curve

See:	 Oxygen Dissociation P50, RBC, Blood

Hemoglobin

Laboratory	Hematology
Order Code	HB
CPT Code	85018
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range	<pre>

	Males	Females
18 years+	13.2-17.7 g/dL	11.9-15.5 g/dL
11 years - <18 years	12.7-17.0 g/dL	11.9-15.0 g/dL
5 years - <11 years	11.9-15.0 g/dL	11.9-15.0 g/dL
1 year - <5 years	10.9-15.0 g/dL	10.9-15.0 g/dL
6 months - <1 year	11.3-14.1 g/dL	11.3-14.1 g/dL
3 months - <6 months*	9.5-14.1 g/dL	9.5-14.1 g/dL
2 months - <3 months*	9.0-14.1 g/dL	9.0-14.1 g/dL
31 days - <2 months*	10.7-17.1 g/dL	10.7-17.1 g/dL
0 - <31 days*	13.4-19.9 g/dL	13.4-19.9 g/dL

*values refer to full term infants

Critical value: <u><</u>6 gm/dL and <u>></u>22 gm/dL (adult)</pre>

Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Hematology Critical Lab Values Hematology Pediatric Reference Ranges
Methodology	Colorimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hemoglobin

Laboratory	Chemistry
Order Code	PLHB
CPT Code	83051
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer. Suspected 'transfusion reaction' samples are to go to Blood Bank.
Reference Range	1-5 mg/dL
Order Form:	A-1a General Lab or Epic Req
Comments	Draw with syringe and large bore needle (20g or larger). Fill tube gently with needle and stopper removed.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hemoglobin-H Disease

See:	 HBA1/HBA2 Gene Analysis Common Variants, Whole Blood

Hemogram (CBC)

See:	 CBC (Complete Blood Count), Blood

Hemolytic Uremic Syndrome Dense Deposit (Renal Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	HUSDD
CPT Code	86161 (x16)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 5 mL serum from whole blood Absolute Minimum: 2 mL serum from whole blood
Reference Range	Normal (<3%); 1+ (3%-20%); 2+ (20%-40%); 3+ (40%-60%); 4+ (60%-80%); 5+ (80%-100%, complete hemolysis)
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Special Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Sheep erythrocytes are used as index cells in this assay. Sheep erythrocytes generally act as non-activators of complement-mediated lysis in human serum. A small number of C3b molecules spontaneously generated through AP tick-over are deposited on the surface of sheep erythrocytes. In normal human serum, factor H binds to C3b molecules through its N-terminal domains and to sheep erythrocytes through its C-terminal domains. These interactions result in efficient protection of sheep erythrocytes against complement and no lysis is observed (Dragon-Durey et al, 2005, Józsi et al, 2007). Abnormal hemolytic activity may be seen when serum from patients with aHUS is used in this assay if these patients carry either genetic mutations or acquired risk factors for aHUS such as FH autoantibodies. While abnormal hemolytic activity may also be seen with serum from patients with DDD if these patients carry either genetic mutations or acquired factors for DDD such as C3 nephritic factors, hemolysis will be absent when consumption of AP proteins has been extensive and only a small amount of AP proteins remain in the serum.
Analytic Time	1 month

Hemosiderin-Other

Laboratory	Hematology
Order Code	HSDRO
CPT Code	83070
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> If blood: 2 mL whole blood in lavender top If body fluid: 1 mL fluid in lavender top</pre>
Reference Range	Negative
Order Form:	A-1a General Lab or Epic Req
Methodology	Prussian Blue Stain
Analytic Time	6 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Hemosiderin-Urine

Laboratory	Hematology
Order Code	URHSDR
CPT Code	83070
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	10 mL random collection; no preservative
Reference Range	Negative
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Prussian Blue Stain
Analytic Time	6 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Hep C EIA

See:	 Hepatitis C Virus Antibody, Plasma

Heparin Assay

Laboratory	Hemostasis/Thrombosis
Order Code	HEP
CPT Code	85520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top (mix well)
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Recommended target range for treatment of DVT or venous thromboembolism is 0.4-0.7 U/mL.
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw
Methodology	Anti Xa activity by chromogenic substrate.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Heparin Induced Thrombocytopenia

Laboratory	Hemostasis/Thrombosis
Order Code	HIT
CPT Code	86022
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum
Reference Range	<pre> Negative Critical value: Positive</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Same day testing (Monday-Friday) is available if the specimen is received in the lab by 1:00 p.m. For pediatric patients <18 years of age, a Pediatric Hematology/Oncology Service Consult is required for testing approval.
See:	 Serotonin Release Assay, Serum
See Appendix	See Additional Information: Hematology Critical Lab Values
Methodology	Enzyme Linked Immunosorbant Assay (ELISA) used to detect antibodies to Platelet Factor 4
Analytic Time	See comments
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Heparin Removal for PT

Laboratory	Hemostasis/Thrombosis
Order Code	HPT
CPT Code	85525
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL; light blue top
Reference Range	<pre> Heparin is degraded in plasma by the enzyme heparinase prior to performing routine coagulation tests.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Except for NICU, all other locations need Hematology Consult approval (pager 4326) to order this test.
Analytic Time	4 hours (upon receipt in laboratory)

Heparin Removal for PTT

Laboratory	Hemostasis/Thrombosis
Order Code	HPTT
CPT Code	85525
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL; light blue top
Reference Range	<pre> Heparin is degraded in plasma by the enzyme heparinase prior to performing routine coagulation tests.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Except for NICU, all other locations need Hematology Consult approval (pager 4326) to order this test.
Analytic Time	4 hours (upon receipt in laboratory)

Heparin, Low Molecular Weight (Xa Inhibition)

Laboratory	Hemostasis/Thrombosis
Order Code	ENOX
CPT Code	85520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 1.8 mL (N </tr> </table>
Minimum	Draw ONE 1.8 mL in light blue-top (3.2% sodium citrate) tube. 0.5 mL platelet poor plasma needed for testing.
Reference Range	Therapeutic range: 0.3-0.7 IU/mL for unfractionated heparin. The therapeutic range for low molecular weight heparins varies with the type and manufacturer, but is typically between 0.4 and 1.1 IU/mL.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient medications must be recorded on the laboratory requisition.
Methodology	Chromogenic method
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Heparsorb

See:	 Heparin Removal for PT, Plasma

Hepatitis A Antibody (G & M)

Laboratory	Chemistry
Order Code	HAVAB
CPT Code	86708
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers for pediatric patients.
Reference Range	Negative
Order Form:	A-1a General Lab or Epic Req
Methodology	Electrochemiluminescent Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hepatitis A Antibody-IgM

Laboratory	Chemistry
Order Code	HABM
CPT Code	86709
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers for pediatric patients.
Reference Range	See Interpretive Data
Order Form:	A-1a General Lab or Epic Req
Methodology	Electrochemiluminescent immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hepatitis Associated Antigen

See:	 Hepatitis B Surface Antigen, Plasma Hepatitis Be Antigen, Serum

Hepatitis B Core Antibody, IgM

Laboratory	Chemistry
Order Code	HBCM
CPT Code	86705
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers for pediatric patients
Reference Range	See Interpretive Data
Order Form:	A-1a General Lab or Epic Req
Comments	Current methods for the detection of IgM anti-HBc may not detect all infected individuals. False negative results may occur due to antibody levels below the detection limit of this assay or if the patient's antibodies do not react with the antigen used in this test. A reactive anti-HBc IgM result does not exclude co-infection by another hepatitis virus. The assay is limited to the detection of IgM anti-HBc in human serum or plasma. It can be used to determine whether a patient has, or has recently had, acute or subclinical hepatitis B infection. Supportive clinical information, including other hepatitis B markers, should also be evaluated. The test cannot determine a patient's immune status to hepatitis B. Samples should not be taken from patients receiving therapy with high biotin doses (i.e. > 5 mg/day) until at least 8 hours following the last biotin administration. A reactive anti-HBc IgM result does not exclude co-infection by another hepatitis virus.
Methodology	Chemiluminescent microparticle immunoassay (CMIA)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hepatitis B Core Antibody, Total

Laboratory	Chemistry
Order Code	HBCB
CPT Code	86704
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	5 mL whole blood from light green top tube or TWO light green top microtubes for pediatric patients
Reference Range	Non-reactive
Order Form:	A-1a General Lab or Epic Req
Comments	Part of initial diagnostic hepatitis profile. Current methods for the detection of anti-HBc antibodies may not detect all infected individuals. A nonreactive test result does not exclude the possibility of exposure to or infection with HBV.
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hepatitis B Surface Antibody

Laboratory	Chemistry
Order Code	HBSAB
CPT Code	86706
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers for pediatric patients
Reference Range	Non-reactive; positive with vaccine administration. Non-reactive samples have anti-HBs level less than 8.5 mIU/mL. Reactive samples have anti-HBs level greater than or equal to 11.5 mIU/mL. The result is indeterminate if the sample tests twice with anti-HBs results greater than or equal to 8.5 mIU/mL but less than 11.5 mIU/mL.
Order Form:	A-1a General Lab or Epic Req
Comments	Part of initial diagnostic hepatitis profile or to verify immunity status in patients who have received the hepatitis B vaccine. Results include reactivity (REACTIVE or NON-REAC), immune status (IMMUNE or NON IMM OR INDETERM) and quantitative concentration. Anti-HBs can be formed following a hepatitis B infection or after hepatitis B vaccination. New analytical immunoassay instituted April 5, 2010.
Methodology	Electrochemiluminescence Immunoassay (ECLIA)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hepatitis B Surface Antigen

Laboratory	Chemistry
Order Code	HBSG
CPT Code	87340
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers for pediatric patients.
Reference Range	Non-reactive
Order Form:	A-1a General Lab or Epic Req
Comments	Part of initial diagnostic hepatitis profile. May be ordered separately. Samples with weak but repeatedly positive reactivity (cutoff index greater than or equal to 1.0 but less than or equal to 20) will be resulted as "GRAYZONE". If sufficient specimen is available, samples with GRAYZONE reactivity will be analyzed by the hepatitis B surface antigen neutralization test (a confirmatory test) by a reference laboratory. A non-reactive surface neutralization reaction indicates that the patient does NOT have a positive surface antigen test. If insufficient sample is available for the neutralization confirmatory test, the pathology resident or attending will contact the ordering physician to discuss the results. Refer to University of Iowa Health Care policies: <a HREF="https://thepoint.healthcare.uiowa.edu/sites/Policies-UIHCPolicie Provider - contains information about staff member and source patient testing when there has been as significant exposure of a care provider. <a HREF="https://thepoint.healthcare.uiowa.edu/sites/Policies-UIHCPolicie Testing, Reporting and Confidentiality - contains information about patient testing for HIV. New analytical immunoassay instituted April 5, 2010.
Methodology	Electrochemiluminescence Immunoassay (ECLIA)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hepatitis B Virus DNA, Ultra Sensitive Quantitative PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	HBVQUANT
CPT Code	87517
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	2 mL EDTA anti-coagulated pink top tube.
Reference Range	Negative Analytical range in log10 values: 1.3 - 8.2 IU/mL (20-170,000,000 IU/mL non-log transformed values) Positive results less than 20 IU/mL will be reported as "POS <1.3 LOG IU" and negative results will be reported as "Not detected".
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Testing only approved for viral load testing to monitor therapy. Not for diagnostic testing.
See Appendix	See Additional Information: Conversion of Log Value to Integer Value Calculator
Methodology	Polymerase Chain Reaction (PCR)
Testing Schedule	Weekly

Hepatitis B Virus Genotyping

Laboratory	Commercial Mail-out Laboratory
Order Code	HBVG
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL plasma Plasma must be removed from cells within 24 hours.
Rejection Criteria:	Heparinized specimens.
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test may be unsuccessful if the HBV viral load is less than log 3.0 or 1,000 IU/mL of plasma. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Polymerase Chain Reaction/Sequencing
Analytic Time	within 10 days upon receipt at reference laboratory

Hepatitis Be Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	HBEAB
CPT Code	86707
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.5 mL serum
Rejection Criteria:	Specimens containing particulate material or collected in citrate-based anticoagulant. Heat-inactivated, grossly hemolyzed or lipemic specimens.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Qualitative Enzyme Immunoassay
Analytic Time	1-2 days upon receipt at reference laboratory

Hepatitis Be Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	HBEAG
CPT Code	87350
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum Absolute Minimum: 0.5 mL serum
Rejection Criteria:	Heat-inactivated, grossly hemolyzed, or lipemic specimens. Specimens containing particulate material, or collected in citrate-based anticoagulant.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Order this test only when specimen is repeatedly reactive for Hepatitis B Surface Antigen.
See:	 Hepatitis B Surface Antigen, Plasma
Methodology	Qualitative Enzyme Immunoassay
Analytic Time	1-2 days upon receipt at reference laboratory

Hepatitis C Recombinant Immunoblot

Comments	The Hepatitis C Recombinant Immunoblot assay is unavailable as of 3/30/2011. Please see: Hepatitis C Virus Antibody, Plasma Hepatitis C Virus RNA by PCR, Plasma

Hepatitis C Virus Antibody

Laboratory	Chemistry
Order Code	HEPC
CPT Code	86803
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers for pediatric patients.
Rejection Criteria:	Grossly hemolyzed specimens are not acceptable.
Reference Range	Non-reactive
Order Form:	A-1a General Lab or Epic Req
Comments	May be ordered separately. If supplemental testing is desired, please contact the laboratory. Refer to University of Iowa Health Care policies: <a href="https://thepoint.healthcare.uiowa.edu/sites/Policies-UIHCPolicie Provider - contains information about staff member and source patient testing when there has been as significant exposure of a care provider. <a href="https://thepoint.healthcare.uiowa.edu/sites/Policies-UIHCPolicie Testing, Reporting and Confidentiality - contains information about patient testing for HIV. The Roche Diagnostics Anti-HCV assay run on Modular E analyzers is used for the majority of samples. The Abbott Architect Hepatitis Anti-HCV assay is used as a backup to the Roche assay for two scenarios: (1) samples that are too hemolyzed for the Roche assay but can be run without interference on the Abbott assay and (2) specimens that return grayzone (equivocal) results on the Roche assay.
See:	 Hepatitis C Virus; Quantitative PCR, Plasma
Methodology	Chemiluminescent Microparticle Immunoassay (CMIA)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Hepatitis C Virus Genotyping

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	HCVGENO
CPT Code	87902
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	One full pink top tube (EDTA). Note: If HCV Quantitation is also requested, please obtain a second full pink top tube. Sample tube must remain sterile. HCV molecular testing cannot be added onto a previously opened vacutainer tube. Testing requires a dedicated collection tube. All collection tubes need to be processed within six hours of collection.
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Sequence Analysis of the HCV NS5b and/or 5/NTR coding regions.
Analytic Time	1 week
Testing Schedule	Once per week

Hepatitis C Virus; Quantitative PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	HCVQNT
CPT Code	87522
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	One full pink top tube (EDTA). Note: If HCV Quantitation is also requested, please obtain a second full pink top tube. Sample tube must remain sterile. HCV molecular testing cannot be added onto a previously opened vacutainer tube. Testing requires a dedicated collection tube. All collection tubes need to be processed within six hours of collection.
Reference Range	<pre> Negative Analytical range in log10 values: 1.63 - 7.84 Log IU (43-69,000,000 IU/mL non-log transformed values) Positive results less than 43 IU/mL will be reported as "POS <1.63 LOG IU", "POS <43 IU/mL" and negative results will be reported as "Not detected".</pre>
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
See Appendix	See Additional Information: Conversion of Log Value to Integer Value Calculator Specimens Requiring Immediate Delivery
Methodology	Homogeneous Polymerase Chain Reaction (real time PCR)
Analytic Time	1 week
Testing Schedule	Twice per week

Hepatitis Delta Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	HDAB
CPT Code	86692
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 1 mL serum Adult Absolute Minimum: 0.5 mL serum Pediatric Minimum: 0.4 mL serum</pre>
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Citrated or heparin plasma is also acceptable. Order this assay only when patient has an acute or chronic hepatitis B infection.</pre>
Methodology	Enzyme Immunoassay
Analytic Time	7 working days upon receipt at reference laboratory

Hepatitis Delta Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	HDAG
CPT Code	87380
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum Absolute Minimum: 0.5 mL</pre>
Rejection Criteria:	Grossly hemolyzed or lipemic specimens. Thawed specimens.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Qualitative Enzyme-Linked Immunosorbent Assay
Analytic Time	Varies Reported: 3-9 days upon receipt at reference laboratory

Hepatitis E Virus PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	HEVPCR
CPT Code	87798
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	ONE 6 mL whole blood in a Pink top tube or TWO 3 mL whole blood in lavender top tubes. HEV molecular testing cannot be added onto a previously opened vacutainer tube. Testing requires a dedicated collection tube.
Reference Range	Negative Results Reported: Negative, Positive, Indeterminate, Insufficient.
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Real-Time reverse transcription Polymerase Chain Reaction (RT-PCR)
Analytic Time	7 days
Testing Schedule	0800-1700 Testing offered once per week excluding weekends and University holidays.

Hepatitis E Virus, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	HEPEIGG
CPT Code	86790
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Minimum: 0.5 mL Absolute Minimum: 0.25 mL</pre>
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	3-12 days upon receipt at reference laboratory Performed: Varies

Hepatitis E Virus, IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	HEPEIGM
CPT Code	86790
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Minimum: 0.5 mL Absolute Minimum: 0.25 mL</pre>
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	3-12 days upon receipt at reference laboratory Performed: Varies

Her 2 neu

See:	 C-erb-2 Oncoprotein, Tissue Fluorescence In Situ Hybridization for Her-2/neu, Formalin-fixed, Paraffin-embedded breast cancer tissue

Her-2 neu Oncogene

See:	 C-erb-2 Oncoprotein, Tissue

Herceptin Stain

See:	 C-erb-2 Oncoprotein, Tissue

Hereditary Hemochromatosis PCR

See:	 HFE Hemochromatosis Gene Analysis Common Variants with Interpretation, Whole Blood

Hereditary Hemorrhagic Telangiectasia Known Mutation

Laboratory	Commercial Mail-out Laboratory
Order Code	HHTKNM
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Preferred Minimum: 3.0 mL whole blood Absolute Minimum: 2.0 mL whole blood
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre>This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Documentation of the familial gene mutation(s) is required to perform targeted sequencing. Submit a copy of a relative’s laboratory test report which documents the gene and specific mutation(s) for which testing is requested. Please print, complete, and submit the <a href= "http://www.aruplab.com/g for Molecular Genetics from ARUP Laboratories with the A-1a Miscellaneous Request.</pre>
Methodology	Polymerase Chain Reaction/Sequencing
Analytic Time	5-28 days upon receipt at reference laboratory

Hereditary Hemorrhagic Telangiectasia Sequence, Deletion/Duplication

Laboratory	Commercial Mail-out Laboratory
Order Code	HHTSDD
CPT Code	<pre> Sequencing: 83891 Isolation; 83898 x23 Amplification; 83904 x23 Sequencing; 83909 x2 Capillary electrophoresis; Del/Dup: 83896 x2 Nucleic Acid Probes; 83898 x2 Amplification; 83914 x2 Extension; 83909 Capillary electrophoresis. Additional CPT code modifiers may be required for procedures performed to test for oncologic or inherited disorders. </pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube, Yellow top tube (ACD solution A)
Minimum	Preferred Minimum: 3.0 mL whole blood Absolute Minimum: 2.0 ml whole blood
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the following forms to the lab, with the specimen and the A-1a Miscellaneous Request: HHT Testing Consent Form (Full Gene) and the Patient History for HHT from ARUP Laboratories.
Methodology	Bidirectional sequencing of ENG and ACVRL1 - all exons and exon/intron boundaries, including the 5l untranslated region of ENG; Multiplex Ligation-dependent Probe Analysis (MLPA) to detect large ENG and ACVRL1 gene deletion/duplication; oligonucleotide probes cover all ENG and ACVRL1 coding exons.
Analytic Time	Within 35 days

Hereditary Hemorrhagic Telangiectasia Sequencing

Laboratory	Commercial Mail-out Laboratory
Order Code	HHTGENE
CPT Code	<pre> 83891 Isolation; 83898 x23 Amplification; 83904 x23 Sequencing; 83909 x2 Capillary electrophoresis Additional CPT code modifiers may be required for procedures performed to test for oncologic or inherited disorders. </pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube, Yellow top tube (ACD solution A)
Minimum	Preferred Minimum: 3.0 mL whole blood Absolute Minimum: 1.0 mL whole blood
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the following forms to the lab, with the specimen and the A-1a Miscellaneous Request: HHT Testing Consent Form (Full Gene) and the Patient History for HHT from ARUP Laboratories.
Methodology	Bidirectional sequencing of ENG and ACVRL1 - all exons and exon/intron boundaries, including the 5’ untranslated region of ENG.
Analytic Time	28-35 days

Hereditary Persistance of Hemoglobin F

See:	 Fetal Erythrocyte Quantitation, Peripheral Blood (maternal)

Heroin

See:	 Opiate, Urine Confirmation, Random Urine

Herpes Simplex Virus PCR, Vitreous

Laboratory	Commercial Mail-out Laboratory
Order Code	HSVPR
CPT Code	87529
Collection Medium	Sterile container
Minimum	0.2-0.3 mL (This amount of sample will perform from 1 up to 4 viral tests).
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Useful for an aid in the rapid diagnosis of herpes simplex virus (HSV) infections. <u>Cautions</u>: A negative result does not eliminate the possibility of HSV infection. This assay is only to be used for patients with a clinical history and symptoms consistent with HSV infection, and must be interpreted in the context of the clinical picture. This test should not be used to screen asymptomatic patients.
See:	 Cytomegalovirus by PCR, Vitreous, Vitreous Toxoplasma gondii PCR, Vitreous, Vitreous Varicella-Zoster Virus PCR, Vitreous, Vitreous
Methodology	Real-Time Polymerase Chain Reaction (PCR)/DNA Probe Hybridization
Analytic Time	24 hours upon receipt at reference laboratory

Herpes Simplex Virus, Antigen Detection in Tissue

See:	 Immunoperoxidase Staining, Tissue, Body Fluids Skin Biopsy, Tissue

Herpes Virus 6 (HHV-6) AB Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	HV6P
CPT Code	86790(x2)
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Red top tube</td></tr></table>
Minimum	1 mL serum
Rejection Criteria:	Specimens other than serum.
Reference Range	<pre>IgG <1:10 IgM <1:20 Human Herpesvirus 6 (HHV-6) infects T-lymphocytes, and has been identified as an etiologic agent of exanthema subitum. Rises in antibody titers to HHV-6 have been detected during infection with other viruses. In seroepidemiology studies of the prevalence of exposure using serum screening dilutions of 1:10, the detection of IgG antibody in a mid-life population approaches 100%. Due to this high prevalence of HHV-6 antibody, correlations of single IgG titers with specific diseases are of little clinical value. Evidence of acute infection or reactivation of HHV-6 is demonstrated by a significant rise or seroconversion of IgG and IgM titers.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Indirect Fluorescent Antibody (IFA)
Analytic Time	1 week upon receipt at reference laboratory

Herpes Virus 6 (HHV-6) DNA Detection

Laboratory	Commercial Mail-out Laboratory
Order Code	HV6DNA
CPT Code	87532
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA), Yellow top tube (ACD solution A)
Minimum	Preferred Minimum: 1.0 mL serum or plasma
Rejection Criteria:	Heparinized specimens.
Reference Range	By report (not detected)
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Polymerase Chain Reaction (PCR)
Analytic Time	1 week upon receipt at reference laboratory

Herpes Virus 6 (HHV-6) Quant by PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	HHV6PCR
CPT Code	87533
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube
Minimum	Preferred minimum: CSF or 1 mL plasma
Rejection Criteria:	Heparinized or hemolyzed samples.
Reference Range	Not detected.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Note: The limit of quantification for this DNA assay is 3.0 log copies/mL (1,000 copies/mL). If the assay DID NOT DETECT the virus, the test result will be reported as "<3.0 log copies/mL (<1,000 copies/mL)." If the assay DETECTED the presence of the virus but was not able to accurately quantify the number of copies, the test result will be reported as "Not Quantified". This assay detects and quantifies HHV6 subtypes A and B.
Methodology	Quantitative Polymerase Chain Reaction
Analytic Time	2-7 days upon receipt at reference laboratory

Herpes Virus 7 (HHV-7) Quant.

Laboratory	Commercial Mail-out Laboratory
Order Code	HHV7
CPT Code	87799
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	<pre> Plasma (preferred): 2 mL collected in EDTA (pink top) tube <u>Also acceptable</u> Bone Marrow: 2 mL minimum, collected in an EDTA (pink top) tube Bronchial Lavage/Bronchial Wash: 1 to 3 mL, collected in sterile, screw-cap tube CSF: 1 mL minimum, submitted in sterile, screw-cap tube Pericardial Fluid: 1 mL minimum, submitted in a sterile, screw-top tube Pleural Fluid: 1 mL submitted in a sterile, screw top tube Tissue: Place in a sterile, screw cap tube, add a small amount of saline to keep moist. Prefer 1 mm x 1 mm specimen. Prefer fresh over formalin fixed for maximum sensitivity.</pre>
Rejection Criteria:	Whole blood frozen.
Reference Range	Not detected.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> HHV-7 is detectable in a variety of transplant settings, both HSCT and solid organ. Direct effects of HHV-7 include fever, rash, myelosuppression, encephalitis, and pneumonitis. Potentially more important are the indirect effects HHV-7 has on CMV disease, invasive fungal disease, and allograft dysfunction. Quantitative HHV-7 DNA PCR can be used to document the presence of the virus as well as track the course of infection. The primers and probes used in this assay are specific for known strains of HHV-7 based on similarity search algorithms. Additionally, no cross reactivity was detected when tested against adenoviruses, BKV, CMV, EBV, HSV-1, HSV-2, HHV-6 variant A, HHV-6 variant B, HHV-8, JCV, parvovirus B19, SV-40, and VZV.</pre>
Methodology	Quantitative Real-Time PCR
Analytic Time	24 hours upon receipt in reference laboratory.

Herpes Virus 8 (HHV-8) PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	HHV8
CPT Code	87799
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Whole Blood (preferred): 3 to 5 mL collected in EDTA tube Also acceptable Bone Marrow: 2 mL minimum, collected in an EDTA (pink top) tube Bronchial Lavage/Bronchial Wash: 1 to 3 mL, collected in sterile, screw-cap tube Pericardial Fluid: 1 mL minimum, submitted in a sterile, screw-top tube Pleural Fluid: 1 mL submitted in a sterile, screw-top tube Tissue: Place in a sterile, screw-cap tube, add a small amount of saline to keep moist. Prefer 1 mm x 1 mm specimen. Prefer fresh over formalin fixed for maximum sensitivity.</pre>
Rejection Criteria:	Whole blood frozen.
Reference Range	Expected value is not detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> HHV-8 is the etiologic agent of Kaposi’s Sarcoma (KS). Numerous studies have documented a higher risk of developing KS among HIV patients, organ transplant patients, and other immunocompromised individuals. Quantitative HHV-8 DNA PCR can be used to document the presence of the virus as well as track the course of infection. The primers and probes used in this assay are specific for known strains of HHV-8 based on similarity search algorithms. Additionally, no cross reactivity was detected when tested against adenoviruses, BKV, CMV, EBV, HSV-1, HSV-2, HHV-6 variant A, HHV-6 variant B, HHV-7, JCV, parvovirus B19, SV-40, and VZV.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative Real-Time PCR
Analytic Time	24 hours upon receipt in reference laboratory

Heterophile Antibody (Monospot) IRL Only

Laboratory	Iowa River Landing Laboratory
Order Code	MNSP
CPT Code	86308
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	3.0 mL whole blood from red top tube or TWO microtainers.
Reference Range	Negative
Order Form:	A-1a General Lab or Epic Req
Comments	This test is intended only for orders at Iowa River Landing (IRL). Note: Testing performed at University of Iowa Health care Iowa River Landing Laboratory (105 East 9th Street, Coralville, IA, 52241).
Methodology	Latex Particle Agglutination
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	Monday-Thursday 0700-2130 Friday 0700-1830 Saturday 0700-1330

HFE Hemochromatosis Gene Analysis Common Variants with Interpretation

Laboratory	Molecular Pathology
Order Code	HEMPCR
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult minimum: 3 mL whole blood in lavender top tube (EDTA) Children minimum: 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Reference Range	<pre> By report Direct detection of two mutations, C282Y and H63D, in the HFE gene.</pre>
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	This test is useful for diagnosis of symptomatic patients, presymptomatic diagnosis in asymptomatic patients, and carrier testing in healthy adults.
Methodology	Polymerase Chain Reaction: Amplification refractory mutation system (ARMS).
Analytic Time	2 weeks
Testing Schedule	Weekly

HGH

See:	 Growth Hormone, Plasma

HHT 2 Gene Analysis Dup/Delet Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	HHTDD
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube, Yellow top tube (ACD solution A)
Minimum	Preferred Minimum: 3 mL whole blood Absolute Minimum: 2.0 mL whole blood
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre>This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the following forms to the lab, with the specimen and the A-1a Miscellaneous Request: HHT Testing Consent Form (Full Gene) and the Patient History for HHT from ARUP Laboratories.</pre>
Methodology	Polymerase Chain Reaction/Multiplex Ligation-dependent Probe
Analytic Time	Within 14 days
Testing Schedule	Test performed on Sundays

5-HIAA

Laboratory	Commercial Mail-out Laboratory
Order Code	5HIAA
CPT Code	83497
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 5 mL aliquot from a well-mixed 24-hour urine. Refrigerate 24-hour specimens during collection.
Rejection Criteria:	Specimen types other than urine.
Reference Range	<pre> <u>5-HIAA, Urine</u> 0.0-15.0 mg/d <u>5-HIAA, Urine</u> The HIAA-to-creatinine ratio will be reported whenever the urine collection is random or other than 24 hours, or the urine volume is less than 400 mL/24 hours. 0-14 mg/g crt <u>Creatinine (24-hour) </u> Male 3-8 years: 140-700 mg/d 9-12 years: 300-1300 mg/d 13-17 years: 500-2300 mg/d 18-50 years: 1000-2500 mg/d 51-80 years: 800-2100 mg/d 81 years and older: 600-2000 mg/d Female 3-8 years: 140-700 mg/d 9-12 years: 300-1300 mg/d 13-17 years: 400-1600 mg/d 18-50 years: 700-1600 mg/d 51-80 years: 500-1400 mg/d 81 years and older: 400-1300 mg/d</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Collection containers available from pharmacy. <u>Note</u>: Foods and medications associated with altered urinary HIAA results: Decreased HIAA: Aspirin, chlorpromazine (Thorazine), corticotropin, dihydroxyphenylacetic acid, ethanol, gentisic acid, homogentisic acid, hydrazine derivatives, imipramine (Tofranil®), isocarboxazid (Marplan), keto acids, levodopa, MAO inhibitors, methenamine, methyldopa (Aldomet®), perchlorperazine, phenothiazines (Compazine®), promazine, promethazine (Mepergan®). Increased HIAA: Acetaminophen, acetanilide, caffeine, coumaric acid, diazepam (Valium®), ephedrine, fluorouracil, glycerol guaiacolate (Guaifenesin), melphalan (Alkeran®), mephenesin, methamphetamine (Desoxyn), methocarbamol (Robaxin®), naproxen, nicotine, phenacetin, phenmetrazine, phenobarbital, phentolamine, rauwolfia, reserpine.
Methodology	High Performance Liquid Chromatography
Analytic Time	3 working days upon receipt at reference laboratory

High-Density Lipoprotein Cholesterol

See:	 Cholesterol, High-Density Lipoprotein, Plasma

Highly Sensitive CRP

See:	 Cardiac CRP, Plasma

Histalog Test

Comments	Scheduled by consultation with G.I. Medicine.

Histamine

Laboratory	Commercial Mail-out Laboratory
Order Code	HISTP
CPT Code	83088
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre>Collect in pre-chilled tube and deliver on ice to lab. Preferred Minimum: 1 mL plasma from lavender top (EDTA) tube Absolute Minimum: 0.5 mL plasma from lavender top (EDTA) tube</pre>
Rejection Criteria:	Non-frozen or hemolyzed specimens.
Reference Range	Effective June 13, 2011 0-8 nmol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-6 days upon receipt at reference laboratory.

Histamine

Laboratory	Commercial Mail-out Laboratory
Order Code	HISTU
CPT Code	83088
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	<pre> Preferred Minimum: 4 mL urine from a 24 hr collection. Refrigerate during collection and submission to lab. Absolute Minimum: 2 mL urine from a 24 hr collection. Refrigerate during collection and submission to lab.</pre>
Rejection Criteria:	Room temperature specimens.
Reference Range	<pre> Effective February 21, 2012 Histamine, Urine - ratio to CRT 0-450 nmol/g crt Histamine, Urine, Excretion - 24h 0-60 μg/day
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Quantitative Enzyme Immunoassay
Analytic Time	1-6 days upon receipt at reference laboratory

Histidine

See:	 Amino Acids, Quantitative, Plasma Amino Acids, Quantitative, Random Urine

Histone Antibody, IgG

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                 Laboratory  Commercial Mail-out Laboratory
                 Order Code  HIST
                   CPT Code  83516
           Collection Medium  <table>
                              <tr>
                              <td align=center></td></tr>
                              <tr>
                              <td width="110" valign="top" align="center">Red top tube</td>
                              </tr>
                              </table>

                    Minimum  Preferred Minimum: 0.5 mL serum<br />
                              Absolute Minimum: 0.3 mL serum
        Rejection Criteria:  Plasma or urine.  Contaminated specimens.  Grossly hemolyzed, lipemic,
                              or icteric specimens.
          Reference Range  <pre>
                              0.9 units or less       Negative
                              1.0-1.5 units           Weak Positive
                              1.6-2.5 units           Moderate Positive
                              2.6 units or greater    Strong Positive</pre>
              Order Form:  A-1a Miscellaneous Request or Epic Req
              Methodology  Enzyme-Linked Immunosorbent Assay
            Analytic Time  3 working days upon receipt at reference laboratory
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Histoplasma Antibodies CF/ID

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                 Laboratory  Commercial Mail-out Laboratory
                 Order Code  HISTOPAN
                   CPT Code  86698 Histoplasma (ID), 86698 Histoplasma mycelia (CF), 86698
                              Histoplasma yeast (CF)
           Collection Medium  <table>
                              <tr>
                              <td align=center></td></tr>
                              <tr>
                              <td width="110" valign="top" align="center">Red top tube</td>
                              </tr>
                              </table>

                    Minimum  Preferred Minimum: 1.0 mL serum<br />
                              Absolute Minimum: 0.5 mL serum
        Rejection Criteria:  Contaminated or severely lipemic specimens.
          Reference Range  <pre>
                              Test Component                    Reference Range
                             Histoplasma Antibody by ID          None detected
                             Histoplasma Yeast Antibody by CF       < 1:8
                             Histoplasma Mycelia Antibody by CF     < 1:8</pre>
                       See:  <br />Aspergillus spp. Antibody Immunodiffusion, Serum
                             <br />Blastomyces Dermatitidis Abs ID, Serum
                             <br />Coccidioides Antibody, CF/ID, CSF
                             <br />Coccidioides Antibody, CF/ID, Serum
                             <br />Fungal Serology, Serum
              Methodology  Semi-Quantitative Complement Fixation/Qualitative Immunodiffusion
            Analytic Time  2-4 days upon receipt at reference laboratory
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Histoplasma Antibody (CF)

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                       See:  <br />Fungal Serology, Serum
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Histoplasma Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	HSTUR
CPT Code	87385
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	2 mL urine
Rejection Criteria:	Interfering substance: sputolysin and sodium hydroxide.
Reference Range	<pre> - None Detected - Results reports as ng/mL in 0.4 - 19 ng/mL range - Results above the limit of detected but below 0.4 mg/mL are reported as Positive, Below the Limit of Quantification - Results above 19 ng/mL are reported as 'Positive, Above the Limited of Quantification'</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the MiraVista Diagnostics Test Requisition with the specimen and A-1a Miscellaneous Request or Epic Req. <pre>Guidelines for Use As an aid in rapid diagnosis of disseminated or acute pulmonary histoplasmosis. •Testing both urine and serum offers the highest sensitivity, as some patients may have negative results in one but positive results in the other specimen type. •Serum, plasma and other specimens that appear to contain blood are treated with EDTA/heat to allow dissociation of immune complexes. This pre-treatment can increase sensitivity by 95% in specimens that previously tested negative. •Serum is particularly useful for monitoring therapy (see below), and should be tested if initially positive. •CSF or BALF improves sensitivity in meningitis or pulmonary histoplasmosis. False-positive and false-negative results occur. •Antigen results must be correlated with clinical and other laboratory findings. •Repeat the antigen testing if the result is inconsistent with other findings or the sole basis for diagnosis. •Culture and serology are recommended if antigen is the sole basis for diagnosis. •Weak-positive results, <0.6 to 3.9 ng/mL, are less likely to be reproducible and should be verified by repeat testing. •A positive result in serum with a negative result in urine is rare and is cause for concern about a false-positive result caused by anti-rabbit or heterophile antibodies. Cross-reactions occur in blastomycosis, coccidioidomycosis, African histoplasmosis, paracoccidioidomycosis and penicilliosis. Correct diagnosis can usually be distinguished by epidemiologic, clinical or other laboratory findings. Monitoring therapy: Antigen declines with effective therapy. •Failure of antigen to decline by at least 20% during the first month of therapy and 20% during subsequent 3-month intervals suggests treatment failure. •Suggest testing after one month of therapy and then every 3-4 months until negative. •Antigen declines more rapidly in serum than urine, and antigen concentration in serum is less likely to be affected by hydration status than is the concentration in urine. If the baseline serum is positive, it should be monitored until negative, and then urine should be monitored until negative. Diagnosing relapse: Antigen increases at the time of relapse in up to

	90% of cases. The magnitude of change suggestive of the wide range of antigen concentrations. A 3 unit i concerning for relapse in specimens with results < 2 a 15% increase in specimens with results > 20 ng/mL. •Suggest testing every 3 months during therapy suspected relapse. •Most sensitive if both serum and urine are te suspected relapse.</pre>
Methodology	Sandwich Enzyme Immunoassay (EIA) using polyclonal a Histoplasma capsulatum
Analytic Time	1 week upon receipt at reference laboratory

Histoplasma Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	HSBAL
CPT Code	87385
Collection Medium	Miscellaneous container; contact laboratory
Minimum	2 mL BAL fluid
Rejection Criteria:	Interfering substance: sputolysin and sodium hydroxide.
Reference Range	<pre> - None Detected - Results reports as ng/mL in 0.4 - 19 ng/mL range - Results above the limit of detected but below 0.4 mg/mL are reported as Positive, Below the Limit of Quantification - Results above 19 ng/mL are reported as 'Positive, Above the Limited of Quantification'</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre>Guidelines for Use As an aid in rapid diagnosis of disseminated or acute pulmonary histoplasmosis. •Testing both urine and serum offers the highest sensitivity, as some patients may have negative results in one but positive results in the other specimen type. •Serum, plasma and other specimens that appear to contain blood are treated with EDTA/heat to allow dissociation of immune complexes. This pre-treatment can increase sensitivity by 95% in specimens that previously tested negative. •Serum is particularly useful for monitoring therapy (see below), and should be tested if initially positive. •CSF or BALF improves sensitivity in meningitis or pulmonary histoplasmosis. False-positive and false-negative results occur. •Antigen results must be correlated with clinical and other laboratory findings. •Repeat the antigen testing if the result is inconsistent with other findings or the sole basis for diagnosis. •Culture and serology are recommended if antigen is the sole basis for diagnosis. •Weak-positive results, <0.6 to 3.9 ng/mL, are less likely to be reproducible and should be verified by repeat testing. •A positive result in serum with a negative result in urine is rare and is cause for concern about a false-positive result caused by anti-rabbit or heterophile antibodies. Cross-reactions occur in blastomycosis, coccidioidomycosis, African histoplasmosis, paracoccidioidomycosis and penicilliosis. Correct diagnosis can usually be distinguished by epidemiologic, clinical or other laboratory findings. Monitoring therapy: Antigen declines with effective therapy. •Failure of antigen to decline by at least 20% during the first month of therapy and 20% during subsequent 3-month intervals suggests treatment failure. •Suggest testing after one month of therapy and then every 3-4 months until negative. •Antigen declines more rapidly in serum than urine, and antigen concentration in serum is less likely to be affected by hydration status than is the concentration in urine. If the baseline serum is positive, it should be monitored until negative, and then urine should be monitored until negative. Diagnosing relapse: Antigen increases at the time of relapse in up to 90% of cases. The magnitude of change suggestive of relapse varies over the wide range of antigen concentrations. A 3 unit increase is concerning for relapse in specimens with results < 20 ng/mL compared to a 15% increase in specimens with results > 20 ng/mL. •Suggest testing every 3 months during therapy and at the time of suspected relapse. •Most sensitive if both serum and urine are tested at the time of suspected relapse.</pre>
Methodology	Sandwich Enzyme Immunoassay (EIA) using polyclonal antibodies to Histoplasma capsulatum
Analytic Time	1 week upon receipt at reference laboratory

Histoplasma Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	HISTO
CPT Code	87385
Collection Medium	Miscellaneous container; contact laboratory
Minimum	2 mL other sterile fluids
Rejection Criteria:	Interfering substance: sputolysin and sodium hydroxide.
Reference Range	<pre> - None Detected - Results reports as ng/mL in 0.4 - 19 ng/mL range - Results above the limit of detected but below 0.4 mg/mL are reported as Positive, Below the Limit of Quantification - Results above 19 ng/mL are reported as 'Positive, Above the Limited of Quantification'</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the MiraVista Diagnostics Test Requisition with the specimen and A-1a Miscellaneous Request or Epic Req. <pre>Guidelines for Use As an aid in rapid diagnosis of disseminated or acute pulmonary histoplasmosis. •Testing both urine and serum offers the highest sensitivity, as some patients may have negative results in one but positive results in the other specimen type. •Serum, plasma and other specimens that appear to contain blood are treated with EDTA/heat to allow dissociation of immune complexes. This pre-treatment can increase sensitivity by 95% in specimens that previously tested negative. •Serum is particularly useful for monitoring therapy (see below), and should be tested if initially positive. •CSF or BALF improves sensitivity in meningitis or pulmonary histoplasmosis. False-positive and false-negative results occur. •Antigen results must be correlated with clinical and other laboratory findings. •Repeat the antigen testing if the result is inconsistent with other findings or the sole basis for diagnosis. •Culture and serology are recommended if antigen is the sole basis for diagnosis. •Weak-positive results, <0.6 to 3.9 ng/mL, are less likely to be reproducible and should be verified by repeat testing. •A positive result in serum with a negative result in urine is rare and is cause for concern about a false-positive result caused by anti-rabbit or heterophile antibodies. Cross-reactions occur in blastomycosis, coccidioidomycosis, African histoplasmosis, paracoccidioidomycosis and penicilliosis. Correct diagnosis can usually be distinguished by epidemiologic, clinical or other laboratory findings. Monitoring therapy: Antigen declines with effective therapy. •Failure of antigen to decline by at least 20% during the first month of therapy and 20% during subsequent 3-month intervals suggests treatment failure. •Suggest testing after one month of therapy and then every 3-4 months until negative. •Antigen declines more rapidly in serum than urine, and antigen concentration in serum is less likely to be affected by hydration status than is the concentration in urine. If the baseline serum is positive, it should be monitored until negative, and then urine should be monitored until negative. Diagnosing relapse: Antigen increases at the time of relapse in up to 90% of cases. The magnitude of change suggestive of relapse varies over the wide range of antigen concentrations. A 3 unit increase is concerning for relapse in specimens with results < 20 ng/mL compared to a 15% increase in specimens with results > 20 ng/mL. •Suggest testing every 3 months during therapy and at the time of suspected relapse. •Most sensitive if both serum and urine are tested at the time of

suspected relapse.</pre>

Methodology	Sandwich Enzyme Immunoassay (EIA) using polyclonal a Histoplasma capsulatum
Analytic Time	1 week upon receipt at reference laboratory

Histoplasma Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	HSTBL
CPT Code	87385
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	2 mL serum
Rejection Criteria:	Interfering substance: sputolysin and sodium hydroxide.
Reference Range	<pre> - None Detected - Results reports as ng/mL in 0.4 - 19 ng/mL range - Results above the limit of detected but below 0.4 mg/mL are reported as Positive, Below the Limit of Quantification - Results above 19 ng/mL are reported as 'Positive, Above the Limited of Quantification'</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the MiraVista Diagnostics Test Requisition with the specimen and A-1a Miscellaneous Request or Epic Req. <pre>Guidelines for Use As an aid in rapid diagnosis of disseminated or acute pulmonary histoplasmosis. •Testing both urine and serum offers the highest sensitivity, as some patients may have negative results in one but positive results in the other specimen type. •Serum, plasma and other specimens that appear to contain blood are treated with EDTA/heat to allow dissociation of immune complexes. This pre-treatment can increase sensitivity by 95% in specimens that previously tested negative. •Serum is particularly useful for monitoring therapy (see below), and should be tested if initially positive. •CSF or BALF improves sensitivity in meningitis or pulmonary histoplasmosis. False-positive and false-negative results occur. •Antigen results must be correlated with clinical and other laboratory findings. •Repeat the antigen testing if the result is inconsistent with other findings or the sole basis for diagnosis. •Culture and serology are recommended if antigen is the sole basis for diagnosis. •Weak-positive results, <0.6 to 3.9 ng/mL, are less likely to be reproducible and should be verified by repeat testing. •A positive result in serum with a negative result in urine is rare and is cause for concern about a false-positive result caused by anti-rabbit or heterophile antibodies. Cross-reactions occur in blastomycosis, coccidioidomycosis, African histoplasmosis, paracoccidioidomycosis and penicilliosis. Correct diagnosis can usually be distinguished by epidemiologic, clinical or other laboratory findings. Monitoring therapy: Antigen declines with effective therapy. •Failure of antigen to decline by at least 20% during the first month of therapy and 20% during subsequent 3-month intervals suggests treatment failure. •Suggest testing after one month of therapy and then every 3-4 months until negative. •Antigen declines more rapidly in serum than urine, and antigen concentration in serum is less likely to be affected by hydration status than is the concentration in urine. If the baseline serum is positive, it should be monitored until negative, and then urine should be monitored until negative. Diagnosing relapse: Antigen increases at the time of relapse in up to

	90% of cases. The magnitude of change suggestive of the wide range of antigen concentrations. A 3 unit i concerning for relapse in specimens with results < 2 a 15% increase in specimens with results > 20 ng/mL. •Suggest testing every 3 months during therapy suspected relapse. •Most sensitive if both serum and urine are te suspected relapse.</pre>
Methodology	Sandwich Enzyme Immunoassay (EIA) using polyclonal a Histoplasma capsulatum
Analytic Time	1 week upon receipt at reference laboratory

Histoplasma Antigen

Laboratory	Commercial Mail-out Laboratory
Order Code	HSCSF
CPT Code	87385
Collection Medium	Miscellaneous container; contact laboratory
Minimum	2 mL CSF
Rejection Criteria:	Interfering substance: sputolysin and sodium hydroxide.
Reference Range	<pre> - None Detected - Results reports as ng/mL in 0.4 - 19 ng/mL range - Results above the limit of detected but below 0.4 mg/mL are reported as Positive, Below the Limit of Quantification - Results above 19 ng/mL are reported as 'Positive, Above the Limited of Quantification'</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the MiraVista Diagnostics Test Requisition with the specimen and A-1a Miscellaneous Request or Epic Req. <pre>Guidelines for Use As an aid in rapid diagnosis of disseminated or acute pulmonary histoplasmosis. •Testing both urine and serum offers the highest sensitivity, as some patients may have negative results in one but positive results in the other specimen type. •Serum, plasma and other specimens that appear to contain blood are treated with EDTA/heat to allow dissociation of immune complexes. This pre-treatment can increase sensitivity by 95% in specimens that previously tested negative. •Serum is particularly useful for monitoring therapy (see below), and should be tested if initially positive. •CSF or BALF improves sensitivity in meningitis or pulmonary histoplasmosis. False-positive and false-negative results occur. •Antigen results must be correlated with clinical and other laboratory findings. •Repeat the antigen testing if the result is inconsistent with other findings or the sole basis for diagnosis. •Culture and serology are recommended if antigen is the sole basis for diagnosis. •Weak-positive results, <0.6 to 3.9 ng/mL, are less likely to be reproducible and should be verified by repeat testing. •A positive result in serum with a negative result in urine is rare and is cause for concern about a false-positive result caused by anti-rabbit or heterophile antibodies. Cross-reactions occur in blastomycosis, coccidioidomycosis, African histoplasmosis, paracoccidioidomycosis and penicilliosis. Correct diagnosis can usually be distinguished by epidemiologic, clinical or other laboratory findings. Monitoring therapy: Antigen declines with effective therapy. •Failure of antigen to decline by at least 20% during the first month of therapy and 20% during subsequent 3-month intervals suggests treatment failure. •Suggest testing after one month of therapy and then every 3-4 months until negative. •Antigen declines more rapidly in serum than urine, and antigen concentration in serum is less likely to be affected by hydration status than is the concentration in urine. If the baseline serum is positive, it should be monitored until negative, and then urine should be monitored until negative. Diagnosing relapse: Antigen increases at the time of relapse in up to 90% of cases. The magnitude of change suggestive of relapse varies over the wide range of antigen concentrations. A 3 unit increase is concerning for relapse in specimens with results < 20 ng/mL compared to a 15% increase in specimens with results > 20 ng/mL. •Suggest testing every 3 months during therapy and at the time of suspected relapse. •Most sensitive if both serum and urine are tested at the time of

suspected relapse.</pre>

Methodology	Sandwich Enzyme Immunoassay (EIA) using polyclonal a Histoplasma capsulatum
Analytic Time	1 week upon receipt at reference laboratory

Histoplasma, Culture

See:
Fungal Culture

HIV Antigen/Antibody Combo

Laboratory	Chemistry
Order Code	HIV
CPT Code	CPT code: 87389(Chemiluminescent assay); if reflexed, add 86689 HIV-1 confirmation by Western blot
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Minimum	3.0 mL whole blood from light green top tube or THREE microtainers (allows for reflex confirmation of reactive results).
Reference Range	Non-reactive
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> Effective 2/21/2013, the process for consent and documentation of consent for HIV testing will be done when placing an HIV order in Epic. There is no longer a need to obtain an "HIV Pre-Test Counseling Packet". These changes align with current state law requirements for HIV testing and UI Healthcare Policy, Policy Governing Human Immunodeficiency Virus (HIV) Education, Testing, Reporting and Confidentiality. The summary of consent requirements are as follows: • <u>For adults (18 years or older) able to consent</u>: verbal consent must be obtained prior to testing. Written consent is not necessary for adult patients. • <u>For minors (less than 18 years old)</u>: Before undergoing HIV test, a minor must be informed that the legal guardian will be notified if the result is confirmed as positive. Minors must give written consent for HIV testing and treatment services. The consent form must note that that the legal guardian will be notified of confirmed positive results. • <u>For adults or minors unable to consent</u>: The individual’s guardian may give consent. If the legal guardian cannot be located or is unavailable, a health care provider may authorize an HIV test when the test is necessary for diagnostic purposes to provide appropriate urgent medical care. HIV orders in minors will all receive retrospective audit review to make sure proper written consent has been obtained and is scanned into the patient chart in Epic. Below are hyperlinks to the education and minor informed consent forms: G-2d16 Consent for Human Immunodeficiency Virus (HIV)-Related Testing to be used for Minors (<18 Years of Age) HIV Pre-Test Education A signed patient informed consent (where required for minors) to human immunodeficiency virus (HIV)-related testing should be kept on record with the patient medical record at the ordering physician office. Repeatable reactive plasma will be confirmed by western blot. No results will be given by telephone. There is also a specific consent form in the event that a minor is the source patient for a blood borne pathogen exposure and HIV testing is needed as part of the management of this exposure: <a href="http://www.path.uiowa.edu/path_handbook/forms/HIV_consent_minors_

	B BP_exp_Feb_13.pdf">G-2d16 Consent for Human Immunode (HIV)-Related Testing Due to a Healthcare Worker Exp Fluids to be used for Minors (<18 Years of Age)<
	This test replaces "HIV 1/2 Combined Antibodies" (EL Western), "HIV Antigen", and "HIV, Rapid" (OraQuick)
See Appendix	See Additional Information: Bloodborne Pathogens
Methodology	Chemiluminescent microparticle immunoassay (CMIA) ru Architect platform. This assay uses antibodies agai antibodies and a conserved epitope on the p24 antige has anti-HIV antibodies and/or HIV antigen in plasma positive. This test thereby can detect both acute a infection.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

HIV Phenotyping & Genotyping

Laboratory	Commercial Mail-out Laboratory
Order Code	HIVPHENOGT
CPT Code	87900, 87901, 87903, 87904 x11
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Draw TWO 6 mL pink EDTA tubes to yield at least 3 mL plasma
Rejection Criteria:	Thawed specimens.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Viral load, performed within the last month, must be at least 500 copies/mL. This mailout test requires Infectious Disease attending approval. Mailouts staff will not process order without approval. If approval is given, the name of the Infectious Disease attending can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Effective 2/21/2013, the process for consent and documentation of consent for HIV testing will be done when placing an HIV order in Epic. There is no longer a need to obtain an "HIV Pre-Test Counseling Packet". These changes align with current state law requirements for HIV testing and UI Healthcare Policy, Policy Governing Human Immunodeficiency Virus (HIV) Education, Testing, Reporting and Confidentiality. The summary of consent requirements are as follows: • <u>For adults (18 years or older) able to consent</u>: verbal consent must be obtained prior to testing. Written consent is not necessary for adult patients. • <u>For minors (less than 18 years old)</u>: Before undergoing HIV test, a minor must be informed that the legal guardian will be notified if the result is confirmed as positive. Minors must give written consent for HIV testing and treatment services. The consent form must note that that the legal guardian will be notified of confirmed positive results. • <u>For adults or minors unable to consent</u>: The individual’s guardian may give consent. If the legal guardian cannot be located or is unavailable, a health care provider may authorize an HIV test when the test is necessary for diagnostic purposes to provide appropriate urgent medical care. HIV orders in minors will all receive retrospective audit review to make sure proper written consent has been obtained and is scanned into the patient chart in Epic. Below are hyperlinks to the education and minor informed consent forms: G-2d16 Consent for Human Immunodeficiency Virus (HIV)-Related Testing to be used for Minors (<18 Years of Age) HIV Pre-Test Education</pre>
See:	 HIV-1 Genotyping, Plasma
See Appendix	See Additional Information:

	Specimens Requiring Immediate Delivery
Methodology	Phenotyping and Genotyping
Analytic Time	Varies at reference laboratory.
Testing Schedule	Varies

HIV Quantitative PCR (Viral Load)

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	HIVQNTPCR
CPT Code	87536
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> 6 mL whole blood or 3 mL plasma. Testing requires a dedicated collection tube. If also testing for HCV RNA or Genotype, collect a second Pink top tube (6 mL whole blood or 3 mL plasma).</pre>
Reference Range	<pre> Negative Analytical range in log10 values: 1.3 - 7.00 log (20-10,000,000 CPM non-log transformed values) Negative results and positive results less than 20 CPM will be reported as <1.3 log 10 (<20 CPM).</pre>
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	<pre> Testing only approved for viral load testing to monitor therapy. Not for diagnostic testing. Current testing will detect HIV-1 group M subtypes and HIV-1 group O. Effective 2/21/2013, the process for consent and documentation of consent for HIV testing will be done when placing an HIV order in Epic. There is no longer a need to obtain an "HIV Pre-Test Counseling Packet". These changes align with current state law requirements for HIV testing and UI Healthcare Policy, Policy Governing Human Immunodeficiency Virus (HIV) Education, Testing, Reporting and Confidentiality. The summary of consent requirements are as follows: • <u>For adults (18 years or older) able to consent</u>: verbal consent must be obtained prior to testing. Written consent is not necessary for adult patients. • <u>For minors (less than 18 years old)</u>: Before undergoing HIV test, a minor must be informed that the legal guardian will be notified if the result is confirmed as positive. Minors must give written consent for HIV testing and treatment services. The consent form must note that that the legal guardian will be notified of confirmed positive results. • <u>For adults or minors unable to consent</u>: The individual’s guardian may give consent. If the legal guardian cannot be located or is unavailable, a health care provider may authorize an HIV test when the test is necessary for diagnostic purposes to provide appropriate urgent medical care. HIV orders in minors will all receive retrospective audit review to make sure proper written consent has been obtained and is scanned into the patient chart in Epic. Below are hyperlinks to the education and minor informed consent forms: G-2d16 Consent for Human Immunodeficiency Virus (HIV)-Related Testing to be used for Minors (<18 Years of Age) <a href="http://www.healthcare.uiowa.edu/path_handbook/Bulletin_pdfs/HIV_Pr

etestEd.pdf">HIV Pre-Test Education</pre>

See Appendix	See Additional Information: Conversion of Log Value to Integer Value Calculator< Requiring Immediate Delivery
Methodology	Polymerase Chain Reaction (PCR)
Testing Schedule	Availability: twice per week

HIV, Neonatal and Infant Diagnosis

See:
HIV-1 Proviral DNA, Qual. PCR, Whole Blood

HIV-1 Genotyping

Laboratory	Commercial Mail-out Laboratory
Order Code	HIVGENO
CPT Code	87901
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: Draw TWO 6 mL pink EDTA tube
Rejection Criteria:	Serum. Heparinized specimens.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Effective 2/21/2013, the process for consent and documentation of consent for HIV testing will be done when placing an HIV order in Epic. There is no longer a need to obtain an "HIV Pre-Test Counseling Packet". These changes align with current state law requirements for HIV testing and UI Healthcare Policy, Policy Governing Human Immunodeficiency Virus (HIV) Education, Testing, Reporting and Confidentiality. The summary of consent requirements are as follows: • <u>For adults (18 years or older) able to consent</u>: verbal consent must be obtained prior to testing. Written consent is not necessary for adult patients. • <u>For minors (less than 18 years old)</u>: Before undergoing HIV test, a minor must be informed that the legal guardian will be notified if the result is confirmed as positive. Minors must give written consent for HIV testing and treatment services. The consent form must note that that the legal guardian will be notified of confirmed positive results. • <u>For adults or minors unable to consent</u>: The individual’s guardian may give consent. If the legal guardian cannot be located or is unavailable, a health care provider may authorize an HIV test when the test is necessary for diagnostic purposes to provide appropriate urgent medical care. HIV orders in minors will all receive retrospective audit review to make sure proper written consent has been obtained and is scanned into the patient chart in Epic. Below are hyperlinks to the education and minor informed consent forms: G-2d16 Consent for Human Immunodeficiency Virus (HIV)- Related Testing to be used for Minors (<18 Years of Age) HIV Pre-Test Education</pre>
See:	 HIV Phenotyping & Genotyping, Plasma
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Reverse Transcription Polymerase Chain Reaction/Nucleic Acid Sequencing

Analytic Time 3-7 days upon receipt at reference laboratory

HIV-1 Proviral DNA, Qual. PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	HIV1PRO
CPT Code	87535
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Yellow top tube (ACD solution A)
Minimum	<pre> Adult minimum: 4 mL whole blood from lavender top (EDTA) or yellow top (ACD) tube. Pediatric minimum: 0.5 mL whole blood from lavender top (EDTA) tube.</pre>
Reference Range	Not detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> The HIV-1 Proviral DNA PCR assay is a highly specific and sensitive method used to detect the integrated (proviral) form of HIV-1 DNA in clinical specimens. This testing can be used for neonatal and infant diagnoses. This mailout test requires Infectious Disease attending approval. Mailouts staff will not process order without approval. If approval is given, the name of the Infectious Disease attending can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Effective 2/21/2013, the process for consent and documentation of consent for HIV testing will be done when placing an HIV order in Epic. There is no longer a need to obtain an "HIV Pre-Test Counseling Packet". These changes align with current state law requirements for HIV testing and UI Healthcare Policy, Policy Governing Human Immunodeficiency Virus (HIV) Education, Testing, Reporting and Confidentiality. The summary of consent requirements are as follows: • <u>For adults (18 years or older) able to consent</u>: verbal consent must be obtained prior to testing. Written consent is not necessary for adult patients. • <u>For minors (less than 18 years old)</u>: Before undergoing HIV test, a minor must be informed that the legal guardian will be notified if the result is confirmed as positive. Minors must give written consent for HIV testing and treatment services. The consent form must note that that the legal guardian will be notified of confirmed positive results. • <u>For adults or minors unable to consent</u>: The individual’s guardian may give consent. If the legal guardian cannot be located or is unavailable, a health care provider may authorize an HIV test when the test is necessary for diagnostic purposes to provide appropriate urgent medical care. HIV orders in minors will all receive retrospective audit review to make sure proper written consent has been obtained and is scanned into the patient chart in Epic. Below are hyperlinks to the education and minor informed consent forms: G-2d16 Consent for Human Immunodeficiency Virus (HIV)-Related Testing to be used for Minors (<18 Years of Age) <a href="http://www.healthcare.uiowa.edu/path_handbook/Bulletin_pdfs/HIV_P r

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                                etestEd.pdf">HIV Pre-Test Education</a></pre>

                    Methodology  Polymerase Chain Reaction
                  Analytic Time  1 week upon receipt at reference laboratory
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HIV1 Confirmation, Western Blot

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                    Laboratory  Commercial Mail-out Laboratory
                    Order Code  HIVWB
                      CPT Code  86689
              Collection Medium  <table>
                                 <tr>
                                 <td align=center></td></tr>
                                 <tr>
                                 <td width="110" valign="top" align="center">Plasma Separator Tube</td>
                                 </tr>
                                 </table>

                         Minimum  Preferred Minimum:  1 mL plasma<br />
                                  Absolute Minimum:  0.5 mL plasma
            Rejection Criteria:  Hemolyzed or lipemic specimens.
                Reference Range  Negative
                    Order Form:  A-1a Miscellaneous Request or Epic Req
                       Comments  This test is reflexively ordered when the HIV Antigen/Antibody Combo is
                                 repeatedly positive. This test is not available as direct order option
                                 in Epic, only as the reflexive order.<br />
                                 <br />
                                 No results will be given by telephone.

                           See:  <br />HIV Antigen/Antibody Combo, Plasma
                    Methodology  Western Blot
                  Analytic Time  4 days upon receipt at reference laboratory
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HLA Antibody Detection Assay

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                    Laboratory  Commercial Mail-out Laboratory
                    Order Code  HLAAB
                      CPT Code  88184, 88185(x3), 88187
              Collection Medium  <table>
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                                 <td align=center></td><td rowspan=2 width=20 align=center>and</td>
                                 <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm
                                 <tr>
                                 <td width="110" valign="top" align="center">Red top tube</td>
                                 <td width="110" valign="top" align="center">Red top tube</td>
                                 </tr>
                                 </table>

                         Minimum  Preferred Minimum:  collect TWO full 5 mL red top tubes to yield 5 mL
                                  serum.<br />
                                  <br />
                                  Absolute Minimum: 3-5 mL serum from TWO full red top tubes.
                Reference Range  By report
                    Order Form:  A-1a Miscellaneous Request or Epic Req
                    Methodology  <pre>
                                 Flow Cytometry
                                 This method uses a panel of purified HLA Class I antigens derived from
                                 30-50 different unrelated individuals that are pooled or coupled to
                                 microbeads.  The patient's serum is mixed with microbeads, then washed,
                                 and stained with an anti-human IgG Fluorescent conjugate.  The
                                 microbeads are then analyzed for immunofluorescence by flow cytometry
                                 to detect HLA Class I IgG antibodies.  The results are reported as
                                 panel reactive (PRA) present or absent. A PRA with positive
                                 fluorescence of the HLA-bead population that is greater than the
                                 negative control serum and the patient's autologous serum tested
                                 against beads conjugated with human serum albumin will be reported as
                                 positive. It has been demonstrated that this flow cytometric
                                 methodology can detect antibodies at a more sensitive level than
                                 conventional lymphocyte cytotoxicity procedures.  In addition, flow
                                 cytometry only detects antibodies of the IgG isotype and not IgM
                                 antibodies, which are usually indicative of autoantibodies.</pre>
                  Analytic Time  5 working days upon receipt in reference laboratory
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HLA B27

Laboratory	Commercial Mail-out Laboratory
Order Code	HLAB27
CPT Code	86812
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 4 mL whole blood in pink top K2EDTA tube Absolute Minimum: 0.5 mL whole blood in pink top K2EDTA tube
Rejection Criteria:	Frozen or refrigerated specimens. Specimens older than 72 hours. Clotted or hemolyzed specimens. Collect Monday through Thursday only; do not collect on Fridays, day before a holiday, or weekends.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Qualitative Flow Cytometry
Analytic Time	1-3 days upon receipt at reference laboratory.

HLA Genotyping A, B & C Class I - Urgent (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	81372
Minimum	16 mL whole blood from TWO 10 mL yellow yop (ACD) tubes.
Comments	Schedule with VAMC Histocompatibility lab (158-5640) in advance. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	HLA-A,B,C typing by PCR amplification with sequence specific primers (PCR-SSP)
Analytic Time	Resulted in Epic 2 working days.
Testing Schedule	Test performed daily.

HLA Genotyping A, B and DR Class I and II - Urgent (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	A-81373 B-81373 DR-81373
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	HLA A, B and C intermediate level typing; HLA DR low resolution. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction (PCR) Sequence Specific Primers (SSP)
Analytic Time	Resulted in Epic by 2 working days.
Testing Schedule	Test performed daily.

HLA Genotyping A, B or C Class I - High Resolution - Urgent (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	A-81380 B-81380 C-81380
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	Order each allele separately. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction(PCR) - Sequence Specific Primers (SSP)
Analytic Time	Resulted in Epic in 2 working days.
Testing Schedule	Test performed daily.

HLA Genotyping A, B or C Class I - High Resolution (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	A-81380 B-81380 C-81380
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	Order each allele separately. All HLA Testing is ordered through the University of Iowa Epic System.
Methodology	Polymerase Chain Reaction(PCR) and DNA by Sequence Based Typing (SBT)
Analytic Time	Resulted in Epic 4-5 working days.
Testing Schedule	Test performed twice weekly.

HLA Genotyping A, B or C Class I - Intermediate Resolution (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	A-81373 B-81373 C-81373
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes or purified genomic DNA. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	Order each allele separately. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction(PCR) - Sequence Specific Oligonucleotide (SSO) or Sequence Specific Primers (SSP)
Analytic Time	Resulted in Epic 4-5 working days.
Testing Schedule	Test performed twice weekly.

HLA Genotyping DPB1Class II - High Resolution-Sequencing (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	81382
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	Order each allele separately. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction(PCR) and DNA by Sequence Based Typing (SBT)
Analytic Time	Resulted in Epic by 4-5 working days.
Testing Schedule	Test performed twice weekly.

HLA Genotyping DQB1Class II - High Resolution-Sequencing (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	81382
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	Order each allele separately. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction(PCR) and DNA by Sequence Based Typing (SBT)
Analytic Time	Resulted in Epic by 4-5 working days.
Testing Schedule	Test performed twice weekly.

HLA Genotyping DRB1 and DQB1 Class II - Low Resolution - Urgent (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	81375
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	Order each allele separately. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction (PCR) - Sequence Specific Primers(SSP)
Analytic Time	Resulted in Epic by 2 working days.
Testing Schedule	Test performed daily.

HLA Genotyping DRB1 Class II - High Resolution - Urgent (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	81382
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction (PCR) ˇ Sequence Specific Primers (SSP)
Analytic Time	Resulted in Epic within 2 working days.
Testing Schedule	Test performed daily.

HLA Genotyping DRB1 Class II - High Resolution-Sequencing (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	81382
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	Order each allele separately. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction(PCR) and DNA by Sequence Based Typing (SBT)
Analytic Time	Resulted in Epic 4-5 working days.
Testing Schedule	Test performed twice weekly.

HLA Genotyping DRB1, DRB3, 4, 5, DP Alpha Beta or DQ Alpha Beta Intermediate Resolution (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	DR - 81376 DRB3-5 - 81376 DPB/A - 81376 DQB/A - 81376
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	Order each allele separately. All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction (PCR) - Sequence Specific Oligonucleotide (SSO)
Analytic Time	Resulted in Epic by 5 working days.
Testing Schedule	Test performed twice weekly.

HLA II Typing High Resolution HLA-DQB1

Laboratory	Commercial Mail-out Laboratory
Order Code	NARC
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 3 mL whole blood from pink top tube Absolute Minimum: 1 mL whole blood from pink top tube
Reference Range	By Report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Polymerase Chain Reaction/Fluorescence Monitoring
Analytic Time	10 days upon receipt at reference laboratory
Testing Schedule	Time Varies

HLA:DR2 and DQ1-Narcolepsy Evaluation

See:	 HLA II Typing High Resolution HLA-DQB1, Whole Blood

HME

See:	 Ehrlichia Antibody Panel, Serum

Homocysteine

Laboratory	Chemistry
Order Code	HOMCY
CPT Code	83090
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	Adults - 3 mL whole blood in a light green top tube Pediatrics - ONE microtainer
Reference Range	<pre> < 10 umol/l Patients with end stage renal disease may have elevated levels of cystathionine which may cause a significant positive interference in the homocysteine assay.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Homocystine

Laboratory	Commercial Mail-out Laboratory
Order Code	HOMOU
CPT Code	82131
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 5 mL from 24 hour collection. Random urine is also accepted at reference lab. Refrigerate during collection and submission. Absolute Minimum: 3 mL mL from 24 hour collection. Random urine is also accepted at reference lab. Refrigerate during collection and submission.
Rejection Criteria:	pH less than 5 or greater than 8. Specimens with acid or other preservatives. Ascorbic acid interferes with this assay. Large amounts of blood or hemoglobin can interfere with quantitation.
Reference Range	<pre> Components Reference Interval Homocystine,Urine 0-32 mg/d Homocystine per gram of creatinine 0-53 mg/g CRT Creatinine 24-hour (mg/d) Male Female 3-8 yrs: 140-700 3-8 yrs: 140-700 9-12 yrs: 300-1300 9-12 300-1300 13-17 yrs: 500-2300 13-17 400-1600 18-50 yrs: 1000-2500 18-50 yrs: 700-1600 51-80 yrs: 800-2100 51-80 yrs: 500-1400 81 yrs+: 600-2000 81 yrs+: 400-1300</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> 24 hour or random collection. 24 hour specimens must be refrigerated during collection and submission to Core Laboratory. 24 hour urine specimens: Record starting and ending collection times on requisition. Large amounts of hemoglobin or blood can interfere with quantitation.</pre>
See Appendix	See Additional Information: Collection and Preservation of 24-Hour Urine Specimens Urine Tests Requiring Preservatives, Refrigeration or Special Containers Urine Tests Requiring no Preservatives
Methodology	Spectrophotometry
Analytic Time	within 10 days upon receipt at reference laboratory

Homovanillic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	HVA24
CPT Code	83150
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 4 mL from a well-mixed 24 hr urine collection. Absolute Minimum: 1 mL from a well-mixed 24 hr urine collection. <hr> Abstain from medications for 72 hours prior to collection.
Rejection Criteria:	Specimens types other than urine.
Reference Range	<pre> <u>Components</u> <u>Age</u> <u>Ref. Interval</u> HVA 18 years and older 0.0-15.0 mg/d The HVA-to-creatinine ratio will be reported when the patient is under 18 years or the urine volume is less than 400 mL/24 hours. HVA 0-2 years 0-42 mg/g crt 3-5 years 0-22 mg/g crt 6-17 years 0-15 mg/g crt 18 years and older 0-8 mg/g crt Creatinine-24 hr Male 3-8 years 140-700 mg/d 9-12 years 300-1300 mg/d 13-17 years 500-2300 mg/d 18-50 years 1000-2500 mg/d 51-80 years 800-2100 mg/d 81 years and older 600-2000 mg/d Female 3-8 years 140-700 mg/d 9-12 years 300-1300 mg/d 13-17 years 400-1600 mg/d 18-50 years 700-1600 mg/d 51-80 years 500-1400 mg/d 81 years and older 400-1300 mg/d</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	If screening for Neuroblastoma, the following tests are suggested: CAT24 (Catecholamines, Fractionated; Dopamine is included), HVA24 (Homovanillic Acid), MET24 (Metanephrines), VMA24 (Vanillylmandelic Acid). Moderately elevated HVA (homovanillic acid) may be caused by a variety of factors such as essential hypertension, intense anxiety, intense physical exercise, and numerous drug interactions (including some over-the-counter medications and herbal products). Medications which may interfere with catecholamines and their metabolites include amphetamines and amphetamine-like compounds, appetite suppressants, bromocriptine, buspirone, caffeine, chlorpromazine, clonidine, disulfiram, diuretics (in doses sufficient to deplete sodium), epinephrine, glucagon, guanethidine, histamine, hydrazine derivatives, imipramine, levodopa (L-dopa, Sinemet®), lithium, MAO inhibitors, melatonin, methyldopa (Aldomet®), morphine, nitroglycerin, nose drops, propafenone (Rythmol), radiographic agents, rauwolfia alkaloids (Reserpine), and vasodilators. The effects of some drugs on catecholamine metabolite results may not be predictable.
See:	 Catecholamines, Fractionated, 24 hr Urine Metanephrines Total, 24 hr Urine Vanillylmandelic Acid, 24 hr Urine

See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration o Containers
Methodology	High Performance Liquid Chromatography
Analytic Time	3 working days upon receipt at reference laboratory

Homovanillic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	HVAUR
CPT Code	83150
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 4 mL random urine Absolute Minimum: 1 mL random urine <hr> Abstain from medications for 72 hours prior to collection.
Reference Range	<pre> <u>Components</u> <u>Age</u> <u>Ref. Interval</u> HVA, Urine 18 years and older 0.0-15.0 mg/d HVA 0-2 years 0-42 mg/g crt 3-5 years 0-22 mg/g crt 6-17 years 0-15 mg/g crt 18 years and older 0-8 mg/g crt</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Moderately elevated HVA (homovanillic acid) may be caused by a variety of factors such as essential hypertension, intense anxiety, intense physical exercise, and numerous drug interactions (including some over-the-counter medications and herbal products). Medications which may interfere with catecholamines and their metabolites include amphetamines and amphetamine-like compounds, appetite suppressants, bromocriptine, buspirone, caffeine, chlorpromazine, clonidine, disulfiram, diuretics (in doses sufficient to deplete sodium), epinephrine, glucagon, guanethidine, histamine, hydrazine derivatives, imipramine, levodopa (L-dopa, Sinemet®), lithium, MAO inhibitors, melatonin, methyldopa (Aldomet®), morphine, nitroglycerin, nose drops, propafenone (Rythmol), radiographic agents, rauwolfia alkaloids (Reserpine), and vasodilators. The effects of some drugs on catecholamine metabolite results may not be predictable.
See:	 Catecholamines, Fractionated, Random Urine Metanephrines Total, Random Urine Vanillylmandelic Acid, Random Urine
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	High Performance Liquid Chromatography
Analytic Time	4 working days upon receipt at reference laboratory

HOPP-2 Gene

See:	 SCN4A Gene Analysis Common Variants, Whole Blood

HSV

See:	 Herpes Virus 6 (HHV-6) DNA Detection, Serum or Plasma Skin Biopsy, Tissue

HSV 1&2 Type Specific IgG ABS (Glycoprotein G)

Laboratory	Chemistry
Order Code	HSV
CPT Code	86695, 86696
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers for pediatric patients.
Rejection Criteria:	Specimens other than plasma such as urine, saliva, or cerebrospinal fluid are not acceptable.
Reference Range	Units are in cut-off index (COI) <u>Herpes simplex virus type 1 Glycoprotein G-specific antibody IgG</u>: Non-reactive: COI < 1.0 Reactive: COI >= 1.0 <u>Herpes simplex virus type 2 Glycoprotein G-specific antibody IgG</u>: Non-reactive: COI < 1.0 Reactive: COI >= 1.0
Order Form:	A-1a General Lab or Epic Req
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

HSV 1&2 Typing and VZV Qualitative PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	HSVVZV
CPT Code	87798, 87529
Collection Medium	<table> <tr> <td align=center></td><td <td align=center><a href="javascript:larger_tube('994.jpg')"><img src="/p <tr> <td width="110" valign="top" align="center">Chlamydia/Viral Transport Kit <td width="110" valign="top" align="center">Swab Kit Straight HSV--VZV/Vi </tr> </table>
Minimum	Collect 0.5 mL CSF in CSF container, OR collect vesicle fluid/swab (first three days of rash) in viral transport media.
Rejection Criteria:	Sputum, tracheal aspirate or skin scrapings.
Reference Range	Negative
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Methodology	Real Time PCR
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

HSV Qualitative PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	HSVPCR
CPT Code	87529
Collection Medium	<table> <tr> <td align=center></td><td <td align=center><a href="javascript:larger_tube('994.jpg')"><img src="/p <tr> <td width="110" valign="top" align="center">Chlamydia/Viral Transport Kit <td width="110" valign="top" align="center">Swab Kit Straight HSV--VZV/Vi </tr> </table>
Minimum	Collect 0.5 mL CSF in CSF container, OR collect vesicle fluid/swab (first three days of rash) in viral transport media.
Rejection Criteria:	Sputum, tracheal aspirate or skin scrapings.
Reference Range	Negative Positive results will be reported as positive for HSV Type 1, HSV Type 2, or both.
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Methodology	Real Time PCR
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

HSV Type 1/Type 2 Ab, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	HER12CSF
CPT Code	86694
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum Absolute Minimum: 0.5 mL serum</pre>
Rejection Criteria:	Specimens types other than CSF. Contaminated, heat-inactivated or hemolyzed specimens.
Reference Range	<pre> 0.89 IV or less: Negative - No significant level of detectable HSV IgG antibody. 0.90-1.09 IV: Equivocal - Questionable presence of IgG antibodies. Repeat testing in 10-14 days may be helpful. 1.10 IV or greater: Positive - IgG antibody to HSV detected which may indicate a current or past HSV infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Chemiluminescent Immunoassay
Analytic Time	24 hours upon receipt in reference laboratory.

HTLV I/II Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	HTLV
CPT Code	<pre> 86790 HTLV, if positive reflex confirmation CPT of 86689.</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum
Rejection Criteria:	Hemolyzed specimens. Specimens containing particulate material.
Reference Range	<pre> Components Reference Interval HTLV I/II Antibodies by ELISA Negative HTLV I/II Antibodies, Western Blot Negative</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test is used for clinical diagnosis. This assay should not be used for blood donor screening, associated re-entry protocols, or for screening Human Cell, Tissues and Cellular and Tissue-Based Products (HCT/P). Reactive EIA results will be confirmed by Western blot; additional charges will occur.
Methodology	Qualitative Enzyme-Linked Immunosorbent Assay/Qualitative Western Blot
Analytic Time	1 week upon receipt at reference laboratory

Hu

See:	 Paraneoplastic Autoantibody, CSF

Human Chorionic Gonadotropin (HCG)

See:	 HCG, Quant-Hum Chor Gon, Plasma Pregnancy Test, Qualitative, Plasma

Human Epididymis Protein 4

Laboratory	Commercial Mail-out Laboratory
Order Code	HE4
CPT Code	86305
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.1 mL serum</pre>
Rejection Criteria:	Hemolyzed or lipemic specimens.
Reference Range	0-150 pmol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme Immunoassay
Analytic Time	8 working days upon receipt at reference laboratory

Human Erythrocyte Antigen Phenotype

Laboratory	Commercial Mail-out Laboratory
Order Code	HEAP
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Preferred Minimum: 3 mL whole blood from a lavender EDTA tube Absolute Minimum: 1 mL whole blood from a lavender EDTA tube
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Whole blood for testing is submitted to DeGowin Blood Center for pick-up by reference laboratory courier. Reporting and billing is completed in the Mail-out Laboratory. This test determines the patient’s red cell antigen genotype for common blood groups. A pre- or post-transfusion sample can be used. The results are often used in the selection of blood for patients with hemoglobinopathies who are likely to receive chronic transfusions.
Methodology	Microarray-Based Molecular Genetic Assay
Analytic Time	1-2 days (Monday through Friday).

Human Granulocytic Ehrlichiosis (HGE)

See:	 Ehrlichia Antibody Panel, Serum

Human Papilloma Virus (HPV) High Risk DNA

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	HPVPCR
CPT Code	87621
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">SurePath^{TM} collect </tr> </table>
Rejection Criteria:	<pre> Vaginal specimens are not recommended because of limited clinical correlative data. Samples other than cervical are not acceptable for children under age 12. </pre>
Reference Range	Negative
Order Form:	H-2 Cytopathology or Epic Req
Comments	Specimen must be transported in SurePath Liquid-Based Pap Test: HPV specimen transport medium.
Methodology	PCR amplification; Cobas HPV Test (Roche Diagnostics, Inc.)
Analytic Time	8 working days
Testing Schedule	Batch testing two to three times per week.

Human Papilloma Virus (HPV) High Risk DNA, SurePath LBC

Laboratory	Molecular Pathology
Order Code	HPVIND
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">SurePath^{TM} collect </tr> </table>
Minimum	Collect and Transport: SurePath PAP specimen transport media collection device.
Rejection Criteria:	<pre> Vaginal specimens are not recommended because of limited clinical correlative data. Samples other than cervical are not acceptable for children under age 12. </pre>
Reference Range	Negative
Order Form:	H-2 Cytopathology or Epic Req
Comments	Specimen must be transported in SurePath Liquid-Based Pap Test: HPV specimen transport medium.
Methodology	Hologic, Inc. Invader assay
Analytic Time	5 working days
Testing Schedule	Batch testing once per week, specimen must be received by noon on Wednesday.

Human Papillomavirus (HPV) High Risk, Paraffin

Laboratory	Molecular Pathology
Order Code	HPVPET
Collection Medium	Miscellaneous container; contact laboratory
Minimum	<pre> Paraffin-embedded, formalin-fixed tissue block at 20-25°C. Protect paraffin block from excessive heat. Ship in cooled container during summer months. If paraffin block is unavailable to send, submit 12 unstained tissue sections on glass slides.</pre>
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	High-risk HPV cocktail includes genotypes 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66 and 68.
Methodology	PCR amplification; Cobas HPV Test (Roche Diagnostics, Inc)
Analytic Time	1 week

Human Progenitor Cells

Laboratory	Hematology
Order Code	HPC
CPT Code	86367
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	This test may be ordered on the same tube as Stem Cell Quantitation, Peripheral Blood.
Reference Range	N/A
Order Form:	A-1a General Lab or Epic Req
See:	 Stem Cell Quantitation, Peripheral Blood
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow cytometry on Hematology analyzer
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Huntington Disease (HTT Gene) DNA Analysis with Interpretation

Laboratory	Molecular Pathology
Order Code	HUND
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults - 3 mL whole blood in lavender top tube (EDTA) Children - 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Reference Range	<pre> Normal: <27 CAG repeats Premutation: 27-35 CAG repeats Reduced Penetrance: 36-39 CAG repeats Complete Penetrance: >39 CAG repeats</pre>
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	<pre> Presymptomatic patients must be enrolled in the University of Iowa Presymptomatic Huntington Disease Testing protocol or similar protocol compliant with the Huntington Disease Society of America’s "Guidelines for Genetic Testing for HD". Samples for presymptomatic testing must be accompanied by a signed and witnessed consent form from the individual being tested. Contact Division of Medical Genetics (6-2674) for further information. Presymptomatic patients under the age of 18 will not be tested. Samples from symptomatic patients must be accompanied by a written and signed statement from the ordering physician stating he/she believes HD is the cause of the patient’s symptoms. Please complete the following two forms and submit to the laboratory with the specimen and requisition. <a href = "http://www.healthcare.uiowa.edu/path_handbook/requisitions/hd_ Huntington’s Disease Indication Form <a href = "http://www.path.uiowa.edu/path_handbook/requisitions/hdconsent Presymptomatic Testing for Huntington Disease / Informed Consent </pre>
Methodology	Polymerase Chain Reaction (PCR) and Southern Blot
Analytic Time	21 days
Testing Schedule	Weekly

Hutchinson-Gilford Progeria Syndrome, HGPS

See:	 Lamin (LMNA) Full Gene Sequence with Interpretation, Whole Blood

Hydrocodone

See:	 Opiate, Urine Confirmation, Random Urine

Hydromorphone

See:	 Opiate, Urine Confirmation, Random Urine

Hydroxyprogesterone

See:	 17-Alpha Hydroxyprogesterone, Serum

Hydroxyproline, Free and Total

See:	 Amino Acids, Quantitative, Random Urine

Hypercoagulability Profile

Comments A hypercoag profile are hemostasis tests which test for a patient’s genetic and coagulation activity for thrombosis risk. These tests include: Factor 5 Leiden/Prothrombin Gene Mutation (molecular testing) and Antithrombin 3, Lupus Anticoagulant, Protein C Activity and Protein S Activity.

See:
Antithrombin III, Plasma

Leiden Variant Factor 5 & F2 1199G>A Variant Factor 2 with Interpretation, Whole Blood

Lupus Anticoagulant, Citrated Whole Blood

Protein C, Functional, Plasma

Protein S, Functional, Plasma

Hypersensitivity Pneumonitis Test

See:
Farmer’s Lung Panel, Serum

HYPP

See:
SCN4A Gene Analysis Exon 12 Variants, Whole Blood

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IA-2 Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	IA2
CPT Code	86341
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum
Rejection Criteria:	Plasma specimens. Hemolyzed or lipemic specimens.
Reference Range	0.0-0.8 Kronus Units/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative Radioimmunoassay
Analytic Time	2-10 days upon receipt in reference laboratory

IBD SGI Diagnostic Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	IBDSGI
CPT Code	81479
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	2.0 mL serum in red top tube + 2.0 mL whole blood in (EDTA) lavender top tube. <u>Both tube types are required</u>.
Reference Range	<pre> NOTE: Patient test results are based on the Smart Diagnostic Algorithm which interprets patterns among the assay and values. Serology: ASCA IgA ELISA: <8.5 EU/mL ASCA IgG ELISA: <17.8 EU/mL Anti-OmpC IgA ELISA: <10.9 EU/mL Anti-CBir1 ELISA: <78.4 EU/mL Anti-A4-Fla2 IgG ELISA: <44.8 EU/mL Anti-FlaX IgG ELISA: <33.4 EU/ml AutoAntibody ELISA: <19.8 EU/mL IFA Perinuclear Pattern: Not Detected DNAse Sensitivity: Not Detected Genetics: ATG16L1 SNP (rs2241880): No Mutation Detected EMC1 SNP (rs3737240): No Mutation Detected NKX2-3 (rs10883365): No Mutation Detected STAT3 SNP (rs744166): No Mutation Detected Inflammation: ICAM-1: <0.54 μg/mL VCAM-1: <0.68 μg/mL VEGF: <345 pg/mL CRP: <13.2 mg/L SAA: <10.9 mg/L</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. This test aids in differentiating IBD vs non-IBD and Crohn’s Disease vs Ulcerative Colitis in one comprehensive blood test. This assay includes 9 serological markers including the proprietary Anti-Fla-X, Anti-A4-Fla2, Anti-CBir1, Anti-OmpC, and DNAse-sensitive pANCA that helps identify patients with IBD and utilizes Smart Diagnostic Algorithm Technology to improve the predictive accuracy. Genetic susceptibility influences immune responses and this assay includes evaluation of ATG16L1, STAT3, NKX2-3, and ECM1. Inflammatory markers include VEGF, ICAM, VCAM, CRP, SAA. While most other labs only offer assay values, the reference laboratory provides added clarity in diagnosing IBD, UC, and CD. The reference laboratory services provide important information to aid in the diagnosis and management of certain diseases. Test results should be used with other clinical and diagnostic findings to make a diagnosis and prognosis. This test was developed and its performance characteristics determined by the reference laboratory and has not been cleared or approved by the U.S. Food and Drug Administration.
Methodology	Enzyme-linked immunosorbent Assays (ELISA) and indirect immunofluorescent assays

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                Analytic Time  3-4 days upon receipt at reference laboratory
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Ibuprofen Drug Level

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                  Laboratory  Commercial Mail-out Laboratory
                  Order Code  IBUP
                    CPT Code  82491
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Red top tube</td>
                               </tr>
                               </table>

                     Minimum  Preferred Mimimum: 1 mL serum
          Rejection Criteria:  Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS
                               or ACD solution).
        Reference Range        Therapeutic Range:  Not established.
            Order Form:        A-1a Miscellaneous Request or Epic Req
               Comments        Collect specimen between 60 and 90 minutes post-dose.

                  Methodology  High Performance Liquid Chromatography
               Analytic Time   5 days upon receipt at reference laboratory
```

IgA, IgG or IgM

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                          See:  <br />Immunoglobulin A, Individual Quant, Plasma
                                <br />Immunoglobulin G, Individual Quant, Plasma
                                <br />Immunoglobulin M, Individual Quant, Plasma
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IgD

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                          See:  <br />Immunoglobulin D, Serum
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IgE

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                          See:  <br />Immunoglobulin E, Quantitation, Total, Plasma
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IgG Subclasses

Laboratory	Commercial Mail-out Laboratory
Order Code	IGGSUB
CPT Code	82787(x4) IgG subclasses (1,2,3,4)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Light Green top tube (Lithium Heparin), Green top tube 4 mL (Na Heparin)
Minimum	Preferred minimum: 2.0 mL serum Absolute minimum: 0.45 mL serum
Reference Range	<pre> Immunoglobulin G Subclass 1: Cord blood: 435-1084 mg/dL 0-2 months: 218-498 mg/dL 3-5 months: 143-394 mg/dL 6-8 months: 190-388 mg/dL 9-23 months: 288-880 mg/dL 2 years: 170-950 mg/dL 3-4 years: 290-1065 mg/dL 5-6 years: 330-1065 mg/dL 7-8 years: 225-1100 mg/dL 9-10 years: 390-1235 mg/dL 11-12 years: 380-1420 mg/dL 13-14 years: 165-1440 mg/dL 15 years & over: 240-1118 mg/dL Immunoglobulin G Subclass 2: Cord blood: 143-453 mg/dL 0-2 months: 40-167 mg/dL 3-5 months: 23-147 mg/dL 6-8 months: 37-60 mg/dL 9-23 months: 30-327 mg/dL 2 years: 22-440 mg/dL 3-4 years: 28-315 mg/dL 5-6 years: 57-345 mg/dL 7-8 years: 42-375 mg/dL 9-10 years: 61-430 mg/dL 11-12 years: 73-455 mg/dL 13-14 years: 71-460 mg/dL 15 years & over: 124-549 mg/dL Immunoglobulin G Subclass 3: Cord blood: 27-146 mg/dL 0-2 months: 4-23 mg/dL 3-5 months: 4-70 mg/dL 6-8 months: 12-62 mg/dL 9-23 months: 13-82 mg/dL 2 years: 4-69 mg/dL 3-4 years: 4-71 mg/dL 5-6 years: 8-126 mg/dL 7-8 years: 9-107 mg/dL 9-10 years: 10-98 mg/dL 11-12 years: 16-194 mg/dL 13-14 years: 12-178 mg/dL 15 years & over: 21-134 mg/dL Immunoglobulin G Subclass 4: Cord blood: 1-47 mg/dL 0-2 months: 1-33 mg/dL 3-5 months: 1-14 mg/dL 6-8 months: 1-16 mg/dL 9-23 months: 1-65 mg/dL 2 years: 0-120 mg/dL 3-4 years: 0-90 mg/dL 5-6 years: 2-116 mg/dL 7-8 years: 0-138 mg/dL 9-10 years: 1-95 mg/dL 11-12 years: 1-153 mg/dL 13-14 years: 2-143 mg/dL 15 years & over: 7-89 mg/dL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Ordering Recommendation: Do not order for total IgG measurements. Secondary test in suspected immunoglobulin deficiency. Do not order before IgG, IgA, and IgM measurements are performed.
See:	 Immunoglobulin G, Individual Quant, Plasma
Methodology	Quantitative Nephelometry
Analytic Time	3 days upon receipt at reference laboratory

IgG, Anti-IgA Antibodies

Laboratory	Commercial Mail-out Laboratory
Order Code	ANTIA
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum in red top tube
Reference Range	<pre> Normal = Healthy individuals who do not have anti-IgA antibodies <113 U/mL Range = 113-700 U/mL Reported = U/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Clinical Utility</u> For the evaluation of patients with recurrent infection for the possibility of IgA deficiency (IgAD). Patients with IgA deficiency may develop antibodies against IgA that make them susceptible to adverse reactions to blood products including intravenous immunoglobulin.
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	5-7 business days upon receipt at reference laboratory

IGH Gene Clonality by PCR with Interpretation

Laboratory	Molecular Pathology
Order Code	BCELLPCR
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	5 mL blood in a pink top or yellow top, 1 mL bone marrow aspirate in a pink top or yellow top, 3 cu mm of fresh frozen tissue or Formalin-fixed, paraffin embedded tissue, body fluids in a pink top or yellow top or lymph node aspirates in RPMI.
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	DNA extracted from blood, bone marrow mononuclear cells or tissue is examined for rearrangement of immunoglobin heavy chain genes.
Methodology	Multiplex PCR followed by Fluorescence Capillary Electrophoresis
Analytic Time	7 working days
Testing Schedule	Weekly

IGH Variable Region Mutation Analysis, Bone Marrow

Laboratory	Commercial Mail-out Laboratory
Order Code	IGVHBM
Minimum	3 mL (EDTA) bone marrow.
Rejection Criteria:	Frozen or clotted specimens.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. This assay is designed for individuals with a confirmed diagnosis of CLL, and for these individuals testing will include sequencing. All other diagnoses will terminate after amplification and will not have the sequencing component. Test indicated for chronic lymphocytic leukemia (CLL) prognosis; prior diagnosis of CLL should be obtained.
Methodology	Polymerase Chain Reaction/Sequencing
Analytic Time	12-14 days upon receipt at reference laboratory.

IGH Variable Region Mutation, Blood

Laboratory	Commercial Mail-out Laboratory
Order Code	IGVHB
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Pink top tube</td></tr></table>
Minimum	6 mL whole blood from a pink(EDTA) top tube.
Rejection Criteria:	Frozen or clotted specimens.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. This assay is designed for individuals with a confirmed diagnosis of CLL, and for these individuals testing will include sequencing. All other diagnoses will terminate after amplification and will not have the sequencing component. Test indicated for chronic lymphocytic leukemia (CLL) prognosis; prior diagnosis of CLL should be obtained.
Methodology	Polymerase Chain Reaction/Sequencing
Analytic Time	2 weeks upon receipt at reference laboratory

IL28B Gene Analhysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	IL28B
CPT Code	81479
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 3 mL whole blood in pink (EDTA) top tube Absolute Minimum: 1 mL whole blood in pink (EDTA) top tube
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the following form to the lab, with the specimen and the A-1a Miscellaneous Request: Patient History For Molecular Genetic Testing from ARUP Laboratories.
Methodology	Qualitative Polymerase Chain Reaction/Qualitative Fluorescence Monitoring
Analytic Time	7-10 days upon receipt at reference laboratory

Immature Platelet Fraction

Laboratory	Hematology
Order Code	IPF
CPT Code	85055
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </td> </tr> </table>
Minimum	Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range	1.1-6.1%
Order Form:	A-1a General Lab or Epic Req
See:	 Platelet Count, Blood
Methodology	Flow Cytometry
Analytic Time	Routine turnaround time is approximately 1 hour.
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Immuno-Electrophoresis

See:	 Immunofixation Electrophoresis, Serum Urine Immunofixation Electrophoresis, Urine

Immunodeficiency Evaluations; Adult and Pediatric

Laboratory	Flow Cytometry Service
CPT Code	<pre> 88184, 88185 variable - Technical 88187, 88188 or 88189 variable - Professional (varies due to the number of antibodies performed)</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Alternate Collection Media:	Green top tube 4 mL (Na Heparin), Lavender top tube 3 mL (EDTA)
Minimum	Adult: 10 mL whole blood in a yellow top tube (ACD solution A) Pediatric: 2 mL whole blood in a yellow top tube (ACD solution A) Minimum specimen requirements are cell count dependent. For absolute quantitative results, a CBC with Automated Differential must also be ordered.
Reference Range	<pre> Antibodies performed vary with the patient’s clinical problem; please provide history and lab findings. The pathologist will provide an interpretative report. Adult Immunodeficiency Screening Panel: CD3, CD4, CD8, CD14, CD19, CD25, CD45, and CD56 Autoimmune Lymphoproliferative Syndrome (ALPS): CD3, CD4, CD5, CD8, CD14, CD16+56, CD19, CD20, CD45, CD56, CD95, HLA-DR, TCR alpha-beta, TCR gamma-delta, Kappa, and Lambda Bruton’s Agammaglobulinemia: CD3/CD4/CD8, CD5/CD20, CD14/CD45, CD19/Kappa, CD19/Lambda</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	<pre> Specimens with absolute lymphocyte counts of <100/mm3 can not be tested. Test includes various T and B cell assays, as dictated by the clinical question asked. Include pertinent clinical information on the reqisition. Deliver specimen immediately to Specimen Control. Recent corticosteroid or chemotherapy may invalidate result.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow Cytometry-Whole Blood Lysis
Analytic Time	2 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Immunofixation Electrophoresis

Laboratory	Chemistry
Order Code	SIFE
CPT Code	<pre> 86334 x1 (Technical) 86334-26 x1 (Professional)</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Adult - 2 mL; red top tube Pediatric - 2 mL; red top tube
Reference Range	Negative for monoclonal proteins. The serum IFE report will include a descriptive report of abnormalities, if present.
Order Form:	A-1a General Lab or Epic Req
Comments	Serum immunofixation electrophoresis methodology switched from traditional gel electrophoresis to capillary electrophoresis on September 24, 2012. Technically, the method used in capillary electrophoresis to identify monoclonal proteins is known as immunotyping. This methodology can resolve IgA, IgG, and IgM heavy chains, as well as kappa and lambda light chains. Monoclonal gammopathies involving IgD and IgE are rare but can occur. Contact pathology resident at page #3725 if additional workup may be needed for workup of suspected IgD or IgE gammopathy.
See:	 Kappa/Lambda Quant Free Light Chain Ratio, Blood, Blood Protein Electrophoresis, Serum
Methodology	Capillary electrophoresis with immunotyping
Analytic Time	48 hours
Testing Schedule	Monday - Friday

Immunofixation, IGD and IGE

Laboratory	Commercial Mail-out Laboratory
Order Code	IFEDE
CPT Code	86334
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum Absolute Minimum: 0.3 mL serum
Rejection Criteria:	Plasma
Reference Range	Negative for monoclonal IgD and IgE.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Assay is designed for qualitative assessment of monoclonal IgD or IgE protein.
Methodology	Qualitative Immunofixation Electrophoresis
Analytic Time	1-5 days upon receipt at reference laboratory.

Immunofluorescence

See:	 Renal Biopsy, Tissue Skin Biopsy, Tissue

Immunofluorescence, Indirect Autoantibodies

See:	 Liver-Kidney Microsomal Antibody (LKM), Serum Pemphigus/Pemphigoid/EBA Antibodies Screen, Titer and Interpretation, Serum Striated Muscle Antibody, IgG with Reflex to Titer, Serum

Immunofluorescence, Muscle Biopsy

See:	 Muscle Biopsy, Fresh or Frozen Tissue

Immunoglobulin A, Individual Quant

Laboratory	Chemistry
Order Code	IGA
CPT Code	82784
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or ONE microtainer
Reference Range	<pre> 70-400 mg/dL Children and Juveniles 0-1 year 0-83 mg/dL 1-3 years 20-100 mg/dL 4-6 years 27-195 mg/dL 7-9 years 34-305 mg/dL 10-11 years 53-204 mg/dL 12-13 years 58-358 mg/dL 14-15 years 47-249 mg/dL 16-19 years 61-348 mg/dL 20-adult 70-400 mg/dL</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Cryoglobulin Quantitation, Serum
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Immunoglobulin D

Laboratory	Commercial Mail-out Laboratory
Order Code	IGD
CPT Code	82784
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Adult Preferred Minimum: 0.5 mL
Rejection Criteria:	Lipemic or hemolyzed specimens
Reference Range	Less than or equal to 15.3 mg/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Nephelometry
Analytic Time	4 working days upon receipt at reference laboratory

Immunoglobulin E, Quantitation, Total

Laboratory	Chemistry
Order Code	IGE
CPT Code	82785
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers
Reference Range	<pre> Non-allergic Adult: 0-100 IU/mL Non-allergic Children: 10-20% of adult values Neonates: 0-2 IU/mL Infants in 1st year of life: 0-15 IU/mL Children aged 1-5 years: 0-60 IU/mL Children aged 6-9 years: 0-90 IU/mL Children aged 10-15 years: 0-200 IU/mL</pre>
Order Form:	A-1a General Lab or Epic Req
Methodology	Electrochemiluminescence
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Immunoglobulin G, Individual Quant

Laboratory	Chemistry
Order Code	IGG
CPT Code	82784
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or ONE microtainer.
Reference Range	<pre> 700-1600 mg/dL Children and Juveniles 0-1 year 232-1411 mg/dL 1-3 years 453-916 mg/dL 4-6 years 504-1464 mg/dL 7-9 years 572-1474 mg/dL 10-11 years 698-1560 mg/dL 12-13 years 759-1549 mg/dL 14-15 years 716-1711 mg/dL 16-19 years 549-1584 mg/dL</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Cryoglobulin Quantitation, Serum
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Immunoglobulin M, Individual Quant

Laboratory	Chemistry
Order Code	IGM
CPT Code	82784
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or ONE microtainer.
Rejection Criteria:	Specimens received in Sodium Citrate tubes
Reference Range	<pre> 0 - 1 yrs 0 - 145 mg/dL 1 - 3 yrs 19 - 146 mg/dL 4 - 6 yrs 24 - 210 mg/dL 7 - 9 yrs 31 - 208 mg/dL 1O - 11 yrs 31 - 179 mg/dL 12 - 13 yrs 35 - 239 mg/dL 14 - 15 yrs 15 - 188 mg/dL 16 - 19 yrs 23 - 259 mg/dL <u></u> 19 yrs 40 - 230 mg/dL</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Cryoglobulin Quantitation, Serum
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Immunoperoxidase Staining

Laboratory	Immunopathology
CPT Code	<pre> 88342 Technical 88342-26 Professional Interpretation</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	<pre> Studies for various antigens may be performed on formalin fixed paraffin-embedded or frozen tissue. Consult the laboratory for further information. Charges vary with number of stains performed.</pre>
Methodology	Immunohistochemistry
Analytic Time	2 days

Imuran (6MP/6TG Thiopurine Therapy)

Laboratory	Commercial Mail-out Laboratory
Order Code	PROIM
CPT Code	82491(x2)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	5 mL EDTA whole blood
Reference Range	Therapeutic Range - 6-TGN: 235-400 pmole/8x10⁸ RBC; 6-MMPN: <5,700 pmole/8x10⁸ RBC. Routine monitoring of WBC and liver enzymes must be continued to assure optimized response while minimizing risk of leukopenia and drug-induced hepatotoxicity. The target therapeutic range and target toxic thresholds were established in an IBD patient population receiving 6-mercaptopurine or azathioprine.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> If specimen is refrigerated, specimen can be stored for seven days. Record the following items on the requisition: Date of Birth Gender Ordering Doctor’s Name</pre>
Methodology	High Pressure Liquid Chromatography
Analytic Time	5 days upon receipt at reference laboratory

In-situ Hybridization

Laboratory	Immunopathology
CPT Code	<pre> 88365 Technical 88365-26 Professional Interpretation</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	B5 fixed decalcified or frozen tissue is not acceptable for this assay.
Methodology	In-Situ hybridization
Analytic Time	1 week
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Incubated mixed aPTT

See:	 APTT, Mixing Study-Incubated, Plasma

Indirect Coombs

See:	 Antibody Screen, Plasma

Influenza A /B Virus Abs.

Laboratory	Commercial Mail-out Laboratory
Order Code	INFLU
CPT Code	86710(x4)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.5 mL serum
Rejection Criteria:	Plasma. Bacterially contaminated, heat-inactivated, hemolyzed, icteric, lipemic, or turbid specimens.
Reference Range	<pre> <u>Influenza A Virus Antibody, IgG</u>: 0.89 IV or less: Negative - No significant level of influenza A virus IgG antibody detected. 0.90-1.10 IV: Equivocal - Questionable presence of influenza A virus IgG antibody detected. Repeat testing in 10-14 days may be helpful. 1.11 IV or greater: Positive - IgG antibodies to influenza A virus detected, which may suggest current or past infection. <u>Influenza A Virus Antibody, IgM</u>: 0.89 IV or less: Negative - No significant level of influenza A virus IgM antibody detected. 0.90-1.10 IV: Equivocal - Questionable presence of influenza A virus IgM antibody detected. Repeat testing in 10-14 days may be helpful. 1.11 IV or greater: Positive - IgM antibodies to influenza A virus detected, which may suggest current or recent infection. <u>Influenza B Virus Antibody, IgG</u>: 0.89 IV or less: Negative - No significant level of influenza B virus IgG antibody detected. 0.90-1.10 IV: Equivocal - Questionable presence of influenza B virus IgG antibody detected. Repeat testing in 10-14 days may be helpful. 1.11 IV or greater: Positive - IgG antibodies to influenza B virus detected, which may suggest current or past infection. <u>Influenza B Virus Antibody, IgM</u>: 0.89 IV or less: Negative - No significant level of influenza B virus IgM antibody detected. 0.90-1.10 IV: Equivocal - Questionable presence of influenza B virus IgM antibody detected. Repeat testing in 10-14 days may be helpful. 1.11 IV or greater: Positive - IgM antibodies to influenza B virus detected, which may suggest current or recent infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-6 days upon receipt at reference laboratory.
Testing Schedule	Test performed on Monday, Wednesday and Friday.

Influenza A/B Panel, PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	INPCR
CPT Code	87801(x3), 87501(x2)
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Swab Kit Flexible Nasopharyng </tr> </table>
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> This PCR assay tests for eight respiratory viruses: Influenza A (including H1N1), influenza B, parainfluenza viruses 1, 2, 3, adenovirus, respiratory syncytial virus (RSV), and human metapneumovirus. Human metapneumovirus is a recently identified (2001) respiratory virus related to RSV. Its clinical manifestations are also similar to that of RSV and ranges from mild upper respiratory infections to bronchiolitis and severe pneumonia.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Polymerase Chain Reaction
Analytic Time	1-3 days
Testing Schedule	Weekdays

Inhibin-A

Laboratory	Commercial Mail-out Laboratory
Order Code	INHBA
CPT Code	86336
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred minimum: 1.0 mL serum Absolute minimum: 0.5 mL serum</pre>
Rejection Criteria:	Plasma and severely lipemic or hemolyzed samples.
Reference Range	<pre> <u>Age/Phase</u> <u>Inhibin A pg/mL</u> Normal Cycling Females: Normal Cycling Females: Early Follicular Phase (-14 to -10) 1.8-17.3 pg/mL Mid Follicular Phase (-9 to -4) 3.5-31.7 pg/mL Late Follicular Phase (-3 to -1) 9.8-90.3 pg/mL Mid Cycle (Day 0) 16.9-91.8 pg/mL Early Luteal (1 to 3) 16.1-97.5 pg/mL Mid Luteal (4 to 11) 3.9-87.7 pg/mL Late Luteal (12 to 14) 2.7-47.1 pg/mL IVF-Peak Levels 354.2-1690.0 pg/mL PCOS-Ovulatory 5.7-16.0 pg/mL Postmenopausal less than 7.9 pg/mL Normal males less than 2.1 pg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Chemiluminescent Immunoassay
Analytic Time	2 working days upon receipt at reference laboratory

Inhibin-B, ELISA

Laboratory	Commercial Mail-out Laboratory
Order Code	INHIBB
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum
Rejection Criteria:	Hemolyzed, lipemic or ambient specimens.
Reference Range	<pre> Males 0-6 years: 40-630 pg/mL 7-10 years: 35-170 pg/mL 11-18 years: 50-475 pg/mL 19-45 years: 40-450 pg/mL Greater than or equal to 46 years: less than 10-200 pg/mL Females 0-6 years less than 73 pg/mL 7-10 years less than 130 pg/mL 11-12 years less than 186 pg/mL 13-18 years less than 360 pg/mL Pre-menopausal less than 290 pg/mL Follicular phase 10-290 pg/mL Post-menopausal less than than or equal to 16 pg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	1-8 days upon receipt at reference laboratory.

Inorganic Phosphorus (Phosphate)

Laboratory	Chemistry
Order Code	URPO
CPT Code	84105
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	10 mL; random sample. Must have at least 10 mL to titrate.
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	End Point Testing
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Inorganic Phosphorus (Phosphate)

Laboratory	Chemistry
Order Code	UPO4
CPT Code	84105
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> 24 hr collection; (must have 10 mL to titrate). No preservative. Collections other than 24 hr will not be calculated for mg/24 hr.</pre>
Reference Range	400-1300 mg/24 hr
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	End Point Testing
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

INR (International Normalized Ratio)

See:	 Prothrombin Time, Plasma
See Appendix	See Additional Information: International Normalized Ratio (INR)

INR/Fingerstick FCC

Laboratory	Family Care Center Phlebotomy Station
Order Code	INRPOC
CPT Code	85610
Collection Medium	Fingerstick
Minimum	10 uL fresh whole blood by fingerstick
Reference Range	<pre> Individually determined therapeutic level. Linearity = 4.0</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Whole blood agglutination--clot end point.
Analytic Time	15 minutes (upon receipt in laboratory)
Testing Schedule	0830-1730, Monday through Friday

Insulin Antibodies

Laboratory	Commercial Mail-out Laboratory
Order Code	INSAB
CPT Code	86337
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.1 mL serum
Rejection Criteria:	Plasma. Hemolyzed or lipemic specimens.
Reference Range	Negative = 0.4 Kronus Units/mL or less Positive = 0.5 Kronus Units/mL or greater
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Radioimmunoassay
Analytic Time	2-5 days upon receipt at reference laboratory

Insulin Like Growth Factor Binding Protein I (IGFBP-1)

Laboratory	Commercial Mail-out Laboratory
Order Code	IGFBP1
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum from red top tube Absolute Minimum: 0.5 mL serum from red top tube
Reference Range	<pre>Adults: 5-34 ng/mL Pediatrics: 5-9 Years 15-95 ng/mL 10-14 Years 8-64 ng/mL 15-18 Years 5-40 ng/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The concentration of IGFBP-1 is correlated with glycemic conditions. IGFBP-1 may be used for monitoring insulin responsiveness, as a marker for insulin-producing tumors, monitoring acute fluctuations in insulin action, and determining if poor glycemic control is due to inadequate insulin treatment or poor control of dietary intake.
See:	 Insulin Like Growth Factor Binding Protein III (IGFBP-3), Serum Insulin-Like Growth Factor I, Serum Insulin-Like Growth Factor II, Serum
Methodology	Radioimmunoassay (RIA)
Analytic Time	Set up at reference laboratory one day per week; results with 4 days of set-up.

Insulin Like Growth Factor Binding Protein III (IGFBP-3)

Laboratory	Commercial Mail-out Laboratory
Order Code	IGFB3
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum from red top tube
Rejection Criteria:	Plasma
Reference Range	IGF-Binding Protein-3 (UOM mg/L) Reference Ranges (mg/L) for IGF Binding Protein-3 (IGFBP-3): Age Units 1-7 days <0.7 8-15 days 0.5-1.4 16 days-1 year 0.7-3.6 2 years 0.8-3.9 3 years 0.9-4.3 4 years 1.0-4.7 5 years 1.1-5.2 6 years 1.3-5.6 7 years 1.4-6.1 8 years 1.6-6.5 9 years 1.8-7.1 10 years 2.1-7.7 11 years 2.4-8.4 12 years 2.7-8.9 13 years 3.1-9.5 14 years 3.3-10.0 15 years 3.5-10.0 16 years 3.4-9.5 17 years 3.2-8.7 18 years 3.1-7.9 19 years 2.9-7.3 20 years 2.9-7.2 21-30 years 3.4-7.8 31-40 years 3.4-7.0 41-50 years 3.3-6.7 51-60 years 3.4-6.9 61-70 years 3.0-6.6 71-80 years 2.5-5.7 81-85 years 2.2-4.5 >85 years No primary data 81-85 years: 2.2-4.5 Reference Ranges (mg/L) for IGF Binding Protein-3 (IGFBP-3) by Pubertal (Tanner) Stage: Females Tanner I 1.2-6.4 Tanner II 2.8-6.9 Tanner III 3.9-9.4 Tanner IV 3.3-8.1 Tanner V 2.7-9.1 Males Tanner I 1.4-5.2 Tanner II 2.3-6.3 Tanner III 3.1-8.9 Tanner IV 3.7-8.7 Tanner V 2.6-8.6
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Insulin-like growth factor binging proteins bing IGF-I and IGF-II with high affinty but do not bind insulin. Of the 6 distinct IGF binding proteins structurally characterized at this time, IGFBP-3 has been shown to be the major carrier of the IGFs, transporting approximately

	95% of the circulatig IGF-I and IGF-II. IGFBP-3 is growth hormone (GH) responsive. Thus, lev cromegaly and low in hypopituitarism, and levels inc deficient children after GH administration. Other causes of short stature that result in reduced include poorly controlled diabetes. The IGFBP-3 assa assessing nutritional status, since IGFBP-3 decrease caloric and protein restriction.
See:	 Insulin Like Growth Factor Binding Protein I (Insulin-Like Growth Factor I, Serum Insulin-Like Growth Factor II, Serum
Methodology	Immunoassay
Analytic Time	1 week upon receipt at reference laboratory

Insulin, Random (Mailout)

Laboratory	Commercial Mail-out Laboratory
Order Code	INSLR
CPT Code	83525
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA), Pink top tube
Minimum	<pre> Adult preferred minimum: 1 mL serum or plasma Adult absolute minimum: 0.4 mL serum or plasma Pediatric minimum: 0.3 mL serum or plasma</pre>
Rejection Criteria:	Heparinized plasma or I.V. fluid; specimens collected in potassium oxalate/sodium fluoride tubes; hemolyzed specimens
Reference Range	Fasting insulin = 3-19 uIU/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Allow serum to clot completely at room temperature. Separate serum or plasma from cells ASAP.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Chemiluminescent Immunoassay
Analytic Time	5 days upon receipt at reference laboratory

Insulin, Total

Laboratory	Chemistry
Order Code	INSLT
CPT Code	83525
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tubes or TWO microtainers from a fasting patient.
Reference Range	2.6 - 24.9 micro U/mL (fasting)
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Fasting for at least 8 hours prior to collection is recommended. This assay has 100% cross-reactivity with endogenous insulin and recombinant human insulin (e.g., Novolin R and Novolin N). It does <u>not</u> recognize the insulin analogs lispro (Humalog), aspart (NovoLog), and glargine (Lantus). The mail-out test "Insulin, Random, Serum or Plasma" does cross-react with the insulin analogs and may be useful in determining whether a patient is taking one of these analogs (e.g., evaluating whether surreptitious insulin use may be causing otherwise unexplained hypoglycemia). A glucose will be automatically done on each specimen at no additional charge.
See:	 Insulin, Random (Mailout), Serum or Plasma
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)

Insulin-Like Growth Factor I

Laboratory	Commercial Mail-out Laboratory
Order Code	IGFI
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Absolute Minimum: 1 mL serum from red top tube
Rejection Criteria:	Slightly, moderate, and grossly icteric samples. Samples received at room temperature. Frozen glass tubes.
Reference Range	<pre>Pediatrics: Male (ng/mL) Female (ng/mL) <1 years: < or = 142 < or = 185 1-1.9 years: < or = 134 < or = 175 2-2.9 years: < or = 135 < or = 178 3-3.9 years: 30-155 38-214 4-4.9 years: 28-181 34-238 5-5.9 years: 31-214 37-272 6-6.9 years: 38-253 45-316 7-7.9 years: 48-298 58-376 8-8.9 years: 62-347 76-424 9-9.9 years: 80-398 99-483 10-10.9 years: 100-449 125-541 11-11.9 years: 123-497 152-593 12-12.9 years: 146-541 178-636 13-13.9 years: 168-576 200-664 14-14.9 years: 187-599 214-673 15-15.9 years: 201-609 218-659 16-16.9 years: 209-602 201-610 17-17.9 years: 207-576 185-551 Adults: Unit of Measure: 18-19.9 years: 108-548 ng/mL 20-24.9 years: 83-456 ng/mL 25-29.9 years: 63-373 ng/mL 30-39.9 years: 53-331 ng/mL 40-49.9 years: 52-328 ng/mL 50-59.9 years: 50-317 ng/mL 60-69.9 years: 41-279 ng/mL 70-79.9 years: 34-245 ng/mL >80 years: 34-246 ng/mL Z-Score (Male): -2.0 - +2.0 SD Z-Score (Female): -2.0 - +2.0 SD</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Insulin-like growth factor I (IGF-I, or somatomedin C), a protein involved in stimulating somatic growth, is regulated principally by growth hormone (GH) and nutritional intake. IGF-I is transported in serum by several proteins; this helps maintain relatively high IGF-I plasma levels and minimizes fluctuations in serum IGF-I concentrations. Measuring IGF-I is useful in several growth-related disorders. Dwarfism caused by deficiency of growth hormone (hypopituitarism) results in decreased serum levels of IGF-I, while acromegaly (growth hormone excess) results in elevated levels of IGF-I. IGF-I measurements are also helpful in assessing nutritional status; levels are reduced in undernutrition and restored with a proper diet.
See:	 Insulin Like Growth Factor Binding Protein I (IGFBP-1), Serum Insulin Like Growth Factor Binding Protein III (IGFBP-3), Serum Insulin-Like Growth Factor II, Serum
Methodology	Liquid Chromatography Mass Spectrometry (LC/MS)
Analytic Time	8 working days upon receipt at reference laboratory

Insulin-Like Growth Factor II

Laboratory	Commercial Mail-out Laboratory
Order Code	IGFII
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum from red top tube
Reference Range	By report.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Suggested that processing occurs within one hour of collection.
See:	 Insulin Like Growth Factor Binding Protein I (IGFBP-1), Serum Insulin Like Growth Factor Binding Protein III (IGFBP-3), Serum Insulin-Like Growth Factor I, Serum
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Radioimmunoassay
Analytic Time	5-12 days upon receipt at reference laboratory
Testing Schedule	Varies

Integrated Screen

Laboratory	State Hygienic Laboratory
Comments	Please refer to the State Hygienic Laboratory at the University of Iowa.

Interleukin 6 by MADF

Laboratory	Commercial Mail-out Laboratory
Order Code	CYT6
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum from red top tube Absolute minimum: 0.3 mL serum from red top tube</pre>
Rejection Criteria:	Refrigerated specimens. Contaminated or heat-inactivated specimens.
Reference Range	0-5 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative Multi-Analyte Fluorescence Detection
Analytic Time	1-4 days upon receipt at reference laboratory

Interleukin Secretion

Laboratory	VA Diagnostic Immunology Lab
Minimum	20 mL; sodium heparin green tops. Do not use a needle smaller than 21 gauge.
Reference Range	Internal control and normal range reported with each sample.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This assay is run Monday through Thursday during working hours and Friday 8 a.m. to noon. This assay is run using viable lymphocytes. This assay examines the ability of a patient’s lymphocytes to generate IL2, and other cytokines, in response to a physiologic (via the T cell receptor complex) as well as a pharmacological stimulus. An abnormal response would suggest a T lymphocyte immune deficiency and would be consistent with a clinical picture of recurrent infection, failure to thrive and, possibly, recurrent tumors.

Intrinsic Factor Blocking Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	IFBA
CPT Code	86340
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum 1 mL serum
Rejection Criteria:	Grossly hemolyzed or severely lipemic specimens.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	For patients undergoing B12 therapy, wait 48 hours to one week prior to collection.
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	4 days upon receipt at reference laboratory

Iodine, 24 Hour Urine

Laboratory	Commercial Mail-out Laboratory
Order Code	IODINEU
CPT Code	83789
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	10 mL from a 24-hour urine collection
Reference Range	0-15 years: not established > or =16 years: 93-1125 mcg/specimen
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Monitoring iodine excretion rate as an index of daily iodine replacement therapy. Correlating total body iodine load with (131)I uptake studies in assessing thyroid function. There are no known analytic interferences with this procedure. Administration of iodine-based contrast media and drugs containing iodine, such as amiodarone, will yield elevated results. Gadolinium is known to interfere with most metals tests. If gadolinium-containing contrast media has been administered a specimen can not be collected for 48 hours. Frozen specimens sometimes result in falsely-lowered results.
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)
Analytic Time	3 working days upon receipt at reference laboratory

Iodine, Random Urine

Laboratory	Commercial Mail-out Laboratory
Order Code	IODUR
CPT Code	83789
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 5 mL random urine Absolute Minimum: 2 mL random urine
Reference Range	0-15 years: Not established > or = 16 years: 26-705 mcg/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Administration of iodine-based contrast media and drugs containing iodine, such as amiodarone, will yield elevated results.
Methodology	Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)
Analytic Time	3 days upon receipt at reference laboratory

Iron and Iron Binding Capacity

See:	 Iron Panel (IRON, UIBC, TIBC), Plasma

Iron

Laboratory	Commercial Mail-out Laboratory
Order Code	FEU
CPT Code	83540
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	<pre> 1. 10 mL from a 24-hour urine collection. No preservative. Refrigerate during 24-hour collection. 2. Collect in a clean, plastic urine container(s) with no metal cap(s) or glued insert(s). 3. Send specimen in a plastic, 13-mL urine tube or a clean, plastic aliquot container with no metal cap or glued insert. 4. Send specimen refrigerated. Note: 24-Hour volume is required on request form for processing.</pre>
Reference Range	<pre> 100 - 300 mcg/specimen The reference value is for a 24-hour collection. Specimens collected for other than a 24-hour time period are reported in unit of mcg/L, for which reference values are not established.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Containers available from Pharmacy.
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Inductively Coupled Plasma (ICP) Emission Spectroscopy
Analytic Time	1 week upon receipt at reference laboratory

Iron Panel (IRON, UIBC, TIBC)

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                  Laboratory  Chemistry
                  Order Code  IRON
                    CPT Code  83550
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Plasma Separator Tube</td>
                               </tr>
                               </table>

 Alternate Collection Media:  Call laboratory for additional acceptable specimen collection containers.
                     Minimum  <pre>
                               3 mL whole blood from light green top tube or ONE microtainer for
                               pediatric patients.
                               Avoid hemolysis.</pre>
               Reference Range  <pre>
                               Iron
                                    Adult males:                  87-150 mcg/dL
                                    Adult Females:                72-130 mcg/dL

                                    Pediatric ranges for serum iron:
                                      0 - 4 months:               110-270 mcg/dL
                                      5 months - 23 months:       30-70 mcg/dL
                                      24 months - 35 months:      20-124 mcg/dL
                                      3 years - 11 years:         53-119 mcg/dL
                                      12 years and older:         Use adult ranges above

                               TIBC
                                    Adults:                       224-429 mcg/dL

                                    Pediatric ranges for TIBC:
                                      0 - 4 months:               59-175 mcg/dL
                                      5 months - 10 years:        250-400 mcg/dL
                                      11 years and older:         Use adult range above

                               UIBC:                              110-370 mcg/dL

                               % Iron saturation
                                    Adults:                       27-44%

                                    Pediatric ranges for % iron saturation:
                                      0 - 11 days:                56-74%
                                      12 days - 12 months:        17-34%
                                      13 months - 10 years:       22-39%
                                      11 years and older:         Use adult range above</pre>
                    Order Form:  A-1a General Lab or Epic Req
                       Comments  This is a panel of testing that includes plasma iron, UIBC (unsaturated
                                 iron-binding capacity) and TIBC (total iron-binding capacity).  Plasma
                                 iron and UIBC are directly determined by assay.  TIBC is a calculated
                                 parameter derived from plasma iron and UIBC.

                   See Appendix  See Additional Information: <br />
                                 Chemistry Pediatric Reference Ranges
                    Methodology  Colorimetric
                  Analytic Time  1 hour (upon receipt in laboratory)
              Testing Schedule  24 hrs/day, 7 days a week, including holidays.
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Iron Stain of Bone Marrow Smears

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                       Comments  Included in routine 'Bone Marrow Examination'
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Iron

Laboratory	Commercial Mail-out Laboratory
Order Code	FET
CPT Code	83789
Collection Medium	Miscellaneous container; contact laboratory
Minimum	<pre> 1 cm long specimen obtained with an 18 gauge needle. Tissue can be fresh, paraffin-embedded, formalin-fixed, or dried. Formalin is acceptable, but not preferred. Paraffin blocks are acceptable. Metal-free vial available from Specimen Control, 6240 RCP.</pre>
Rejection Criteria:	Specimens less than 0.25 mg dry weight. Samples stored or shipped in saline.
Reference Range	<pre> Male: Hepatic Iron Content (HIC): 200 - 2,000 μg/g of tissue Hepatic Iron Index (HII): Less than 1.0 Female: Hepatic Iron Content (HIC): 200 - 1,600 μg/g of tissue Hepatic Iron Index (HII): Less than 1.0</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Submit to Surgical Pathology 5804 JPP. Iron on Liver Tissue will be ordered if applicable by Pathologist review. Record age on test requisition in order to calculate iron index.</pre>
Methodology	Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	2-6 days upon receipt at reference laboratory

ISH

See:	 In-situ Hybridization, Tissue-formalin fixed

Islet Cell Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	ISLET
CPT Code	86341
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Recomended minimum: 1 mL serum from red top tube Absolute minimum: 0.5 mL serum from red top tube Pediatric minimum: 0.15 mL serum from red top tube</pre>
Rejection Criteria:	Plasma. Contaminated, hemolyzed, or severely lipemic specimens.
Reference Range	< 1:4 No antibody detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Indirect Fluorescent Antibody
Analytic Time	3 days upon receipt at reference laboratory

Isoagglutinin Titer

See:	 Antibody Titration (IgM + IgG), Plasma

Isolator Blood Culture

Laboratory	Microbiology
Order Code	C ISO
CPT Code	87103
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Fungal Isolator Tubes</td> </tr> </table>
Minimum	<pre> 1.5 mL; pediatric Isolator blood culture tube (923003) 8-10 mL; adult Isolator blood culture tube (922848)</pre>
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> Recommended specifically for fungal blood cultures. Should be paired with routine blood culture bottles.</pre>
See:	 Fungal Culture
Methodology	Standard plated media
Analytic Time	Cultures are held 4 weeks.
Testing Schedule	0700-2200, 7 days a week, including holidays.

Isoleucine

See:	 Amino Acids, Quantitative, Plasma Amino Acids, Quantitative, Random Urine

Isopropanol

See:	 Alcohol, Plasma Ethanol/Volatiles Screen (EVS), Plasma

ISPD Full Gene Sequence with Interpretation

Laboratory	Molecular Pathology
Order Code	ISPD
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> 2-3 mL whole blood in pink or TWO lavender top tubes. Smaller volumes than those requested will be attempted may compromise the ability to perform testing if insufficient DNA is obtained from the specimen.</pre>
Rejection Criteria:	Testing requires a dedicated collection tube.
Reference Range	Normal
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Mutations in the isoprenoid synthase domain containing (ISPD) gene (OMIM #614631) have been shown to cause Walker-Warburg syndrome (WWS) (now identified as muscular dystrophy-dystroglycanopathy type A,7). WWS is characterized by congenital muscular dystrophy, hydrocephalus, agyria, retinal dysplasia, with or without encephalocele.
Methodology	Sequence analysis of the 10 coding exons and flanking intronic regions of the ISPD (Isoprenoid synthase domain containing gene).
Analytic Time	21 days
Testing Schedule	Weekly

Itraconazole Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	ICZ
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum Absolute Minimum: 0.2 mL serum</pre>
Rejection Criteria:	Serum gel tube is not acceptable.
Reference Range	<pre> Itraconazole (trough): >0.5 mcg/mL (localized infection) >1 mcg/mL (systemic infection) Hydroxyitraconazole: No therapeutic range established; activity and serum concentration are similar to parent drug.</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	<pre> Enteropathy, H2-histamine receptor blockers, hepatic enzyme inducers, and other variables can result in low to nondetectable serum levels with concomitant high risk of therapeutic failure. AIDS patients and organ transplant patients receiving immunosuppressive therapy tend to have lower serum itraconazole levels on standard doses and are thus at high risk of therapeutic failure.</pre>
Methodology	Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)
Analytic Time	1 day upon receipt in reference laboratory.

J

JAK2 Gene Analysis p.VAL617PHE Variant with Interpretation

Laboratory	Molecular Pathology
Order Code	JAK2
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Adults 3 mL whole blood. Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.
Reference Range	Direct detection of G-T tranversion at position 1849 of the Janus kinase 2 locus, giving rise to a Valine-to-Phenylalanine substitution at position 617 (JAK2 V617F mutation).
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	This test is useful for diagnosis of myeloproliferative isorders: Polycythemia Vera and Essential Thrombocythemia.
Methodology	Allele specific real-time Polymerase Chain Reaction
Analytic Time	7 working days
Testing Schedule	Weekly

JC Virus (Polyomavirus) by PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	JCVPCR
CPT Code	87798
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	<pre> Spinal Fluid (For Detection of JC Virus Only) 0.5 mL of spinal fluid.</pre>
Reference Range	<pre> Negative Positive results will be reported as JC virus DNA detected.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Maintain sterility. JC virus (JCV), a member of the genus Polyomavirus, is a small nonenveloped DNA-containing virus. Primary infection occurs in early childhood, with a prevalence of >80%.(1) The virus is latent but can be reactivated in immunosuppressed patients, especiallythose with AIDS. JCV is recognized as the etiologic agent of progressive multifocal leukoencephalopathy (PML), a fatal demyelinating disease of the central nervous system.(2-4) Histologic examination of brain biopsy tissue may reveal characteristic pathologic changes localized mainly in oligodendrocytes and astrocytes. Detection of JCV DNA by PCR (target gene, large T antigen) in the cerebrospinal fluid specimens of patients with suspected PML infection has replaced the need for biopsy tissue for laboratory diagnosis.(5) This molecular amplification technology provides a faster, easier, and more sensitive test for diagnosing of JCV infection compared with brain biopsy pathology. Importantly, the PCR test is specific with no cross-reaction with BK virus (BKV), a closely related polyomavirus. A negative result does not rule out the possibility of JCV infection. This test is not to be used as a diagnostic tool for Creutzfeldt-Jakob disease (CJD).</pre>
Methodology	<pre> Real-Time Polymerase Chain Reaction (PCR)/DNA Probe Hybridization Viral nucleic acid is extracted from the specimen using the MagNA Pure automated instrument (Roche Applied Science). Primers are directed to the large T antigen gene, which is a conserved sequence specific for JCV. This assay detects only JCV; it does not detect BK Virus or SV 40 (other polyomaviruses). The LightCycler instrument (Roche Applied Science) amplifies and monitors the development of target nucleic acid sequences after the annealing step during PCR cycling. This automated PCR system can rapidly detect amplicon development through stringent air-controlled temperature cycling in capillary cuvettes. The detection of amplified products is based on the fluorescence resonance energy transfer (FRET) principle. For FRET product detection, a hybridization probe with a donor fluorophore, fluorescein, on the 3'-end is excited by an external light source and emits light that is absorbed by a second hybridization probe with an acceptor fluorophore, LC-Red 640, at the 5'-end. The acceptor fluorophore then emits a light of a different wavelength that can be measured with a signal that is proportional to the amount of specific PCR product.</pre>
Analytic Time	5 days upon receipt at reference laboratory

Jo-1 Antibody

Laboratory	Chemistry
Order Code	JO1
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers
Reference Range	1.0 AI (antibody index) or less
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 25, 2013.
See:	 Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum PM-Sc1 (PM1) Antibody, IgG, Serum
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Joint Fluid

See:	 Aspirated Knee/Joint/Cyst, Fluid

K

Kaletra Antiretroviral Level

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                Laboratory  Commercial Mail-out Laboratory
                Order Code  KALETRA
                  CPT Code  80299 x 2
          Collection Medium  <table>
                             <tr>
                             <td align=center></td></tr>
                             <tr>
                             <td width="110" valign="top" align="center">Red top tube</td>
                             </tr>
                             </table>

                   Minimum  <pre>
                             Preferred Minimum: 2 mL serum
                             Absolute Minimum: 1 mL serum</pre>
        Rejection Criteria:  SST's; other body fluids including plasma are not acceptable.
           Reference Range  <pre>
                             < 0.2 mcg/mL

                             Kaletra levels peak approximately 4 hours after administration of 400
                             mg lopinavir/100 mg ritonavir.  The mean peak concentration is
                             approximately 22% lower for the oral solution than the capsule
                             formulation under fasting conditions.  To enhance bioavailability,
                             Kaletra oral suspension should be taken with food.

                             HIV-1 infected adults, 400/100 mg twice daily x 3 weeks.
                             Lopinavir mean steady state trough level:
                               7.1 + or - 2.9 mcg/mL

                             Lopinavir mean peak level:
                               9.8 + or - 3.7 mcg/mL

                             Pediatric lopinavir levels are similar to those obtained in adult
                             patients.</pre>
              Order Form:  A-1a Miscellaneous Request or Epic Req
              Methodology  HPLC (High Performance Liquid Chromatography)
            Analytic Time  5-6 days upon receipt at reference laboratory
```

Kappa Lambda Light Chain

```
                Laboratory  Commercial Mail-out Laboratory
                Order Code  KLU
                  CPT Code  83883(x2), 84156
          Collection Medium  <table>
                             <tr>
                             <td align=center><a href="javascript:larger_tube('41.jpg')"></a></td><td
                             <td align=center><a href="javascript:larger_tube('41.jpg')"><img src="/pa
                             <tr>
                             <td width="110" valign="top" align="center">Yellow top conical tube (no a
                             <td width="110" valign="top" align="center">Yellow top conical tube (no a
                             </tr>
                             </table>

                   Minimum  TWO 4 mL aliquots from a well-mixed random collection.
             Reference Range  <pre>
                             Total Protein                       10-140 mg/d
                             Albumin, Urine                      Detected
                             Alpha-1 Globulins, Urine            None detected
                             Alpha-2 Globulins, Urine            None detected
                             Beta Globulins, Urine               None detected
                             Gamma, Urine                        None detected
                             Free Urinary Kappa Light Chains     0.14 - 2.42 mg/dL
                             Free Urinary Kappa Excretion/Day    By report
                             Free Urinary Lambda Light Chain     0.02 - 0.67 mg/dL
                             Free Urinary Lambda Excretion/Day   By report
                             Free Urinary Kappa/Lambda Ratio     2.04 - 10.37 (ratio)</pre>
              Order Form:  A-1a Miscellaneous Request or Epic Req
                     See:  <br />Kappa/Lambda Quant Free Light Chain Ratio, Blood, Blood
              Methodology  Qualitative Immunofixation Electrophoresis/Quantitative Nephelometry
            Analytic Time  1-5 days upon receipt at reference laboratory
```

Kappa/Lambda Quant Free Light Chain Ratio, Blood

Laboratory	Chemistry
Order Code	KLFQT
CPT Code	83883 x2
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 3 mL whole blood
Rejection Criteria:	Plasma separator tube
Reference Range	<pre> Lambda Quantitative Free Light Chains 5.7 - 26.3 mg/L Kappa Quantitative Free Light Chains 3.3 - 19.4 mg/L Kappa/Lambda Free Light Chain Ratio 0.26 - 1.65</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	This assay is highly sensitive to increasing concentrations of monoclonal free kappa or free lambda light chains in the serum of patients with evolving or relapsing myelomas.
See:	 Kappa Lambda Light Chain, Urine
Methodology	Turbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Karyotyping

See:	 Cell Culture (Biochemical and Molecular Studies), Amniotic Fluid, Skin, Fetal Tissue, Diaphragm, Other Tissue Chromosomal Analysis, Amniotic Fluid Chromosomal Analysis, Bone Marrow (for acquired and constitutional abnormalities) Chromosomal Analysis, Chorionic Villi (CV) Chromosomal Analysis, Fetal Blood (Prenatal Diagnosis) Chromosomal Analysis, Peripheral Blood for Hematological Disorders Chromosomal Analysis, Peripheral Blood, Cord Blood Chromosomal Analysis, Product of Conception (POC) Chromosomal Analysis, Skin or Internal Tissue or Blood from Autopsy Chromosomal Analysis, Skin, Other Tissue Chromosomal Breakage Studies, Peripheral Blood FMR1 Gene Analysis Characterization of Alleles with Interpretation, Whole Blood

KCNQ4 (Deafness Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	KCNQ4
CPT Code	83891, 83894, 83898 (x12), 83903 (x12), 83904 (x10)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Screening for KCNQ4 is performed via DHPLC and sequencing. Oligonucleotide primers have been designed to amplify each exon. Amplified samples are run on the DHPLC; abnormal elution profiles are sequenced to identify specific mutations. Exons carrying known SNPs are directly sequenced.
Analytic Time	3 months

Keppra (Levetiracetam)

Laboratory	Chemistry
Order Code	KEPPRA
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	5 mL pink top tube (adults) or ONE EDTA microtainers (pediatric patients).
Rejection Criteria:	Gel separator tubes
Reference Range	Therapeutic range: 5-30 mcg/mL
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	The proposed therapeutic range for seizure control is 5-30 mcg/mL. Pharmacokinetics of levetiracetam are affected by renal function. The relationship between serum concentrations and toxicity is not known.
Methodology	Enzyme Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Ketones (Semi-Quantitative)

Comments	This assay was discontinued as of 11/14/2011. There are other laboratory testing options for workup of diabetic ketoacidosis and other ketotic states.
See:	 Basic Metabolic Panel, Plasma Beta Hydroxybutyrate, Plasma Blood Gases (Arterial), Blood (syringe only) Urinalysis, Urine

17-Ketosteroids

Comments	This test is no longer performed. Urinary Free Cortisol is the recommended replacement test.
See:	 Cortisol, Urinary Free (HPLC), Urine

KIT (AML) Targeted Gene Analysis Exons 8, 17 with Interpretation

Laboratory	Molecular Pathology
Order Code	KITAML
Collection Medium	<table><tr><td align=center></td><td rowspan=2 width=20 align=center>or</td><td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl<td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl<tr><td width="110" valign="top" align="center">Pink top tube</td><td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA)<td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA)</tr></table>
Minimum	3 mL of whole blood or bone marrow aspirate. Specimens for which the AML blast count is at least 10% will be tested. Testing on smaller volumes may be attempted. However, this may compromise the ability to perform testing. Testing requires a dedicated collection tube.
Reference Range	Negative
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	KIT AML Mutation Analysis detected exons related to patients with AML. If patient has GIST or melanoma, order KIT Mutation Analysis (LAB7660). This is a sequence-based assay. This test is not intended to detect the D816 mutation in bone marrow for mast cell disease or to detect minimal residual disease (see KIT Mutation (D816V) Mast Cell Disease (LAB7567).
See:	 KIT (GIST) Targeted Gene Analysis Exons 9, 11, 13, 17 with Interpretation, Tissue KIT Mutation (D816V) For Mast Cell Disease, Bone Marrow, Bone Marrow
Methodology	PCR followed by DNA sequencing.
Analytic Time	7-10 working days
Testing Schedule	0800-1700 Testing offered once per week excluding weekends and University holidays.

KIT (GIST) Targeted Gene Analysis Exons 9, 11, 13, 17 with Interpretation

Laboratory	Molecular Pathology
Order Code	KIT
Minimum	Specimen requires 20% or greater tumor cell content. Submit 1 H&E with 10 unstained 6 micron-thick sections on non-charged slides or formalin-fixed, paraffin-embedded tissue block.
Rejection Criteria:	Specimens fixed in B5 fixative or that have been decalcified will not be accepted. Tumor specimens containing less than 20% tumor cells or are less than 10mm² in area may be unacceptable.
Reference Range	Negative
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	The principle use of this test is to detect mutations in patients with gastrointestinal stromal tumor (GIST) and melanoma. For acute myeloid leukemia (AML) testing, please order KITAML Mutation Analysis (LAB7659). This test is not intended to detect the D816 mutation in bone marrow for mast cell disease or to detect minimal residual disease, see KITMAST Mast Cell Disease (LAB7567).
See:	 KIT (AML) Targeted Gene Analysis Exons 8, 17 with Interpretation, Whole Blood, Bone Marrow KIT Mutation (D816V) For Mast Cell Disease, Bone Marrow, Bone Marrow
Methodology	PCR followed by DNA sequencing.
Analytic Time	7-10 working days
Testing Schedule	0800-1700 Testing offered once per week excluding weekends and University holidays.

KIT Mutation (D816V) For Mast Cell Disease, Bone Marrow

Laboratory	Commercial Mail-out Laboratory
Order Code	KITMAST
CPT Code	81402
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 3 mL bone marrow in pink top tube Absolute Minimum: 1 mL bone marrow in pink top tube
Rejection Criteria:	Frozen specimens. Clotted or grossly hemolyzed specimens.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Polymerase Chain Reaction
Analytic Time	2-7 days upon receipt at reference laboratory.
Testing Schedule	Varies

Kleihauer-Betke Stain For Fetal Hemoglobin

See:	 Fetal Erythrocyte Quantitation, Peripheral Blood (maternal)

Known Family Mutation (Renal Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	KIDNEYKN
CPT Code	83891, 83894, 83898, 83904
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href= "http://www.healthcare.uio from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. Sequencing for Familial Mutations (Indicate gene and mutation known to segregate in family).
Analytic Time	3 months

Known Mutation (Deafness Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	DEAFKNM
CPT Code	83891, 83894, 83898, 83904
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. Documentation of familial mutation from outside testing sites is recommended to be submitted with sample.
Analytic Time	3 months

KOH Prep (Fungal Stain, KOH with Calcofluor White)

Laboratory	Microbiology
Order Code	C KOH
CPT Code	87210
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	This test is performed on all fungal culture requests. It can also be ordered as an individual test. It is used when looking for fungi in skin, hair, nails, body fluids and other clinical specimens.
Methodology	Microscopic slide examination
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	0700-1500, 7 days a week, including holidays.

KRAS Gene Analysis Variants in codons 12 and 13 and Exon 3 with Interpretation

Laboratory	Molecular Pathology
Order Code	KRAS
Minimum	Tumor cells more than 50% of the total tissue and greater than 10mm² in surface area on the block.
Rejection Criteria:	Specimens fixed in B5 fixative or that have been decalcified will not be accepted. Tumor specimens containing less than 50% tumor cells or are less than 10mm² in area may be unacceptable.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The tissue will be reviewed by a pathologist prior to testing to identify that it contains at least 50% tumor. This assay detects mutations in codons 12, 13 and 61 (19 mutations in total).
Methodology	Polymerase Chain Reaction and Single Nucleotide Primer Extension
Analytic Time	7-10 working days
Testing Schedule	Weekly

L

Lacosamide Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	LACOSA
CPT Code	82542
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum in a red top tube.
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	Therapeutic Range-Not well established. Suggested Range: 5.0-10.0 μg/mL Dose-related range (values at doses of 200-600 mg/day): 2.5-18.0 μg/mL Toxic Level: Not well established.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	High Performance Liquid Chromatography/Tandem Mass Spectrometry
Analytic Time	1-4 days upon receipt at reference laboratory

Lactate

Laboratory	Critical Care Laboratory
Order Code	LACTC
CPT Code	83605
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Heparinized syringe or Green </tr> </table>
Minimum	<pre> 0.5 mL in Lithium/Sodium Heparin syringes or Sodium Heparin vacutainer tube</pre>
Reference Range	<pre> 0.5 - 2.2 mEq/L Critical value: >4.0 mEq/L for patients > 16 years of age--testing performed in Critical Care Lab Critical value: >5.0 mEq/L for patients tested in Special Care Nursery Lab</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required); all needles must be removed from the syringe before delivery.
See Appendix	See Additional Information: Special Care Nurseries Critical Lab Values Specimens Requiring Immediate Delivery
Methodology	Ion Selective Electrode
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lactate Dehydrogenase (LD)

Laboratory	Chemistry
Order Code	LD
CPT Code	83615
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients.
Reference Range	<pre> Adult Males 135-225 U/L Adult Females 135-214 U/L Pediatric Reference Ranges Male Female 0-31 days 125-735 U/L 145-765 U/L 31 days-1 year 170-450 190-420 1 year-4 years 155-345 165-395 4 years-7 years 155-345 135-345 7 years-10 years 145-300 140-280 10 years-13 years 120-290 120-260 13 years-16 years 120-290 100-275 16 years-19 years 105-235 105-230</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Avoid hemolysis. False elevations may occur in specimens which are not processed promptly to separate serum from RBC’s.
See:	 Lactate Dehydrogenase-Other, Body Fluid
Methodology	UV Assay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lactate Dehydrogenase-Other

Laboratory	Chemistry
Order Code	LDO
CPT Code	83615
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, or urine.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Lactate Dehydrogenase (LD), Plasma
Methodology	UV assay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lactoferrin

Laboratory	Commercial Mail-out Laboratory
Order Code	FECLACTO
CPT Code	83630
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Feces specimen, stool contain </tr> </table>
Minimum	5 g stool in a clean, leak-proof container
Rejection Criteria:	Samples preservatives other than Cary-Blair.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	24 hours upon receipt at reference laboratory
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lamellar Body Count

Laboratory	Hematology
Order Code	LBC
CPT Code	83664
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	1 mL Amniotic Fluid
Reference Range	Percent Risk of Respiratory Distress Relative to Gestational Age (GA) and Lamellar Body Count of Amniotic Fluid ---------- <pre> Lamellar body count Weeks Gestation (#/μL x10⁻³) 34 35 36 37 38 39 40 ---------- <16 74 72 71 70 68 67 66 16-20 47 46 44 42 41 39 38 21-25 33 31 30 28 27 26 25 26-30 21 20 19 18 17 16 15 31-35 12 12 11 10 10 9 9 36-40 7 7 6 6 5 5 5 41-45 4 4 3 3 3 3 3 46-50 2 2 2 2 2 2 1 51-55 1 1 1 1 1 1 1 56-60 <1 <1 <1 1 1 <1 <1 61-65 <1 <1 <1 <1 <1 <1 <1 66-70 <1 <1 <1 <1 <1 <1 <1 From: Karcher R, Sykes E, Batton D, Uddin Z, Ross G, Hockman E, Shade GH Jr. Gestational age-specific predicted risk of neonatal respiratory distress syndrome using lamellar body count and surfactant-to-albumin ratio or amniotic fluid. Am J Obstet Gynecol 193(5):1680-1684, 2005.</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	If amniotic fluid contains meconium or blood, the LBC is cancelled and a PG (phosphatidyl glycerol) ordered. Patient will be charged for a PG only. This test replaces the "Fetal Lung Maturity" test.
Methodology	Flow cytometry
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lamictal

See:	 Lamotrigine (Lamictal), Whole Blood

Lamin (LMNA) Full Gene Sequence with Interpretation

Laboratory	Molecular Pathology
Order Code	LAMINT
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult minimum: 3 mL whole blood in lavender top (EDTA) tube. Children minimum: 2 mL whole blood in lavender top (EDTA) tube. Optional specimen type: Formalin Fixed paraffin embedded tissue; Fresh Frozen tissue. Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing.</pre>
Rejection Criteria:	Testing requires a dedicated collection tube.
Reference Range	Normal
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Methodology	Sequence analysis of the coding region of the LAMIN A/C gene.
Analytic Time	21 days
Testing Schedule	Weekly

Lamotrigine (Lamictal)

Laboratory	Chemistry
Order Code	LAMT
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	5 mL pink top tube (adults) or TWO EDTA microtainers (pediatric patients).
Rejection Criteria:	Gel separator tubes
Reference Range	Therapeutic range: 3 - 14 mcg/mL.
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	The proposed therapeutic range for seizure control is 3 - 14 mcg/mL. Concentrations that exceed 15 mcg/mL may contribute to adverse effects. Pharmacokinetics varies widely, particularly with co-medications and/or compromised renal function.
Methodology	Enzyme Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lanoxin

See:	 Digoxin, Plasma

LAP

See:	 Leukocyte Alkaline Phosphatase, Whole Blood

LARGE Full Gene Sequencing with Interpretation

Laboratory	Molecular Pathology
Order Code	LARGE
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Adult Minimum: 3 mL blood in lavender top (EDTA) tube. Children Minimum: 2 mL blood in lavender top (EDTA) tube. Optional specimen type: Formalin Fixed paraffin embedded tissue; Fresh Frozen tissue. Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing.
Rejection Criteria:	Testing requires a dedicated collection tube.
Reference Range	Normal
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	PCR followed by sequence analysis of the coding regions of the LARGE gene.
Analytic Time	21 days
Testing Schedule	Weekly

Latex Agglutinins

See:	 Rheumatoid Factor, Plasma

LD

See:	 Lactate Dehydrogenase (LD), Plasma

LDH

See:	 Lactate Dehydrogenase (LD), Plasma

LDH Isoenzymes

Laboratory	Commercial Mail-out Laboratory
Order Code	LDISO
CPT Code	83615 LD Total, 83625 LD Isoenzyme
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum Absolute Minimum: 0.6 mL serum
Rejection Criteria:	Specimens collected with EDTA, potassium oxalate, or sodium fluoride anticoagulants. Frozen, refrigerated, or hemolyzed specimens.
Reference Range	<pre> Components Reference Interval LD-1 14-27% of total LD-2 29-42% of total LD-3 18-30% of total LD-4 8-15% of total LD-5 6-23% of total Lactate Dehydrogenase, Total 0 up to 30 days: 200-465 U/L 30 days-17 mos: 200-450 U/L 18 mos-10 yrs: 165-430 U/L 11 yrs-16 yrs: 127-287 U/L 17 yrs & over: 105-230 U/L</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Note: LD-1 and LD-2 are elevated in hemolyzed specimens and serum which has not been separated from cells. LD-3, LD-4, and LD-5 are labile at low temperatures, and are erroneously low in specimens that have been refrigerated or frozen.
Methodology	Enzymatic/Electrophoresis
Analytic Time	2 working days upon receipt at reference laboratory

LDH-Other

See:
Lactate Dehydrogenase-Other, Body Fluid

LDL

See:
Cholesterol, Low-Density Lipoprotein (calculated), Plasma

Low Density Cholesterol Measured, Plasma

LE Preparation

See:
Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum

Lead

Laboratory: Commercial Mail-out Laboratory
Order Code: UPB
CPT Code: 83655
Collection Medium:

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<table>
<tr>
<td align=center><a href="javascript:larger_tube('26.jpg')"></a></td></tr
<tr>
<td width="110" valign="top" align="center">Urine - 24 hour/timed plastic
</tr>
</table>
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Minimum: Preferred Minimum: 8 mL aliquot from 24 hour collection.
Random urine is also accepted at reference lab.
Refrigerate during collection and submission.

Absolute Minimum: 1 mL aliquot from 24 hour collection.
Random urine is also accepted at reference lab.
Refrigerate during collection and submission.

Random collection is acceptable, no reference ranges will apply.

Rejection Criteria: Urine collected within 48 hours after administration of a gadolinium (Gd) containing contrast media (may occur with MRI studies). Acid perserved urine.

Reference Range:

<pre>

COMPONENTS	REFERENCE INTERVAL
Lead, Urine	0 - 23 μg/L
Lead, Urine (24-hour)	0 - 31 μg/d
Lead per gm of Creatinine	No reference interval (μg/g CRT)

Creatinine (24-hour) mg/d	Male	Female
	3-8 yrs: 140-700	3-8 yrs: 140-700
	9-12 yrs: 300-1300	9-12 yrs: 300-1300
	13-17 yrs: 500-2300	13-17 yrs: 400-1600
	18-50 yrs: 1000-2500	18-50 yrs: 700-1600
	51-80 yrs: 800-2100	51-80 yrs: 500-1400
	81 yrs+: 600-2000	81 yrs+: 400-1300

</pre>

Order Form: A-1a Miscellaneous Request or Epic Req
See Appendix: See Additional Information:
Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology: Quantitative Inductively Coupled Plasma/Mass Spectrometry
Analytic Time: 3 days upon receipt at reference laboratory

Lead

Laboratory	Chemistry
Order Code	BLPB
CPT Code	83655
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL lavender top tube (EDTA), green top tube (Heparin), or special trace metals tube or ONE lavender top (EDTA) microtube for pediatric patients. It is recommended that patients at high risk for having elevated lead concentrations have a venous (as opposed to capillary) sample drawn to facilitate confirmatory testing if blood lead concentration exceeds 15 μg/dL.
Reference Range	<pre> Children: <10 ug/dL Adults: <10 ug/dL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Methodology of blood lead testing changed on 4/20/2011 from atomic absorption (AA) to the LeadCare II instrument. This allows for 24/7 availability of lead concentrations compared to the previous schedule of routine testing performed only one day/week. By state of Iowa requirements, all lead concentrations of 15 μg/dL or greater by the LeadCare II instrument must be confirmed with a venous sample analyzed by a reference method such as atomic absorption or inductively-coupled plasma mass spectrometry (ICP-MS). This requirement is fulfilled by having the test "LEAD, VENOUS CONFIRMATION BY ICP-MS" (Epic LAB7479) available. For the confirmatory test, only a venous specimen is acceptable (i.e., no capillary sample allowable). If the lead concentration is 15 μg/dL or greater by LeadCare II test and sufficient venous specimen is available for confirmatory testing, the Clinical Chemistry laboratory will reflexively send out the confirmatory testing and the following comment will be appended to the LeadCare II result: "This venous specimen has a blood lead concentration of 15 μg/dL by the LeadCare II instrument and has been sent-out for confirmation by a reference method. This is in accord with state of Iowa requirements. Contact Medical Director at 384-9380 with questions." If the lead concentration is 15 μg/dL or greater by LeadCare II but insufficient specimen is available for confirmatory testing (which includes all capillary samples), the ordering clinician will be contacted and informed of the state of Iowa requirement for obtaining a venous confirmatory specimen at a future visit. The following comment will be appended to the LeadCare II results. "This venous specimen has a blood lead concentration of 15 μg/dL by the LeadCare II instrument but does not have sufficient specimen for confirmatory testing. By state of Iowa requirements, the patient must have a follow-up venous sample analyzed by a reference method (orderable as "LEAD, VENOUS CONFIRMATION BY ICP-MS" in Epic). Contact Medical Director at 384-9380 with questions."
See:	 Lead, Confirmation by ICP-MS, Blood (Venous)
Methodology	Electrochemical
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lead Screen

See:	 Lead, Whole Blood, by LeadCare II

Lead, Confirmation by ICP-MS

Laboratory	Commercial Mail-out Laboratory
Order Code	LEADV
CPT Code	83655
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	7 mL blood in royal blue tube
Rejection Criteria:	Heparin anticoagulant. Frozen specimens.
Reference Range	0.0-4.9 μg/dL <pre> <u>Concentration</u> <u>Comment</u> 5-9.9 μg/dL Adverse health effects are possible, particularly in children under 6 years of age and pregnant women. Discuss health risks associated with continued lead exposure. For children and women who are or may become pregnant, reduce lead exposure. 10-19.9 μg/dL Reduced lead exposure and increased biological monitoring are recommended. 20-69.9 μg/dL Removal from lead exposure and prompt medical evaluation are recommended. Consider chelation therapy when concentrations exceed 50 μg/dL and symptoms of lead toxicity are present. >69.9 μg/dL Critical. Immediate medical evaluation is recommended. Consider chelation therapy when symptoms of lead toxicity are present.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Lead, Whole Blood, by LeadCare II
Methodology	Quantitative Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	1-2 days upon receipt at reference laboratory

Leflunomide as Metabolite Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	TERI
CPT Code	82542
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum from red top tube
Rejection Criteria:	Gross Hemolysis and Lipemia.
Reference Range	Therapeutic: >40 mcg/mL Elimination: <0.020 mcg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful For</u>: Therapeutic monitoring of patients actively taking leflunomide Assessment of elimination in patients requiring enhanced elimination of the drug
Methodology	High Turbulence Liquid Chromatography˘Tandem Mass Spectrometry (HTLC-MS/MS)
Analytic Time	5 days upon receipt at reference laboratory

Legionella Antigen

Laboratory	Microbiology
Order Code	C LEGU
CPT Code	87450
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine</td> </tr> </table>
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Send urine to laboratory as soon as possible after collection.
Methodology	Direct antigen detection
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Leiden Variant Factor 5 & F2 1199GA Variant Factor 2 with Interpretation

Laboratory	Molecular Pathology
Order Code	PROTPCR
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult mimimum: 3 mL whole blood in lavender top tube (EDTA) Children minimum: 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Reference Range	Normal
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Genomic DNA is PCR amplified and the presence of the Factor 5 Leiden and Factor 2 mutations associated with venous thrombosis are assessed simultaneously by gel electrophoresis.
Methodology	Polymerase Chain Reaction (PCR) - Amplification Refractory Mutation Systems (ARMS)
Analytic Time	14 days
Testing Schedule	Weekly

Leptin, Quant by Chemiluminescents Immunoassay

Laboratory	Commercial Mail-out Laboratory
Order Code	LEPTIN
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL of serum from fasting patient
Rejection Criteria:	Non-fasting specimens. Icteric or severely hemolyzed specimens.
Reference Range	0-17 years: Not Established Adult Male: 0.5-12.7 ng/mL Adult Female: 0.5-15.2 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Quantitative Chemiluminescent Immunoassay
Analytic Time	1-5 days upon receipt at reference laboratory

Leptospira Antibody, IgM by Dot Blot

Laboratory	Commercial Mail-out Laboratory
Order Code	LEPTO
CPT Code	86720
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum in red top tube Absolute Minimum: 0.05 mL serum in red top tube
Rejection Criteria:	Severely lipemic, hemolyzed, heat-inactivated, or contaminated specimens. Any other body fluid.
Reference Range	Negative: No significant level of Leptospira IgM antibody detected. Equivocal: Questionable presence of Leptospira IgM antibody detected. Repeat testing in 10-14 days may be helpful. Positive: Presence of IgM antibody to Leptospira detected, suggestive of a current or recent infection.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Dot Blot
Analytic Time	1-5 days upon receipt at reference laboratory.

Leucine

See:	 Amino Acids, Quantitative, Plasma

Leukocyte Adhesion Deficiency Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	LAD
CPT Code	86356 CD11b; 86356 CD15; 86356 CD18
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/green_4ml.png" class <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Alternate Collection Media:	Light Green top tube (Lithium Heparin)
Minimum	Draw TWO 4 mL green (sodium or lithium heparin) to send 5 mL preferred Minimum. Client must supply a CBC and a differential with the whole blood specimen. The differential must include eosinophil and basophil counts.
Rejection Criteria:	Clotted specimens. Frozen or room temperature specimens. Specimens greater than 48 hours.
Reference Range	<pre>Effective: August 20, 2012 Component Reference Interval % CD11b 93-100% % CD15 93-100% % CD18 93-100% </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Semi-Quantitative Flow Cytometry
Analytic Time	1-3 days upon receipt in reference laboratory

Leukocyte Alkaline Phosphatase

Laboratory	Commercial Mail-out Laboratory
Order Code	LAP
CPT Code	85540
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Alternate Collection Media:	Light Green top tube (Lithium Heparin)
Minimum	<pre> Adult preferred minimum: 5 mL whole blood from green top tube AND six unfixed, well-prepared smears (smears to be prepared by lab). Adult absolute minimum: 3 mL whole blood from green top tube AND six unfixed, well-prepared smears (smears to be prepared by lab). Pediatric minimum: 1 mL whole blood from green top tube AND six unfixed, well-prepared smears (smears to be prepared by lab).</pre>
Rejection Criteria:	Specimen must be received at reference laboratory within 24 hours of collection; do not collect on Fridays, holidays, day before a holiday, or weekends; specimens collected in EDTA tubes, poorly prepared smears (too thick or no feather edge), broken smears, fixed smears.
Reference Range	<pre> Female: 33-149 (no units) Male: 22-124 (no units)</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> PLEASE NOTE: ALL slides will be prepared by the Core laboratory staff from the green top (Na or Lithium Heparin) tube submitted for the reference laboratory. When only unfixed smears are submitted, the slides must be received within 72 hours of preparation; protect from light and pack accordingly to avoid breakage.</pre>
Methodology	Cytochemical Stain
Analytic Time	5 days upon receipt at reference laboratory

Leukocyte Lysosomal Enzyme Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	LESB
CPT Code	82657, 82658
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Alternate Collection Media:	Light Green top tube (Lithium Heparin)
Minimum	<pre> Preferred Minimum: 8-10 mL whole blood Absolute Minimum: 2.0 mL whole blood If draw is difficult, obtain as much as possible.</pre>
Rejection Criteria:	Mix well, sample is only viable for 24 hours. Collect Monday through Thursday only; do not collect on Fridays, holidays, day before a holiday, or weekends.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient information sheet, available from Specimen Control 6240 RCP, must accompany the specimen. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	4 weeks
Testing Schedule	Test available Monday through Thursday only.

Levetiracetam

See:	 Keppra (Levetiracetam), Whole Blood

LH

See:	 Luteinizing Hormone (LH), Plasma

Lidocaine

Laboratory	Chemistry
Order Code	LIDO
CPT Code	80176
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL light green top tube or ONE microtainer.
Reference Range	<pre> 1.5-5.0 mcg/mL Critical value: >5 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	Availability: As needed.
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Enzyme Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Light Chains

See:	 Kappa/Lambda Quant Free Light Chain Ratio, Blood, Blood

Limb Girdle Muscular Dystrophy (LGMD)

Laboratory	Histopathology
CPT Code	<pre> 88305 Muscle Biopsy (technical and professional) 88346x Number of Immunofluorescent Stains (technical and professional) 88331 Frozen Section H&E (technical and professional)</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Methodology	Immunofluorescence
Analytic Time	1 week
Testing Schedule	0800-1700 Monday through Friday. For additional services, contact the Histopathology Laboratory at 356-2140 or contact Dr. Steve Moore at pager #5197.

Limb Girdle Muscular Dystrophy type 1B

See:	 Lamin (LMNA) Full Gene Sequence with Interpretation, Whole Blood

Limb Girdle Muscular Dystrophy type 2A

See:	 Calpain 3 Full Gene Sequence with Interpretation, Whole Blood

Limb Girdle Muscular Dystrophy type 2B (Dysferlin sequencing)

See:	 Dysferlin (DYSF) Full Gene Sequence with Interpretation, Whole Blood

Limb Girdle Muscular Dystrophy type 2I

See:	 FKRP Full Gene Sequence with Interpretation, Whole Blood

Limb Girdle Muscular Dystrophy type 2K

See:	 POMT1 Full Gene Sequence with Interpretation, Whole Blood

Limb Girdle Muscular Dystrophy type 2M

See:	 Fukutin (FKTN) Full Gene Sequence with Interpretation, Whole Blood

Limb Girdle Muscular Dystrophy type 2N

See:	 POMT2 Full Gene Sequence with Interpretation, Whole Blood

Limb Girdle Muscular Dystrophy type 2O

See:	 POMGNT1 Full Gene Sequence with Interpretation, Whole Blood

Limb Girdle Muscular Dystrophy, Autosomal Recessive Common Mutation Panel with FKRP sequencing

Laboratory	Molecular Pathology
CPT Code	81479, 81404
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults - 3 mL whole blood in lavender top tube (EDTA) Children - 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Direct detection of mutations for alpha sarcoglycan R77C, beta sarcoglycan S114F and fukutin-related protein L276I is performed initially followed by sequencing of FKRP.
See:	 FKRP Full Gene Sequence with Interpretation, Whole Blood Limb-Girdle Muscular Dystrophy (LGMD), Autosomal Recessive Common Variants with Interpretation, Whole Blood
Analytic Time	21 days

Limb-Girdle Muscular Dystrophy (LGMD), Autosomal Recessive Common Variants with Interpretation

Laboratory	Molecular Pathology
Order Code	LGPCR
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults - 3 mL whole blood in lavender top tube (EDTA) Children - 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube. Do not freeze.</pre>
Reference Range	By report
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Direct detection of mutations for alpha sarcoglycan R77C, beta sarcoglycan S114F and fukutin-related protein L276I.
See:	 FKRP Full Gene Sequence with Interpretation, Whole Blood Limb Girdle Muscular Dystrophy (LGMD), Muscle Biopsy
Methodology	Polymerase Chain Reaction - Amplification Refractory Mutation System (ARMS).
Analytic Time	2 weeks
Testing Schedule	0800-1700 Testing offered once per week excluding weekends and University holidays.

Linezolid Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	LINE
CPT Code	80299
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	2 mL serum in a red-top tube
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Recommended times of collection: 2 hours (peak) and 6 hours (trough) after dosage. Please print, complete and submit the following requisition to the lab, with the specimen and the A-1a Miscellaneous Request, following referral laboratory instructions. Infectiou Disease Pharmacokinetics Laboratory Requisition
Analytic Time	1 week upon receipt at reference laboratory

Lipase-Other

Laboratory	Chemistry
Order Code	LPSEO
CPT Code	83690
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Lipase, Plasma
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lipase

Laboratory	Chemistry
Order Code	LPSE
CPT Code	83690
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or ONE microtainer for pediatric patients.
Reference Range	13-60 U/L
Order Form:	A-1a General Lab or Epic Req
See:	 Lipase-Other, Body Fluid
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lipid Laden Macrophage Count

Comments	The presence of lipid laden macrophages in a bronchioalveolar lavage specimen has been reported to be a potential indicator of recurrent aspiration of food in the lungs. The lavage specimen is processed in Cytopathology. For specimen handling see Bronchioalveolar Lavage (BAL).
See:	 Bronchioalveolar Lavage (BAL) for Cancer Evaluation, Bronchioalveolar Lavage

Lipid Panel

Laboratory	Chemistry
Order Code	LIPP
CPT Code	80061
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood or ONE microtainer
Reference Range	Refer to individual components.
Comments	Fasting for at least 8 hours prior to collection is recommended. This panel includes the tests for plasma total cholesterol, high-density lipoprotein (HDL), and triglycerides, as well as the calculated parameters low-density lipoprotein-calculated (LDL-C) and non-HDL-C. See below for links to the individual tests.
See:	 Cholesterol, High-Density Lipoprotein, Plasma Cholesterol, Low-Density Lipoprotein (calculated), Plasma Cholesterol, Plasma Triglycerides, Plasma
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Refer to individual components.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lipoprotein (a)

Laboratory	Commercial Mail-out Laboratory
Order Code	LIPOA
CPT Code	83695
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	0.4 mL serum
Reference Range	Lp(a) CHOLESTEROL Normal: <3 mg/dL Suggests increased risk of coronary artery disease: > or =3 mg/dL LpX Undetectable
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful For</u>: Evaluation of increased risk for cardiovascular disease and events: -Most appropriately measured in individuals at intermediate risk for cardiovascular disease according to the individuals' Framingham risk score -Patients with early atherosclerosis or strong family history of early atherosclerosis without explanation by traditional risk factors should also be considered for testing <u>Cautions</u>: Lp(a) cholesterol values should not be confused with Lp(a) mass values, although they are highly correlated. Lp(a) cholesterol values will be approximately 10X lower than Lp(a) mass values, but the difference between the measures is not uniform. Lp(a) mass values are considered elevated when >30 mg/dL. Lp(a) cholesterol is increased if > or =3 mg/dL. <u>Clinical Information</u>: Lipoprotein (a) (Lp[a]) is a highly heterogeneous molecule, consisting of a low-density lipoprotein (LDL) with a highly glycosylated apolipoprotein(a) (apo[a]) covalently linked to the apolipoprotein B moiety of LDL via a single disulfate bond. Lp(a) has been associated with atherogenesis and promotion of thrombosis. Increased levels of Lp (a) have been estimated to confer a 1.5 to 3.0-fold increased risk for coronary artery disease (CAD) in many but not all studies. Apo(a) has approximately 80% structural homology with plasminogen, but does not contain the active site for fibrin cleavage. One proposed mechanism for Lp(a)'s atherogenicity is competition for binding sites with plasminogen during fibrin clot formation and the resulting inhibition of fibrinolysis. Recently a high correlation was demonstrated between Lp (a) and oxidized LDL, suggesting that the atherogenicity of Lp(a) lipoprotein may be mediated in part by associated proinflammatory oxidized phospholipids. Lack of standardization of assays and apo(a) heterogeneity may partially account for these discrepancies. The heterogeneity of Lp(a) arises mainly from the variable number of kringle repeats in the apo(a) portion of the molecule. Kringles are specific structural domains containing 3 intra-strand disulfide bonds that are highly homologous to similar repeats found in plasminogen. In the clinical laboratory, immunologic methods are generally used to quantify Lp(a) protein mass. Reagents for Lp(a) mass measurement are available from multiple manufacturers and although standardization efforts are underway, currently available methods are not standardized. Difficulties in standardizing Lp(a) mass measurement arise from the variability in signals produced by different reagents due to the size polymorphisms of apo(a). For this reason, some elevations of Lp(a) mass are associated with low levels of Lp(a) cholesterol. Lp(a)

	quantification can be done by densitometric measurem cholesterol. This method measures only the cholester Lp(a) particles and is thus not influenced by the re apo(a) size, it may provide a more specific assessme cardiovascular risk than Lp(a) mass measurement. Lp(measurement may be used in concert with Lp(a) mass d may be used as a stand-alone test for assessment of
Methodology	Electrophoresis, Enzyme Staining, and Densitometry
Analytic Time	2 days upon receipt at reference laboratory (not rep or Sunday).

Lipoprotein Profile

```
                 Laboratory  Commercial Mail-out Laboratory
                 Order Code  BETAQ
                   CPT Code  80061 Lipid panel(includes HDL, total cholesterol and triglyceride),
                             82172 Apolipoprotein B, 82664 Lipoprotein A Cholesterol Electrophoresis
          Collection Medium  <table>
                             <tr>
                             <td align=center></td><td rowspan=2 width=20 align=center>and</td>
                             <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm
                             <tr>
                             <td width="110" valign="top" align="center">Red top tube</td>
                             <td width="110" valign="top" align="center">Red top tube</td>
                             </tr>
                             </table>

                     Minimum  <pre>
                             Adult Minimum: 10 mL whole blood in TWO 5 mL red top tubes to yield
                               (Min: 2.0 mL serum)

                             Pediatric Minimum: 5 mL whole blood in ONE red top tube to yield
                               (Min: 2.0 mL serum)</pre>
           Reference Range  <pre>
                             The National Cholesterol Education Program (NCEP) has set the following
                             guidelines for lipids (total cholesterol; triglycerides; HDL; and LDL
                             cholesterol) in adults ages 18 and up:

                             TOTAL CHOLESTEROL
                             Optimal: <200 mg/dL
                             Borderline high: 200-239 mg/dL
                             High: > or =240 mg/dL

                             TRIGLYCERIDES
                             Normal: <150 mg/dL
                             Borderline: 150-199 mg/dL
                             High: 200-499 mg/dL
                             Very high: > or =500 mg/dL

                             HDL CHOLESTEROL
                             Low: <40 mg/dL
                             Normal: 40-59mg/dL
                             Desirable: > or = 60 mg/dL

                             LDL CHOLESTEROL
                             Optimal: <100 mg/dL
                             Near Optimal: 100-129 mg/dL
                             Borderline: 130-159 mg/dL
                             High: 160-189 mg/dL
                             Very high: > or =190 mg/dL

                             The National Cholesterol Education Program (NCEP) and National Health
                             and Nutrition Examination Survey (NHANES) have set the following
                             guidelines for lipids (total cholesterol, triglycerides, HDL, and LDL
                             cholesterol) in children ages 2-17:

                             TOTAL CHOLESTEROL
                             Desirable: < 170 mg/dL
                             Borderline high: 170 -199 mg/dL
                             High: > or =200 mg/dL

                             TRIGLYCERIDES
                             Normal: <90 mg/dL
                             Borderline high: 90-129 mg/dL
                             High: > or =130 mg/dL

                             HDL CHOLESTEROL
                             Low: <40 mg/dL
                             Normal: 40-59mg/dL
                             Desirable: > or = 60 mg/dL

                             LDL CHOLESTEROL
                             Desirable: <110 mg/dL
                             Borderline high: 110-129 mg/dL
                             High: > or =130 mg/dL
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APOLIPOPROTEIN B
Males and females > or = 18 years: 48-124 mg/dL

VLDL CHOLESTEROL
<30 mg/dL

VLDL TRIGLYCERIDES
<120 mg/dL

BETA-VLDL CHOLESTEROL
<15 mg/dL

BETA-VLDL TRIGLYCERIDES
<15 mg/dL

CHYLOMICRON CHOLESTEROL
Undetectable

CHYLOMICRON TRIGLYCERIDES
Undetectable

LP(A) CHOLESTEROL
Desirable: <3 mg/dL
Values > or = 3 mg/dL may suggest increased risk of
disease.

LpX
Undetectable</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Ultracentrifugation/Electrophoresis/Automated Enzyma Analysis
Analytic Time	4 working days upon receipt at reference laboratory

Lipoprotein-Associated Phospholipase A2

Laboratory	Commercial Mail-out Laboratory
Order Code	PLAC
CPT Code	83698
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum Absolute Minimum: 0.2 mL serum</pre>
Rejection Criteria:	Whole blood
Reference Range	0-234 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	5 days upon receipt at reference laboratory

Lithium

Laboratory	Chemistry
Order Code	LITH
CPT Code	80178
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Red top tube
Minimum	3 mL in a pink top tube or ONE EDTA microtainers
Reference Range	Usual therapeutic range 1.00 to 1.2 mEq/l at steady state (12 hr after dose). Critical value: >1.4 mEq/l
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Spectrophotometry
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Liver-Kidney Microsomal Antibody (LKM)

Laboratory	Immunopathology
Order Code	LKM
CPT Code	86256
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult- 5 ml; red top tube Pediatric- 2ml; red top tube</pre>
Reference Range	<1:10 Titer
Order Form:	A-1a Immunopathology or Epic Req
Methodology	Indirect Immunofluorescence
Analytic Time	1 week
Testing Schedule	Weekly

LKM

See:	 Liver-Kidney Microsomal Antibody (LKM), Serum

LMNA-Related Dilated Cardiomyopathy, CMD1A

See:	 Lamin (LMNA) Full Gene Sequence with Interpretation, Whole Blood

LMWH (Low Molecular Weight Heparin)

See:	 Heparin, Low Molecular Weight (Xa Inhibition), Citrated Plasma

Long QT Syndrome Full Sequence Analysis

Laboratory	Commercial Mail-out Laboratory
Order Code	LQTS
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	4 mL Whole Blood in pink K2EDTA tube
Reference Range	See report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre>This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Genetic analysis is very important for identifying all mutation carriers within the LQTS family. Once identified, silent carriers of LQTS genetic defects may be treated with beta-blockers for prophylaxis of life-threatening arrhythmias. Furthermore, silent mutation carriers should receive genetic counseling to learn about the risk of transmitting LQTS to offspring. In patients affects by LQTS, genetic analysis is useful for risk stratification and for making therapeutic decisions. Risk Stratification *Genetic testing is often useful in probands with a clinical diagnosis of LQTS to provide more accurate risk stratification and to guide therapeutic strategies. *It has been shown that the interplay between genetic defect, QT duration, and gender may provide an algorithm for risk stratification. Genetic testing that can detect a mutation which may cause cardiac channelopathies, rare, potentially lethal heart conditions. The tests can reduce uncertainty and find the specific causes of cardiac channelopathies, the test can: *Help diagnose a patient’s disease *Guide treatment options *Determine whether family members are at risk Patients presenting with: -Unexplained syncope -Onset of symptoms typically occurs during childhood and adolescence -Family Hx of sudden cardiac death -Unexplained VT/VF or TdP -Prolonged QT interval KCNQ1 (LQT1) KCNH2 (LQT1) SCN5A (LQT3) KCNE1 (LQTS) KCNE2 (LQT6)</pre>
Analytic Time	4-6 weeks

Lorazepam Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	LORAZ
CPT Code	80154
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Dose-Related Range: 50 - 240 ng/mL - Based on dosages up to 10 mg/d Toxic: > 300 ng/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Avoid use of separator tubes and gels.
Methodology	High Performance Liquid Chromatography
Analytic Time	4 days upon receipt at reference laboratory

Lovenox

See:	 Heparin, Low Molecular Weight (Xa Inhibition), Citrated Plasma

Low Density Cholesterol Measured

Laboratory	Chemistry
Order Code	LDL
CPT Code	83721
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or ONE microtainer.
Reference Range	< 130- mg/dL (Approved by NCEP, National Cholesterol Education Program) Normal - <100 mg/dL Above Normal - 100-129 mg/dL Borderline High - 130-159 mg/dL High - 160-189 mg/dL Very High - <u>></u>190 mg/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Fasting for at least 8 hours prior to collection is recommended. Non-fasting sample can be used, but they are slightly lower than fasting results. Correlation between calculated LDL and measured LDL is very good. Measured can be used for LDL (measured) non-fasting samples with Triglycerides > 400 mg/dL. Effective 2/20/06: If the triglyceride value is less than 400 md/dL, the measured LDL cholesterol order will be canceled.</pre>
See:	 Cholesterol, Low-Density Lipoprotein (calculated), Plasma
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lung Cancer, ALK FISH

Laboratory	Immunopathology
Order Code	FALK
CPT Code	88368, 88368-26
Reference Range	An interpretative report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Note</u>: Decalcified tissue is not acceptable for this assay. <u>Useful For</u>: Identifying patients with late-stage, non-small cell lung cancers who may benefit from treatment with the drug Xalkori. <u>Cautions</u>: This test is intended to be used for therapeutic purposes in pulmonary carcinoma. This FISH assay does not rule out other chromosome abnormalities. While results may indicate the likely response to ALK inhibitor therapy, selection of treatment remains a clinical decision.
Methodology	Fluorescence In Situ Hybridization (FISH)
Analytic Time	7 days upon receipt.

Lupus Anticoagulant/Antiphospholipid Syndrome

Comments	If you are looking for the Antiphospholipid Syndrome, it is recommended that you collect both the Lupus Anticoagulant and the Cardiolipin Antibodies (IgG and IgM). Please refer to the links below.
See:	 Cardiolipin Antibody, IgG and IgM, Serum Lupus Anticoagulant, Citrated Whole Blood

Lupus Anticoagulant

Laboratory	Hemostasis/Thrombosis
Order Code	LUPUS
CPT Code	PT = 85610 PTT = 85730 MPTT = 85732 FIBG = 85384 TT = 85670 IMPTT = 85557 HPTT = 85525 DVV = 85613 MDVV = 85613 DVVC = 85613 PNP 85597 LUPUSI = 80500 (Pathologist Consult) See Lupus Algorithm for CPT details.
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lt_blue_2.7ml.png" c <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Collect TWO full tubes - 2.7 mL citrated (light blue top) tube
See:	 Cardiolipin Antibody, IgG and IgM, Serum
See Appendix	See Additional Information: Antiphospholipid Syndrome (APS): Laboratory Evaluation Phlebotomy Tubes and Order of Draw
Methodology	A prolonged PTT is investigated to determine the presence of a Lupus Anticoagulant.
Analytic Time	24-36 hours
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Luteinizing Hormone (LH)

Laboratory	Chemistry
Order Code	LH
CPT Code	83002
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers.
Reference Range	<pre> FEMALES - menstruating: Follicular phase 2.4 - 12.6 mIU/mL Ovulation phase 14.0 - 95.6 mIU/mL Luteal phase 1.0 - 11.4 mIU/mL Postmenopause 7.7 - 58.5 mIU/mL MALES: 1.7 - 8.6 mIU/mL AGE MALES FEMALES Prepubertal <0.5 mIU/mL <0.5 mIU/mL Tanner II 0.2-2.8 mIU/mL 0.1-4.1 mIU/mL Tanner III 1.2-3.9 mIU/mL 0.2-9.2 mIU/mL Tanner IV 0.9-4.4 mIU/mL 0.7-8.6 mIU/mL Tanner V 1.8-5.3 mIU/mL 0.5-7.3 mIU/mL</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	New immunoassay method instituted 3/21/00 at 0900.
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Lyme Antibody, IgG & IgM

See:	 B. burgdorferi (Lyme), CSF

Lyme Disease Antibodies (Acute Disease)

Laboratory	Commercial Mail-out Laboratory
Order Code	LYMEA
CPT Code	86618 C6 Peptide; if positive add, 86617 x2 Lyme IgG/IgM
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	3 mL serum
Rejection Criteria:	CSF, contaminated, heat-inactivated, hemolyzed or lipemic specimens.
Reference Range	<u>Borrelia burgdorferi C6 Peptide Antibodies, Total by ELISA</u> <pre> 0.90 LI or less: Negative - C6 peptide antibody to B. burgdorferi not detected. 0.91 - 1.09 LI: Equivocal - Repeat testing in 10-14 days may be helpful. 1.10 LI or greater: Positive - C6 peptide antibody to B. burgdorferi detected. <u>Borrelia burgdorferi Antibody, IgG by Western Blot</u> Negative <u>Borrelia burgdorferi Antibody, IgM by Western Blot</u> Negative</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This panel is appropriate for Lyme disease testing less than four weeks from erythema migrans or onset of disease symptoms. If ELISA result is 1.00 LIV or higher, then IgG and IgM Western blot will be added. Additional charges apply. A negative result indicates that the Western blot evaluation for Borrelia burgdorferi antibody demonstrates no antibodies unique to Borrelia burgdorferi, and therefore is not supportive of Lyme disease. A positive result indicates that the Western blot evaluation for Borrelia burgdorferi antibody is consistent with the presence of antibody produced by patients in response to infection by Borrelia burgdorferi and suggests the presence of Lyme disease. Although the test has been shown to have a high degree of reliability for diagnostic purposes, laboratory data should always be correlated with clinical findings. Current CDC recommendations for the serological diagnosis of Lyme disease are to screen with a polyvalent ELISA test and confirm equivocals and positives with Western blot. Both IgM and IgG Western blots should be performed on specimens obtained less than four weeks after appearance of erythema migrans or disease symptoms. Only IgG Western blot is to be performed on specimens greater than four weeks after disease onset. IgM Western blot in the chronic stage is not recommended and does not aid in the diagnosis of neuroborreliosis or chronic Lyme disease.
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay/Qualitative Western Blot
Analytic Time	1-9 days upon receipt at reference laboratory

Lyme Disease Antibodies (Late Disease)

Laboratory	Commercial Mail-out Laboratory
Order Code	LYMEL
CPT Code	86618 B. burgdorferi total Ab. IgG/IgM; if reflexed, add 86617 Borrelia burgdorferi Western blot IgG
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	3 mL serum
Rejection Criteria:	CSF or plasma. Contaminated, heat-inactivated, hemolyzed, or severely lipemic specimens.
Reference Range	<u>Borrelia burgdorferi Antibodies, Total by ELISA</u> These reference intervals are to be used in the interpretation of Borrelia burgdorferi Total Antibodies, IgG and/or IgM by ELISA result. <pre>0.99 LIV or less Negative - Antibody to Borrelia burgdorferi not detected. 1.00-1.20 LIV Equivocal - Repeat testing in 10-14 days may be helpful. 1.21 LIV or greater Positive - Probable presence of antibody to Borrelia burgdorferi detected. <u>Borrelia burgdorferi Antibody, IgG by Western Blot</u> Negative</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This panel is appropriate for Lyme disease testing greater than four weeks from erythema migrans or onset of disease symptoms. If ELISA result is 1.00 LIV, then IgG Western blot will be added. Additional charges apply. A negative result indicates that the Western blot evaluation for Borrelia burgdorferi antibody demonstrates no antibodies unique to Borrelia burgdorferi, and therefore is not supportive of Lyme disease. A positive result indicates that the Western blot evaluation for Borrelia burgdorferi antibody is consistent with the presence of antibody produced by patients in response to infection by Borrelia burgdorferi and suggests the presence of Lyme disease. Although the test has been shown to have a high degree of reliability for diagnostic purposes, laboratory data should always be correlated with clinical findings. Current CDC recommendations for the serological diagnosis of Lyme disease are to screen with a polyvalent EIA test and confirm equivocal and positive with Western blot. Both IgM and IgG Western blots should be performed on specimens obtained less than four weeks after appearance of erythema migrans. Only IgG Western blot is to be performed on specimens greater than four weeks after disease onset. IgM Western blot in the chronic stage is not recommended and does not aid in the diagnosis of neuroborreliosis or chronic Lyme disease. Please submit requests for appropriate Western blot testing within 10 days.
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay/Qualitative Western Blot
Analytic Time	1-3 days upon receipt at reference laboratory

Lymphocyte Subsets

Laboratory: Flow Cytometry Service

CPT Code: 88184 x1, 88185 x7 Technical, 88187 Professional

Collection Medium:

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<tr>
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<tr>
<td width="110" valign="top" align="center">Yellow top tube (ACD solution
</tr>
</table>

Alternate Collection Media: Lavender top tube 3 mL (EDTA)

Minimum: Adult: 10 mL whole blood in a yellow top tube (ACD solution A)
Pediatric: 2 mL whole blood in a lavender top tube (EDTA)

For absolute quantitative results, a <a
href=
"http://www.healthcare.uiowa.edu/path_handbook/handbook/test396.ht
ml">CBC with Automated Differential must also be ordered.

Reference Range:

<pre>
The pathologist will provide an interpretative report. Antibodies routinely included are: CD3, CD4, CD8, CD14, CD16/56, CD19, CD20 and CD45.

Adult reference ranges for peripheral blood by whole blood lysis method using flow cytometry:

		Absolute Counts
B cells (CD19)	6-22%	53-726/mm3
T cells (CD3)	65-85%	569-2804/mm3
T cells (CD4)	34-62%	298-2045/mm3
T cells (CD8)	14-42%	122-1386/mm3
T helper/induce (CD4+/CD3+)	30-62%	263-2045/mm3
T cytotoxic/suppressor (CD8+/CD3+)	13-37%	114-1221/mm3
NK cells (CD16+/CD56+/CD3-)	5-31%	44-1023/mm3
NK cells (CD56)	5-29%	44-957/mm3
CD4/CD8 ratio	0.9-3.6	

Age specific pediatric reference ranges will be provided with the interpretive report.</pre>

Order Form: A-1a Immunopathology or Epic Req

Comments:

<pre>
Specimens with absolute lymphocyte counts of <100/mm3 will not be tested.</pre>

See Appendix: See Additional Information:
Specimens Requiring Immediate Delivery

Methodology: Flow Cytometry-Whole Blood Lysis

Analytic Time: 2 days

Testing Schedule: 0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Lymphocyte T and B

See:
Lymphocyte Transformation, Antigen, Whole Blood

Lymphocyte Transformation, Mitogen, Whole Blood

Lymphocyte Transformation, Antigen

Laboratory	VA Diagnostic Immunology Lab
Minimum	10 mL; sodium heparin green top. Do not use a needle smaller than 21 gauge.
Reference Range	Internal control and normal range reported with each sample. Responses to recall antigens assesses the function of memory CD4 lymphocytes, response to alloantigen assesses the function of virgin CD4 and CD8 lymphocytes.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This assay is run Monday through Thursday during working hours and Friday 8 a.m. to noon. This assay is run using viable lymphocytes. This assay examines the ability of T cells to respond to Tetanus and Candida recall antigens and to alloantigen. For a global assessment of T lymphocyte function, order 'Lymphocyte Transformation, Spontaneous' and 'Lymphocyte Transformation, Mitogen'.
See:	 Lymphocyte Transformation, Mitogen, Whole Blood

Lymphocyte Transformation, Mitogen

Laboratory	VA Diagnostic Immunology Lab
Minimum	10 mL; sodium heparin green top. Do not use a needle smaller than 21 gauge.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This assay is run Monday through Thursday during working hours and Friday 8 a.m. to noon. This assay is run using viable lymphocytes. This assay examines the ability of lymphocytes (T and B) to respond to a polyclonal stimuli (PHA, CON A, PWM, IL-2, and Anti-CD3). A normal response suggests that the patient's T and B lymphocytes have a normal capacity to proliferate upon encountering an appropriate stimulus. For a global assessment of lymphocyte function, order 'Lymphocyte Transformation, Spontaneous' and 'Lymphocyte Transformation, Mitogen' or 'Lymphocyte Transformation, Battery'.

Lymphocytes, Killer

See:	 Natural Killer (NK) Cells, Enhanced, Whole Blood Natural Killer (NK) Cells, Fresh, Whole Blood

Lymphocytic Choriomeningitis

Laboratory	Commercial Mail-out Laboratory
Order Code	LCM
CPT Code	86727(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum from red top tube Absolute Minimum: 0.2 mL serum from red top tube</pre>
Rejection Criteria:	Contaminated, hemolyzed, or severely lipemic specimens.
Reference Range	<pre> Lymphocytic Choriomeningitis (LCM) Virus Antibody, IgG Less than 1:10 Negative - No significant level of LCM virus IgG antibody detected. Greatern than or equal to 1:10 Positive - Presence of IgG antibody to LCM virus detected, suggestive of current or past infection. Lymphocytic Choriomeningitis (LCM) Virus Antibody, IgM Less than 1:10 Negative - No significant level of LCM virus IgM antibody detected. Greater than or equal to 1:10 Positive - Presence of IgM antibody to LCM virus detected, suggestive of current or past infection. </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Acute and convalescent samples must be labeled as such; parallel testing is preferred and convalescent samples must be received within 30 days from receipt of the acute samples. Please mark sample plainly as "acute" or "convalescent."
Methodology	Semi-Quantitative Indirect Fluorescent Antibody
Analytic Time	1-5 days upon receipt at reference laboratory

Lymphocytic Choriomeningitis (LCM), CSF

Laboratory	Commercial Mail-out Laboratory
Order Code	LCMCSF
CPT Code	86727(x2)
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	<pre> Preferred minimum: 1 mL CSF Absolute minimum: 0.2 mL CSF</pre>
Rejection Criteria:	Heat-inactivated, contaminated or hemolyzed specimens.
Reference Range	<pre> Lymphocytic Choriomeningitis (LCM) Virus Antibody, IgG, CSF Is less than 1:1 Negative - No significant level of LCM virus IgG antibody detected. Is greater than or equal to 1:1 Positive - Presence of IgG antibody to LCM virus detected, suggestive of current or past infection. Lymphocytic Choriomeningitis (LCM) Virus Antibody, IgM, CSF Is less than 1:1 Negative - No significant level of LCM virus IgM antibody detected. Is greatern than or equal to 1:1 Positive - Presence of IgM antibody to LCM virus detected, suggestive of current or past infection. </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Indirect Fluorescent Antibody
Analytic Time	5 days upon receipt at reference laboratory

Lymphocytic Leukemia

See:	 Acute Leukemia, Peripheral Blood, Bone Marrow, or CSF Chronic Lymphocytic Leukemia, Various

Lymphoma

See:	 Chronic Lymphocytic Leukemia, Various

Lysine

See:	 Amino Acids, Quantitative, Plasma Amino Acids, Quantitative, Random Urine

Lysosomal Enzyme Screen

See:	 Leukocyte Lysosomal Enzyme Screen, Whole Blood

Lysozyme

Laboratory	Commercial Mail-out Laboratory
Order Code	LYSO
CPT Code	85549
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum, 0.5 mL CSF, tears or other body fluid in leak-proof container.</pre>
Reference Range	9 - 17 ug/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Serum and urine lysozyme levels may be elevated in acute myelomonocytic leukemia (FAB-M4), chronic myelomonocytic leukemia (CMML), and chronic myelocytic leukemia (CML). Increased serum lysozyme activity is present in tuberculosis, sarcoidosis, megaloblastic anemias, acute bacterial infections, ulcerative colitis, regional enteritis, and Chrohn's disease. Elevated levels of urine and serum lysozyme occur during severe renal insufficiency, renal transplant rejection, urinary tract infections, pyelonephritis, glomerulonephritis, and nephrosis.
Methodology	Radial Immunodiffusion
Analytic Time	5 working days upon receipt at reference laboratory

Lysozyme

Laboratory	Commercial Mail-out Laboratory
Order Code	LYSOU
CPT Code	85549
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 3 mL aliquot from well-mixed random collection Absolute Minimum: 0.5 mL</pre>
Reference Range	< 4 ug/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Radial Immunodiffusion
Analytic Time	5 days upon receipt at reference laboratory

M

Macroprolactin Check

Laboratory	Chemistry
Order Code	MPRO
CPT Code	84146
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood light green top tube or TWO microtainers.
Reference Range	<pre> MALES: 4.0 to 15.2 ng/mL FEMALES: 4.8-23.3 ng/mL</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	The macroprolactin check will only be run on samples that have prolactin concentration above the upper limit of the gender-specific reference range. If prolactin concentration is within or below the gender-specific reference range, the macroprolactin result will be credited and only the prolactin concentration reported. If the prolactin concentration is above the appropriate reference range, the prolactin concentration will be determined with and without treatment with polyethylene glycol (PEG). A decrease of greater than 50% when precipitated with polyethylene glycol indicates the possible presence of macroprolactin and the macroprolactin result will be resulted as "POSITIVE". Prior to September 14, 2010, the laboratory had the routine practice of doing PEG precipitation for all prolactin concentrations greater than the gender-specific reference range. An analysis of results from January 2006-July 2010 revealed that the incidence of macroprolactin in quantities sufficient to cause PEG precipitation results to be less than 50% of the total prolactin concentration is very low (<0.1%). Consequently, the macroprolactin check is now only available by separate order.
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	Monday-Friday batch analysis.

MAG Antibody Titer IgM by IFA

Comments	MAG Antibody, IgM by Western Blot and MAG Antibody Titer IgM by IFA have been replaced by Myelin Associated Glycoprotein (MAG) Antibody, IgM.
See:	 MAG Antibody, IgM, Serum

MAG Antibody, IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	MAG
CPT Code	83516
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.1 mL serum</pre>
Rejection Criteria:	Urine. Contaminated, heat inactivated, hemolyzed, severely lipemic specimens.
Reference Range	Less than 1000 Titer Units (TU)
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-4 days upon receipt at reference laboratory
Testing Schedule	Weekly

MAG Antibody, IgM by Western Blot

Comments	MAG Antibody, IgM by Western Blot and MAG Antibody Titer IgM by IFA have been replaced by Myelin Associated Glycoprotein (MAG) Antibody, IgM.
See:	 MAG Antibody, IgM, Serum

Magnesium

Laboratory	Chemistry
Order Code	URMG
CPT Code	83735
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	10 mL; random specimen (must have 10 mL to titrate)
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Colorimetric Endpoint
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Magnesium

Laboratory	Chemistry
Order Code	UMG
CPT Code	83735
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> 24 hr collection; no preservative; collections other than 24 hr will not be calculated for mg/24 hr.</pre>
Reference Range	60 - 210 mg/24 hours
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Colorimetric Endpoint
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Magnesium-Other

Laboratory	Chemistry
Order Code	MGO
CPT Code	83735
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Magnesium, Plasma
Methodology	Colorimetric endpoint
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Magnesium

Laboratory	Chemistry
Order Code	MG
CPT Code	83735
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients.
Rejection Criteria:	Avoid hemolysis
Reference Range	<pre> 1.5-2.9 mg/dL Critical value: <1.0 mg/dL and >4.7 mg/dL</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Magnesium-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Colorimetric endpoint
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

MAI Complex

See:	 Mycobacterial Culture

Malaria/Filaria

See:	 Blood Parasite Exam (R/O Malaria/Bld Parasites), Blood

Mandibuloacral Dysplasia with Typa A Lipodystrophy, MADA

See:	 Lamin (LMNA) Full Gene Sequence with Interpretation, Whole Blood

Manganese

Laboratory	Commercial Mail-out Laboratory
Order Code	MNS
CPT Code	83785
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	<pre> Adult Preferred = 7 mL whole blood, royal blue K2 EDTA tube. Absolute Minimum = 0.5 mL whole blood, royal blue K2 EDTA tube.</pre>
Rejection Criteria:	Heparin anticoagulant. Frozen apecimens
Reference Range	4.2 - 16.5 μg/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Royal Blue trace metal tube available from Clinical Pathology Core Laboratory, 6240 RCP.
Methodology	Quantitative Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	5 working days upon receipt at reference laboratory

Mannose Binding Lectin

Laboratory	Commercial Mail-out Laboratory
Order Code	MBL
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred minimum: 1 mL serum Absolute minimum: 0.3 mL serum</pre>
Rejection Criteria:	No hemolysis, lipemia, gels or glass tubes.
Reference Range	<pre> Mannose-binding Lectin ng/mL DEFICIENT: <100 NORMAL: >=100 Mannan-binding lectin (MBL) is a plasma collection (c-type lectin) and is considered an important component of the innate immune system. Clinical studies have used 50 or 100 ng/mL to define severe MBL deficiency. MBL is also known to activate the classical complement pathway through its binding to serine proteases MASP-2 and MASP-1. MBL deficiency has been associated with recurrent infections in children 6 months to 17 months of age, during the time when the adaptive immune system (IgG Production) is not fully mature.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme Linked Immunosorbent Immunoassay
Analytic Time	within 10 days upon receipt at reference laboratory

Marfan Syndrome

See:	 FBN1 Gene Analysis Full Gene Sequence, Whole Blood

Marijuana

See:	 THC (Marijuana) Confirmation, Random Urine

Mau

See:	 Microalbumin-Urine, Random, Urine, Random

MCP Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	MCPCD46
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href= "http://www.healthcare.uic from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. <u>The reference laboratory offers a known familial variant test. If you want to order the known familial variant version of the test, please order LAB7839</u>.
Methodology	Oligonucleotide primers have been designed to amplify each exon of MCP. Because MCP contains many non-disease causing polymorphisms, it is sequenced directly using overlapping primer sets.
Analytic Time	3 months

MDMA

See:	 Amphetamines, Urine Confirmation, Urine

Measles (Rubeola) Antibody, IgG

Laboratory	Chemistry
Order Code	MEASL
CPT Code	86765
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers.
Reference Range	Reference range and methodology changed effective 12/11/2012. 0.8 AI or less: Negative - No significant level of detectable measles (rubeola) IgG antibody. 0.9-1.0 AI: Equivocal - Repeat testing in 10-14 days may be helpful. 1.1 AI or greater: Positive - IgG antibody to measles (rubeola) detected, which may indicate a current or past exposure/immunization to measles (rubeola).
Order Form:	A-1a General Lab or Epic Req
Comments	Indicate whether specimen is "ACUTE", "CONVALESCENT" or "RANDOM." RANDOM would be appropriate selection if the test is ordered to determine patient immunity status for measles (e.g., for student or employee health). For workup related to possible measles infection, acute and convalescent specimens must be labeled as such; parallel testing is preferred and convalescent specimens must be received within 30 days from receipt of the acute specimens. Please mark specimen plainly as "ACUTE" or "CONVALESCENT."
Methodology	Multiplex Flow Immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

MECP2 Gene Analysis Dup/Delet Variant

Laboratory	Commercial Mail-out Laboratory
Order Code	RETTD
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	<pre> Adult Minimum: Collect TWO 6 mL pink top (EDTA sprayed) tubes Child Minimum: Collect ONE 6 mL pink top (EDTA sprayed) tube Infant Minimum: 2-6 mL whole blood from pink top (EDTA sprayed) tube Please contact the laboratory for specific requirements for prenatal testing.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the following form with the appropriate signatures, the correct sample type and the A-1a Miscellaneous Request: Molecular Diagnostic Requisition from Baylor College of Medicine (BCM) Medical Genetics Laboratories. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Southern and densitometry analysis for gene rearrangements involving MECP2 exons 1-4.
Analytic Time	3 weeks upon receipt at reference laboratory

MECP2 Gene Analysis Full Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	RETTS
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	<pre> Adult minimum: Collect TWO 6 mL pink top (EDTA sprayed) tubes Child minimum: Collect one FULL 6 mL pink top (EDTA sprayed) tube Infant minimum: 2-4 mL whole blood from pink top (EDTA sprayed) tube Please contact the laboratory for specific requirements for prenatal testing.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the following form with the appropriate signatures, the correct sample type and the A-1a Miscellaneous Request: Molecular Diagnostic Requisition from Baylor College of Medicine (BCM) Medical Genetics Laboratories. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	DNA Sequencing of MECP2 exons 1 through 4 in both directions using a 96- capillary sequencer.
Analytic Time	3 weeks upon receipt at reference laboratory

MECP2 Sequencing

See:	 MECP2 Gene Analysis Full Sequence, Whole Blood

Medical/Legal Specimens

Comments	<pre> Contact the Hospital Mortican at pager #3263 for retrieval of rape evidence kits. Pathology no longer offers services for chain of custody/evidence procedures for collection of urine drug screens.</pre>

MEN1 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	MEN1
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 4 mL whole blood in pink K2EDTA tube Absolute Minimum: 1 mL whole blood in pink K2EDTA tube</pre>
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Also known as: MEN1; Endocrine adenomatosis, multiple; MEA I; Wermer syndrome; Menin Please print, complete and submit the following forms to the lab, with the specimen and the A-1a Miscellaneous Request: Testing and the Sample Submission Form - Testing Services for Rare Mendelian Disorders from GeneDx DNA Diagnostic Experts. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. <u>The reference laboratory offers a known familial variant test. If you want to order the known familial variant version of the test, please order LAB7858</u>.
Methodology	<pre> Analysis is performed by bi-directional sequencing of the coding regions and splice sites of exons 2-10 of the MEN1 gene. Mutations found in the first person of a family to be tested are confirmed by repeat analysis using sequencing, restriction fragment analysis, or other appropriate method. Germline MEN1 gene mutations have been found in 75-90% of patients with a clinical diagnosis of MEN1, regardless of family history. This sequencing approach is expected to identify >95% of existing small intragenic mutations.</pre>
Analytic Time	4 weeks

MEN2A

See:	 RET Gene Analysis Common Variants, Whole Blood

MEN2B

See:	 RET Gene Analysis Common Variants, Whole Blood

Mercury

Laboratory	Commercial Mail-out Laboratory
Order Code	HGU
CPT Code	83825
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 8 mL aliquot from a well-mixed collection from 24 hour collection. Random urine is also accepted at reference lab. Refrigerate during collection and submission. Absolute Minimum: 1 mL aliquot from a well-mixed collection from 24 hour collection. Random urine is also accepted at reference lab. Refrigerate during collection and submission.
Rejection Criteria:	Urine collected within 48 hours after administration of a gadolinium (Gd) containing contrast media (may occur with MRI studies). Acid preserved urine.
Reference Range	<pre>

COMPONENTS	REFERENCE INTERVAL
Mercury, Urine	0-10 μg/L
Mercury, Urine (24-Hour)	0-15 μg/d
Mercury per gram of creatinine	Less than or equal to 35 μg/g CR

Creatinine (24-hour) mg/d	Male	Female
3-8 yrs: 140-700	3-8 yrs: 140-700
9-12 yrs: 300-1300	9-12 yrs: 300-1300
13-17 yrs: 500-2300	13-17 yrs: 400-1600
18-50 yrs: 1000-2500	18-50 yrs: 700-1600
51-80 yrs: 800-2100	51-80 yrs: 500-1400
81 yrs+: 600-2000	81 yrs+: 400-1300

	</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Record total volume and collection time interval on transport tube and on test request form. Stability: Mercury is volatile; concentration may reduce after seven days or more storage. </pre>
See Appendix	See Additional Information: Collection and Preservation of 24-Hour Urine Specimens Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Quantitative Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	4 days upon receipt at reference laboratory

Mercury

Laboratory	Commercial Mail-out Laboratory
Order Code	HGB
CPT Code	83825
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	Preferred Minimum: 7 mL whole blood in royal blue K2 EDTA tube. Absolute Minimum: 1.0 mL whole blood in royal blue K2 EDTA tube.
Rejection Criteria:	Heparin anticoagulant.
Reference Range	0-10 μg/l
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Royal blue, EDTA, trace metal tube is available from Specimen Control, 6240 RCP.
Methodology	Quantitative Antomic Absorption/Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	2 days upon receipt at reference laboratory

Merosin-Deficient Congenital Muscular Dystrophy

Laboratory	Histopathology
Order Code	DMER
CPT Code	<pre> 88305 Muscle Biopsy (technical and professional) 88346x Number of Immunofluorescent Stains (technical and professional) 88331 Frozen Section H&E (technical and professional)</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Methodology	Immunofluorescence
Analytic Time	1 week
Testing Schedule	0800-1700 Monday through Friday. For additional services, contact the Histopathology Laboratory at 356-2140 or contact Dr. Steve Moore at pager #5197.

Metanephrines Total

Laboratory	Commercial Mail-out Laboratory
Order Code	MET24
CPT Code	83835
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 4 mL of a well-mixed urine from 24 hour collection. Random urine is also accepted at reference lab. Refrigerate during collection and submission. Absolute Minimum: 1.5 mL of a well-mixed urine from 24 hour collection. Random urine is also accepted at reference lab. Refrigerate during collection and submission.
Rejection Criteria:	Room temperature specimens.
Reference Range	Reference Intervals for 24 Hour Calculations (24-Hour Urine) <pre>

Components	Reference Interval
Metanephrine	
0-17 years	Not Established
18 years and older	30-350 μg/d
Normetanephrine	
0-17 years	Not Established
18 years and older	50-650 μg/d
Creatinine (24 hr)	
Male	
3-8 years	140-700 mg/d
9-12 years	300-1300 mg/d
13-17 years	500-2300 mg/d
18-50 years	1000-2500 mg/d
51-80 years	800-2100 mg/d
81 years and older	600-2000 mg/d
Female	
3-8 years	140-700 mg/d
9-12 years	300-1300 mg/d
13-17 years	400-1600 mg/d
18-50 years	700-1600 mg/d
51-80 years	500-1400 mg/d
81 years and older	400-1300 mg/d</pre>

Order Form:	A-1a General Lab or Epic Req
Comments	<pre> If screening for Neuroblastoma, the following tests are suggested: CAT24 (Catecholamines, Fractionated; Dopamine is included), HVA24 (Homovanillic Acid), VMA24 (Vanillylmandelic Acid). Secreting neuroendocrine tumors typically are associated with metanephrine or normetanephrine concentrations several times higher than the upper reference intervals. Other reasons for elevated concentrations include intense physical activity, life-threatening illness, and drug interferences. Essential hypertension is often associated with slight elevations (metanephrine less than 3500 nmol/day and normetanephrine less than 4900 nmol/day). Other reasons for slight and moderate elevations include emotional and physical stress and improper specimen collection. </pre>
See:	 Catecholamines, Fractionated, 24 hr Urine Homovanillic Acid, 24 hr Urine Vanillylmandelic Acid, 24 hr Urine
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry

Analytic Time 1-3 days upon receipt at reference laboratory.

Metanephrines Total

Laboratory: Commercial Mail-out Laboratory
Order Code: METUR
CPT Code: 83835
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Yellow top conical tube (no a
</tr>
</table>

Minimum: Preferred Minimum: 4 mL random urine
Absolute Minimum: 1.5 mL random urine
<hr>
Abstain from medications for 72 hours prior to collection.

Rejection Criteria: Room temperature specimens.

Reference Range:

<pre>
Reference Intervals for Ratio-to-Creatinine (CRT) Calculations (Random Urine)

<u>Components</u>	<u>Age</u>	<u>Ref. Interval</u>
Metanephrine	0-3 months	0-700 μg/g crt
	4-6 months	0-650 μg/g crt
	7-11 months	0-650 μg/g crt
	1 year	0-530 μg/g crt
	2-5 years	0-500 μg/g crt
	6-17 years	0-320 μg/g crt
	18 years and older	0-300 μg/g crt
Normetanephrine	0-3 months	0-3400 μg/g crt
	4-6 months	0-2200 μg/g crt
	7-11 months	0-1100 μg/g crt
	1 year	0-1300 μg/g crt
	2-5 years	0-610 μg/g crt
	6-17 years	0-450 μg/g crt
	18 years and older	0-400 μg/g crt</pre>

Order Form: A-1a General Lab or Epic Req

Comments: Secreting neuroendocrine tumors typically are associated with metanephrine or normetanephrine concentrations several times higher than the upper reference intervals. Other reasons for elevated concentrations include intense physical activity, life-threatening illness, and drug interferences. Essential hypertension is often associated with slight elevations (metanephrine less than 3500 nmol/day and normetanephrine less than 4900 nmol/day). Other reasons for slight and moderate elevations include emotional and physical stress and improper specimen collection.

See:
Catecholamines, Fractionated, Random Urine

Homovanillic Acid, Random Urine

Vanillylmandelic Acid, Random Urine

See Appendix: See Additional Information:
Urine Tests Requiring no Preservatives

Methodology: Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry

Analytic Time: 4 working days upon receipt at reference laboratory
1-3 days upon receipt at reference laboratory.

Metanephrines, Free

Laboratory	Commercial Mail-out Laboratory
Order Code	METP
CPT Code	83835
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 2.5 mL plasma from lavender top (EDTA) tube Pediatric Minimum: 1.1 mL plasma from lavender top (EDTA) tube</pre>
Reference Range	<pre> METANEPHRINE, FREE <0.50 nmol/L NORMETANEPHRINE, FREE <0.90 nmol/L </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patients should be relaxed in either a supine or upright position before blood is drawn. Patient should avoid alcohol, coffee, tea, tobacco and strenuous exercise prior to collection. Overnight fasting is preferred.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	High Performance Liquid Chromatography, Electrochemical Detection
Analytic Time	1 week upon receipt at reference laboratory 4 days upon receipt in reference laboratory

Methadone & Metabolite

Laboratory	Commercial Mail-out Laboratory
Order Code	METHU
CPT Code	83840
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 4 mL urine Absolute Minimum: 1 mL urine
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles.
Reference Range	Positive cutoff: 10.0 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-4 days upon receipt in reference laboratory

Methadone Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	METHADO
CPT Code	83840
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Collect TWO full 5 mL plain red top. Preferred Minimum: 4.0 mL serum. Absolute Minimum: 2.0 mL serum Does not allow for sample repeat at reference laboratory if necessary.</pre>
Rejection Criteria:	Separator tubes. Plasma or whole blood collected in lt. blue (sodium citrate). Specimens exposed to repeated freeze/thaw cycles.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-4 days upon receipt at reference laboratory.

Methamphetamine

See:	 Amphetamines, Urine Confirmation, Urine

Methamphetamine &Metabolites Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	METHP
CPT Code	82145
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 4.0 mL serum Adult/Pediatric Absolute Minimum: 2.0 mL serum</pre>
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles. Separator tubes and plasma or whole blood from lt. blue (sodium citrate).
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Gas Chromatography-Mass Spectrometry and/or Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	4 working days upon receipt at reference laboratory

Methanol

See:	 Alcohol, Plasma Ethanol/Volatiles Screen (EVS), Plasma

Methemoglobin

Laboratory	Critical Care Laboratory
Order Code	MHB
CPT Code	83050
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Heparinized syringe or Green </tr> </table>
Minimum	<pre> 0.5 mL in Lithium/Sodium Heparin syringes or, 1 ml whole blood in Lithium/Sodium Heparin green top tube</pre>
Reference Range	<pre> <2% Special Care Nurseries Critical Value: >3%</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required); all needles must be removed from the syringe before delivery.
Methodology	Oximetric
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Methicillin Resistant Staphylococcus aureus

See:	 Staphylococcus aureus (MRSA/MSSA) by PCR, Surveillance Swab Specimen collected from Nares

Methionine

See:	 Amino Acids, Quantitative, Plasma Amino Acids, Quantitative, Random Urine

Methotrexate Assay

Laboratory	Chemistry
Order Code	MTXL
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green lithium heparin tube or ONE microtainer.
Reference Range	<pre> Clinical toxicity following high-dose methotrexate more frequent with serum concentrations: > 10 umol/L at 24 hrs. > 1 umol/L at 48 hrs. > 0.1 umol/L at 72 hrs.</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	<pre> Methotrexate units changed 12/7/2009 from mol/L (molar) to umol/L (micromolar). 1 umol/L = 1 x 10exp-6 mol/L. Analytical method changed 12/9/2010.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	EMIT (Enzyme-multiplied immunoassay technique)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

3-Methylglutaconic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	3METHUR
CPT Code	82543
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 5 mL random urine Pediatric Minimum: 0.5 mL random urine</pre>
Reference Range	0.1 - 7.3 mg/gCR
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the <a href= "http://www.kennedykrieger Biochemical Genetics Requisition to the lab, with the specimen and the A-1a Miscellaneous Request.
Methodology	Gas Chromatography
Analytic Time	2 weeks upon receipt at reference laboratory
Testing Schedule	Monday-Thursday collection, No Saturday delivery.

3-Methylglutaconic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	3METHB
CPT Code	82543
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 1 mL plasma Pediatric Minimum: 0.5 mL plasma</pre>
Reference Range	<pre> 0 - 2 years 144 +/- 58 (SD) nmol/l 3 - 12 years 162 +/- 68 (SD) nmol/l > 12 years 157 +/- 66 (SD) nmol/l</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the <a href= "http://www.kennedykrieger Biochemical Genetics Requisition to the lab, with the specimen and the A-1a Miscellaneous Request.
Methodology	Gas Chromatography
Analytic Time	2 weeks upon receipt at reference laboratory
Testing Schedule	Monday-Thursday collection, No Saturday delivery.

Methylmalonic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	MMAUR
CPT Code	83921
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	<pre> Preferred Minimum: 4 mL urine from a well-mixed 24-hour or random urine collection; refrigerated during collection/ submission to laboratory.</pre>
Rejection Criteria:	Room temperature specimens.
Reference Range	<pre> Components Reference Interval Methylmalonic Acid, Urine 0.0-3.6 mmol/mol CRT Creatinine (24-hour) Male Female 3-8 yrs: 140-700 mg/d 3-8 yrs: 140-700 mg/d 9-12 yrs: 300-1300 mg/d 9-12 yrs: 300-1300 mg/d 13-17 yrs: 500-2300 mg/d 13-17 yrs: 400-1600 mg/d 18-50 yrs: 1000-2500mg/d 18-50 yrs: 700-1600 mg/d 51-80 yrs: 800-2100 mg/d 51-80 yrs: 500-1400 mg/d 81 yrs+: 600-2000 mg/d 81 yrs+: 400-1300 mg/d </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-3 days upon receipt at reference laboratory.

Methylmalonic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	MACID
CPT Code	83921
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL serum
Rejection Criteria:	Room temperature specimens. Grossly hemolyzed or lipemic specimens.
Reference Range	0.00-0.40 μmol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	2 working days upon receipt at reference laboratory

5-Methyltetrahydrofolate

Laboratory	Commercial Mail-out Laboratory
Order Code	5MTHF
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">CSF Collection Tubes</td> </tr> </table>
Minimum	Absolute Minimum: 0.5 mL CSF
Reference Range	<pre> Age (years) (nmol/L) 0-0.2 40-240 0.2-0.5 40-240 0.5-2.0 40-187 2.0-5.0 40-150 5.0-10 40-128 10-15 40-120 Adults 40-120</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit to the lab, the <a href= "http://www.me Metabolic Test Order Form from Medical Neurogenetics, with the specimen and the A-1a Miscellaneous Request.
Analytic Time	2 weeks upon receipt at reference laboratory

Metoprolol (Lopressor) Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	METOPSP
CPT Code	83788
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	<pre> Absolute Adult Minimum: 2.0 mL serum or plasma Absolute Pediatric Minimum: 0.5 mL serum or plasma</pre>
Rejection Criteria:	Gels or separator tubes are not accepted.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	High Performance Liquid Chromatography/Mass Spectrometry
Analytic Time	3-9 days upon receipt at reference laboratory
Testing Schedule	Varies

Metoprolol (Lopressor)

Laboratory	Commercial Mail-out Laboratory
Order Code	METOPU
CPT Code	80299
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	<pre> Preferred Minimum: 2.0 mL Absolute Minimum: adult/peds 0.5 mL)</pre>
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	High Performance Liquid Chromatography/Mass Spectrometry
Analytic Time	Time varies
Testing Schedule	Varies

MIC

See:	 Antimicrobial Susceptibility Profile MIC, (Per Organism)

MICA Genotyping Intermediate Resolution (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	81479
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes. For patients with low white counts-additional tubes are needed. Buccal swabs may be used if normal sample requirements can not be met.
Comments	All HLA Testing is ordered through the University of Iowa Epic System.
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction (PCR) - Sequence Specific Oligonucleotide (SSO)
Analytic Time	Resulting in Epic by 7 working days.
Testing Schedule	Test performed twice weekly.

Microalbumin, Timed Collection

Laboratory	Chemistry
Order Code	MAUTC
CPT Code	82043
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	24 hr urine with no preservative
Reference Range	<pre> Microalbumin/creatine ratio: 0-25 mcg/gm (males) 0-17 mcg/gm (females) Microalbumin mg/day: 2.0-30 mg/day Microalbumin mcg/minute: 0-19.9 mcg/min</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	If collection is less than 24 hrs, "Microalbumin, mg/day" is not calculated.
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Immunoturbidimetric
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Microalbumin-Urine, Random

Laboratory	Chemistry
Order Code	MAUS
CPT Code	82043
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL random urine, no preservative
Reference Range	<20 micrograms microalbumin/milligram creatinine.
Order Form:	A-1a General Lab or Epic Req
Comments	(Creatinine done on sample at no additional charge).
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Microbiology Specimen Collection Procedures

See Appendix	See Additional Information: Microbiology Specimen Collection and Transport

Microbiology: Stool/GI Aspirate

Laboratory	Microbiology
Order Code	STGIREC
CPT Code	87045, 87046, 87427
Collection Medium	Sterile container
Minimum	Submit 10-20 g stool in sterile container. Transport time is less than or equal to 1 hr. Refrigerate if transport is delayed.
Rejection Criteria:	STAT Microbiology requests are not accepted for this specimen type. Specimens from inpatients who are in-house greater than 3 days without preapproval will be rejected.
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> Stool culture only assesses for the presence of (listed roughly in order of prevalence in Iowa) Campylobacter, Salmonella, E. coli O157 and other shiga-toxin producing E. coli, Shigella, and a few other rare enteric pathogens. These are food- or water-borne bacteria that are very unlikely to be acquired in the hospital. Stool cultures are therefore not performed for patients who have been hospitalized greater than 3 days without laboratory consultation (page the microbiology resident on call at 4903 for consultation). Specimens from inpatients who are in-house greater than 3 days without preapproval will be rejected. See "Surveillance Culture" for Bone Marrow Transplant and other immunocompromised patients to detect overgrowth of normal flora by Staph aureus, yeast, or a gram negative bacillus.</pre>
See:	 Bacterial Culture
See Appendix	See Additional Information: Microbiology Specimen Collection and Transport
Analytic Time	Cultures are completed within 2-5 days.
Testing Schedule	0700-2200, 7 days a week, including holidays.

Microsatellite Instability PCR with Interpretation

Laboratory	Molecular Pathology
Order Code	MSI
Minimum	Tumor cells more than 50% of the total tissue and greater than 10mm² in surface area on the block. Must also submit a healthy tissue specimen or peripheral blood from the same subject for comparison of microsatellite markers.
Rejection Criteria:	Specimens fixed in B5 fixative or that have been decalcified will not be accepted. Tumor specimens containing less than 50% tumor cells or are less than 10mm² in area may be unacceptable.
Reference Range	Microsatellite Stable
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Tumor tissue and normal tissue should be obtained as part of the surgical procedure for testing. The tissue should be formalin-fixed, paraffin embedded and reviewed by a surgical pathologist prior to MSI testing. A block containing normal tissue (non-tumor) should be submitted for testing in addition to a block containing at least 50% tumor. Acceptable tissue for the non-tumor block is tissue with a high nuclear content, preferably benign lymph node tissue if available. Blood submitted in EDTA or sodium citrate is acceptable for the normal block if tissue is not available. An H&E stained glass slide from both blocks should also be submitted.
Methodology	Multiplex PCR followed by Fluorescence Capillary Electrophoresis
Analytic Time	7-10 working days
Testing Schedule	Weekly

Microsomal Antibody

See:	 Thyroid Peroxidase Antibody, Plasma

Mismatch Repair Protein Immunohistochemistry

Laboratory	Immunopathology
Order Code	IMMR
CPT Code	"MLH-1, Immunostain" - 88342/(if appropriate) "MSH-2, Immunostain" - 88342/(if appropriate) "MSH-6, Immunostain" - 88342/(if appropriate) "PMS-2, Immunostain" - 88342/(if appropriate)
Collection Medium	Miscellaneous container; contact laboratory
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Mismatch repair protein immunohistochemistry is useful to screen for Lynch syndrome and to determine the functional status of the DNA mismatch repair apparatus. A normal result argues against the presence of Lynch syndrome and indicates with a high degree of specificity that the tumor has proficient mismatch repair function. Microsatellite instability testing is complementary and may be used to confirm a normal result. Depending on the pattern of staining with an abnormal result, additional testing and/or genetic counseling may be indicated. Test results should be interpreted in the context of clinical findings, family history, and other laboratory data. Errors may occur in our interpretation of results if information given to us is inaccurate or incomplete.
Methodology	Immunohistochemical staining is used to determine the presence or absence of protein expression for MLH1, MSH2, MSH6, and PMS2.
Analytic Time	Within 5 days upon receipt

Mito/Met ACGH DNA Analysis

Laboratory	Commercial Mail-out Laboratory
Order Code	MITO
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Draw blood in an EDTA (Pink top) tube(s) and send 3-5 cc (Adults/Children) and 3 cc (Infant<2yrs).
Reference Range	See report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the <a href= "https://www.bcm.edu/gene (mtDNA) Test Requisition from Baylor College of Medicine (BCM) Medical Genetics Laboratories with the appropriate signature, the correct sample type and the A-1a Miscellaneous Request. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Microarray
Analytic Time	28 days upon receipt in reference laboratory

Mitochondrial M2 Ab, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	MITOM2
CPT Code	83516
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Adult/Pediatric Preferred Minimum: 0.5 mL serum
Rejection Criteria:	Plasma. Contaminated, hemolyzed, grossly icteric, or severely lipemic specimens.
Reference Range	<pre> 20.0 Units or less: Negative 20.1-24.9 Units: Equivocal 25.0 Units or greater: Positive </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	24 hours upon receipt at reference laboratory

Mix PTT Panel

Laboratory	Hemostasis/Thrombosis
Order Code	MIX
CPT Code	85730, 85732, 85384, 85670
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top (mix well).
Rejection Criteria:	QNS, clot, excessive hemolysis
Reference Range	PTT = 23-31 sec MPTT = 23-31 sec Fibg = 180-400 mg/dL TT = 15-21 sec
Order Form:	A-1a General Lab or Epic Req
Comments	A MIX testing panel should have its own draw tube and not be combined with other coagulation tests or panels to insure an adequate amount of plasma for testing.
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw
Methodology	Optical clot detection.
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Miyoshi Myopathy

See:	 Dysferlin (DYSF) Full Gene Sequence with Interpretation, Whole Blood

Mo-1 Deficiency

See:	 Leukocyte Adhesion Deficiency Panel, Whole Blood

Molecular Cytogenetics

See:	 Fluorescence In-Situ Hybridization (FISH-Aneuploidy Screening), Peripheral Blood (Newborn or Cord, and Others) Fluorescence In-Situ Hybridization (FISH-Bladder Carcinoma), Voided Urine, Bladder Wash Fluorescence In-Situ Hybridization (FISH-Bone Marrow), Bone Marrow Fluorescence In-Situ Hybridization (FISH-Hematological Blood), Peripheral Blood Fluorescence In-Situ Hybridization (FISH-Microdeletion), Peripheral Blood, Bone Marrow, Fibroblasts, Other Tissue Fluorescence In-Situ Hybridization (FISH-Prenatal-Aneuploidy/Microdeletion), Amniocytes, Chorionic Villi Fluorescence In-Situ Hybridization (FISH-Tumors), Tumor Tissue

Molybdenum

Laboratory	Commercial Mail-out Laboratory
Order Code	MOLY
CPT Code	83018
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	1 mL plasma in royal blue K2 EDTA top tube available from Specimen Control, 6240 RCP.
Rejection Criteria:	Avoid use of separator tubes and gels.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	3-10 days upon receipt at reference laboratory

Mononucleosis Test

See:	 Heterophile Antibody (Monospot) IRL Only, Serum

Monospot Test

See:	 Heterophile Antibody (Monospot) IRL Only, Serum

MORL Soluble MAC

Laboratory	Commercial Mail-out Laboratory
Order Code	SMAC
CPT Code	83516 x32
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood
Rejection Criteria:	If samples do not arrive in the reference laboratory labeled and frozen after processing within 2 hours, they will be rejected for testing.
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Functional Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	Approximately 1 month upon receipt at reference laboratory

Morphine

See:	 Opiate, Urine Confirmation, Random Urine

Mould Culture

See:	 Fungal Culture

MS Screen

See:	 Multiple Sclerosis Screen Panel, Serum & CSF

MT-RNR1 Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	MTRNR1
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Samples are amplified with an oligonucleotide primer pair that flanks the A1555G and C1494T mutations within the MTRNR1 gene, followed by sequencing.
Analytic Time	3 months

MT-TL1 Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	MTTL1
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the Specimen and the Epic Requisition.
Methodology	Following sample amplification with oligonucleotide primers within the MTTL1 gene, a restriction digest is completed; digestion products are resolved by agarose gel electrophoresis. Presence of the A3243G mutation creates an additional ApaI restriction site.
Analytic Time	3 months

MT-TS1 Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	MTTS1
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Following sample amplification with oligonucleotide primers within the MTTS1 gene, a restriction digest is completed; digestion products are resolved by agarose gel electrophoresis. Presence of the A7445G mutation destroys an XbaI restriction site.
Analytic Time	3 months

MTB Culture

See:	 Mycobacterial Culture

MTHFR Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	MTHFR
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 3 mL Absolute Minimum: 1 mL
Rejection Criteria:	Serum, plasma, frozen whole blood, clotted blood, and severely hemolyzed specimens.
Reference Range	Negative: Neither of the common MTHFR gene mutations tested, C677T and A1298C, were detected. Other causes of elevated homocysteine levels, coronary heart disease, or thrombosis cannot be excluded. This genotype is associated with a normal folate metabolism.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the following form to the lab, with the specimen and the A-1a Miscellaneous Request: Patient History For Molecular Genetic Testing from ARUP Laboratories.
Methodology	Polymerase Chain Reaction/Fluorescence Monitoring
Analytic Time	2-7 days upon receipt at reference laboratory

Mucopolysaccharides, Quantitation

Laboratory	Commercial Mail-out Laboratory
Order Code	MUCPU
CPT Code	83866 Screen; 83864 Quantitation
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Collect 20 mL random urine in THREE yellow top conical tubes (no additive). Absolute Minimum is 10 mL random urine.
Rejection Criteria:	Specimens containing preservatives.
Reference Range	<pre> Electrophoresis Pattern By report Quantitative, Urine 0-5 months: 14.6-47.8 mg/mmol creatinine 6-11 months: 3.7-35.5 mg/mmol creatinine 1-2 years: 5.4-30.8 mg/mmol creatinine 3-6 years: 5.2-16.7 mg/mmol creatinine 7-13 years: 2.4-10.2 mg/mmol creatinine 14 years or older: 0.0-7.1 mg/mmol creatinine</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Please print, complete and submit the following form to the lab, with the specimen and the A-1a Miscellaneous Request: Patient History for Mucopolysaccharides (MPS) from ARUP Laboratories.</pre>
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Electrophoresis/Spectrophotometry
Analytic Time	14 days upon receipt at reference laboratory

Multiple Myeloma FISH Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	MMFISH
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	3 - 5 mL in a green-top (sodium heparin) tube.
Rejection Criteria:	Clotted, frozen, small sample volume (1.5 mL for blood) and low white blood cell count (WBC) are possible rejection criteria.
Reference Range	<pre> <u>Probes sets tested initially</u>: 1p32(CDKN2C)/1q21(CDS1B) 5p15.2 (D5S23/D5S721), CEP 9, CEP 15 13q14 (D13S25), 13q34 (13q34) 14q32(IGHBA) 17p13 (TP53) <u>Reflexing probe sets, if applicable</u>: 4p16.3(FGFR3), 14q32(IGH) 6p21(CCND3), 14q32(IGH) 11q13(CCND1), 14q32(IGH) 14q32(IGH), 16q23(MAF) 14q32(IGH), 20q11.2(MAFB) CEP7, CEP11</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	FISH results should be interpreted in the context of the patient’s full clinical history and under most circumstances, in conjunction with metaphase chromosome analysis.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Fluorescence In-Situ Hybridization (FISH)
Analytic Time	Greater than 1 week upon receipt at reference laboratory.

Multiple Myeloma FISH Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	MMFISHBM
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	3 - 5 mL in a green-top (sodium heparin) tube.
Rejection Criteria:	Clotted, frozen, small sample volume (0.5 mL for bone marrow) and low white blood cell count (WBC) are possible rejection criteria.
Reference Range	<pre> <u>Probes sets tested initially</u>: 1p32(CDKN2C)/1q21(CDS1B) 5p15.2 (D5S23/D5S721), CEP 9, CEP 15 13q14 (D13S25), 13q34 (13q34) 14q32(IGHBA) 17p13 (TP53) <u>Reflexing probe sets, if applicable</u>: 4p16.3(FGFR3), 14q32(IGH) 6p21(CCND3), 14q32(IGH) 11q13(CCND1), 14q32(IGH) 14q32(IGH), 16q23(MAF) 14q32(IGH), 20q11.2(MAFB) CEP7, CEP11</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	FISH results should be interpreted in the context of the patient’s full clinical history and under most circumstances, in conjunction with metaphase chromosome analysis.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Fluorescence In-Situ Hybridization (FISH)
Analytic Time	Greater than 1 week upon receipt at reference laboratory.

Multiple Sclerosis Screen Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	MSS
CPT Code	83916 Oligoclonal immune (Oligoclonal bands); 82784 IgG, serum; 82784 IgG CSF; 82040 Albumin, serum; 82042 Albumin, CSF
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><a href="javascript:larger_tube('24.jpg')"><img src="/pa <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum in a red top and 1.5 mL CSF (both required) Absolute Minimum: 0.5 mL serum in a red top and 0.7 mL CSF (both required)
Reference Range	<pre>

Immunoglobulin G, Serum	0-30 days: 611-1542 mg/dL 1 month: 241-870 mg/dL 2 months: 198-577 mg/dL 3 months: 169-558 mg/dL 4 months: 188-536 mg/dL 5 months: 165-781 mg/dL 6 months: 206-676 mg/dL 7-8 months: 208-868 mg/dL 9-11 months: 282-1026 mg/dL 1 year: 331-1164 mg/dL 2 years: 407-1009 mg/dL 3 years: 423-1090 mg/dL 4 years: 444-1187 mg/dL 5-7 years: 608-1229 mg/dL 8-9 years: 584-1509 mg/dL 10 years and older: 768-1632 mg/dL
Immunoglobulin G, CSF	0-6.0 mg/dL
Albumin, CSF	0-35 mg/dL
Albumin Index	0.0-9.0
CSF IgG/Albumin Ratio	0.09-0.25
IgG Index	0.28-0.66
CSF Oligoclonal Bands	Negative
Interpretation	By report
CSF IgG Synthesis Rate	Less than or equal to 8.0 mg/d
Albumin, Serum by Nephelometry	3500-5200 mg/dL
CSF Oligoclonal Bands Number	0-1 Bands</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	A patient is considered positive for CSF oligoclonal bands if there are two or more bands in the CSF immunoglobulin region that are not present in the serum. In order to confirm local production of oligoclonal IgG in CSF, a matched serum sample is required. Oligoclonal bands present in CSF, but not in serum, indicate central nervous system production. Oligoclonal bands are performed using isoelectric focusing and immunofixation.
Methodology	Qualitative Isoelectric Focusing/Immunofixation/Nephelometry
Analytic Time	4 days upon receipt at reference laboratory

Multiplex Ligation Dependent Probe (Renal Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	MLPAD
CPT Code	83891 (x6), 83894 (x6), 83914 x(6), 83898(x6), 83907(x6)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Special Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Multiplex Ligation-Dependent Probe Amplification is used to detect the presence of a NHAR event that results in the deletion of CFHR3 — CFHR1. This assay is based on sequence-specific hybridization and subsequent ligation of two directly flanking half-probes on a target nucleic acid sequence. Only when these half-probes are ligated can the resultant fragment serve as a template for PCR amplification. Multiple probes are used to cross-check validity.
Analytic Time	3 months

Mumps Antibody, IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	MUMPM
CPT Code	86735
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum in a red top tube Absolute Minimum: 0.2 mL serum in a red top tube
Rejection Criteria:	Severely lipemic, hemolyzed, heat-inactivated, or contaminated specimens.
Reference Range	0.79 IV or less: Negative - No significant level of detectable IgM antibody to Mumps virus. 0.80-1.20 IV: Equivocal - Borderline levels of IgM antibody to Mumps virus. Repeat testing in 10-14 days may be helpful. 1.21 IV or greater: Positive - Presence of IgM antibody to Mumps virus detected, which may indicate a current or recent infection. However, low levels of IgM antibody may occasionally persist for more than 12 months post-infection or immunization.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-6 days upon receipt at reference laboratory

Mumps IgG Antibody Detection

Laboratory	Chemistry
Order Code	MUMP
CPT Code	86735
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers.
Reference Range	Reference range and methodology changed effective 12/11/2012. 0.8 AI or less: Negative - No significant level of detectable mumps IgG antibody. 0.9-1.0 AI: Equivocal - Repeat testing in 10-14 days may be helpful. 1.1 AI or greater: Positive - IgG antibody to mumps detected, which may indicate a current or past exposure/immunization to mumps.
Order Form:	A-1a General Lab or Epic Req
Comments	Indicate whether specimen is "ACUTE", "CONVALESCENT" or "RANDOM." RANDOM would be appropriate selection if the test is ordered to determine patient immunity status for mumps (e.g., for student or employee health). For workup related to possible mumps infection, acute and convalescent specimens must be labeled as such; parallel testing is preferred and convalescent specimens must be received within 30 days from receipt of the acute specimens. Please mark specimen plainly as "ACUTE" or "CONVALESCENT."
Methodology	Multiplex Flow Immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Muramidase

See:	 Lysozyme, Urine

Muscle Biopsy

Laboratory	Histopathology
CPT Code	<pre> 88305 Light Microscopy (technical and professional) 88319 Enzyme Histochemistry (technical and professional) 88346 Immunofluorescence (technical and professional) 88348/88349 Electron Microscopy (technical and professional) 88314 Histochemical Staining with frozen section(technical and professional) 88331 Pathology frozen section during surgery with frozen section during surgery (technical and professional)</pre>
Minimum	Place fresh tissue in saline-moistened gauze for transporting to the laboratory. DO NOT place tissue in formalin fixative.
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Light Microscopy, Enzyme Histochemistry, Immunofluorescence, and Electron Microscopy
Analytic Time	1 week
Testing Schedule	0800-1700 Monday through Friday. For additional services, contact the Histopathology Laboratory at 356-2140 or contact Dr. Steve Moore at pager #5197.

Muscle-Eye-Brain Disease

See:	 POMGNT1 Full Gene Sequence with Interpretation, Whole Blood

Muscular Dystrophy Testing

See:
Congenital Muscular Dystrophy, Muscle or Skin Biopsy

DMD Gene Analysis Dup/Delet Variants, Whole Blood

Duchenne/Becker Muscular Dystrophy, Muscle Biopsy

Emery-Dreifuss Muscular Dystrophy, Muscle or Skin Biopsy

FSHMD1A Detection of Abnormal Alleles with Interpretation, Whole Blood

Limb Girdle Muscular Dystrophy (LGMD), Muscle Biopsy

Merosin-Deficient Congenital Muscular Dystrophy, Muscle or Skin Biopsy

Sarcoglycan-Deficient Limb Girdle Muscular Dystrophy, Muscle Biopsy

Muscular Dystrophy, MDA

See:
DMD Gene Analysis Dup/Delet Variants, Whole Blood

MuSK Antibody Test

Laboratory: Commercial Mail-out Laboratory
Order Code: FMUSK
CPT Code: 83519
Collection Medium: <table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>

Minimum: 1 mL serum in a red top tube.
Reference Range: Negative: <10
Borderline: 10
Positive: > or = 20
Order Form: A-1a Miscellaneous Request or Epic Req
Comments: This mailout test requires Neurology attending approval. Mailouts staff will not process order without approval. If approval is given, the name of the Neurology attending can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.

<u>Useful For</u>:
Evaluates the presence of antibodies to muscle-specific receptor tyrosine kinase (MuSK).

This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.

Methodology: Radioimmunoassay (RIA)
Analytic Time: 7 - 14 days

Myasthenia gravis

See:
Acetylcholine Receptor Binding Antibody, Serum

Neurology Myasthenia Gravis Reflexive Panel, Serum

Mycobacterial Culture

Laboratory	Microbiology
Order Code	C AFB
CPT Code	87116
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> A. Blood - media and instructions available upon request from the Microbiology Lab. A transfer device will be distributed with these culture bottles. Test available for limited patient populations only. B. Sputum - collect an early morning specimen on three consecutive days for the diagnosis of pulmonary tuberculosis. Collect 5-15 mL in a sterile container. Pooled specimens are unacceptable. C. Swabs are suboptimal for the recovery of mycobacteria since they provide limited material and the hydrophobicity of the mycobacterial cell envelope often compromises a transfer from swabs onto media. See bacterial culture for collection and transport of all other specimen types.</pre>
See:	 Bacterial Culture
Methodology	Standard culture media and/or semi-automated radiometric detection
Analytic Time	Cultures are held for 6 weeks.
Testing Schedule	0700-1630, 7 days a week, including holidays.

Mycology Culture

See:	 Fungal Culture

Mycophenolic Acid Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	MYCPHN
CPT Code	82541
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum
Rejection Criteria:	Serum gel tube is not acceptable.
Reference Range	<pre> MYCOPHENOLIC ACID 1.0-3.5 mcg/mL MPA GLUCURONIDE 35-100 mcg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Mycophenolate mofetil (CellCept) is a new immunosuppressive agent useful in organ transplantation. It is approved for use in renal, hepatic, and cardiac transplants. When mycophenolate mofetil enters the blood, it is immediately metabolized to the active drug, mycophenolic acid (MPA), which inhibits inosine monophosphate dehydrogenase and interferes with the de novo pathway of guanosine nucleotide synthesis selectively in lymphocytes. MPA inhibits proliferative responses of T- and B-lymphocytes to both mitogenic and allospecific stimulation. MPA acts in the same fashion as azathioprine, and MPA is suggested as replacement therapy for azathioprine. The drug is deactivated by the hepatic enzyme, uridine diphosphate glucuronosyltransferase (UGT) to form mycophenolic acid glucuronide (MPA-G). The principle clinical problem encountered in MPA therapy is excessive immunosuppression, which predisposes the patient to systemic infection. Measurement of the blood level of MPA and MPA-G can be useful to guide therapy. Monitoring is recommended immediately after transplant up to 3 weeks after therapy is initiated to evaluate dosing adequacy. Additional monitoring is indicated if the MPA level is not in the therapeutic range or if a major change in health status occurs. Correct interpretation requires a trough serum specimen (just before the next regular dose). Specimens drawn at other times in the dosing cycle are likely to have higher MPA levels. In these cases, the reference range does not apply.</pre>
Methodology	Tandem Mass Spectrometry (MS/MS)
Analytic Time	4 days upon receipt at reference laboratory

Mycoplasma Antibody, IgG + IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	MYAB
CPT Code	Mycoplasma IgG or IgM = 86738
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Ppreferred Minimum: 0.5 mL serum from red top tube</pre>
Rejection Criteria:	Severely lipemic or hemolyzed specimens.
Reference Range	<pre> Mycoplasma pneumoniae Antibody, IgG < 0.10 U/L: Negative 0.10-0.32 U/L: Equivocal > 0.32 U/L: Positive Mycoplasma pneumoniae Antibody, IgM <0.76 U/L or less: Negative-No clinically significant amount of M. pneumoniae antibody detected. 0.77-0.95 U/L: Equivocal-M. pneumoniae specific IgM presumptively detected. Collection of a follow-up sample in one to two weeks is recommended to assure reactivity. >0.96 U/L or greater: Positive-Highly significant amount of M. pneumoniae specific IgM antibody detected. However, low levels of IgM antibodies may occasionally persist for more than 12 months post-infection. </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please mark sample plainly as "acute" or "convalescent". Convalescent samples must be received within 30 days of receipt of acute samples.
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	3 days upon receipt in reference laboratory

Mycoplasma pneumoniae Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	MYCOG
CPT Code	86738
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.1 mL serum</pre>
Rejection Criteria:	Severely lipemic, hemolyzed, icteric, heat-inactivated, or contaminated specimens.
Reference Range	<pre> < 0.10 U/L: Negative 0.10-0.32 U/L: Equivocal > 0.32 U/L: Positive</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Mycoplasma pneumoniae Antibody, IgM, Serum
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	3 days upon receipt at reference laboratory

Mycoplasma pneumoniae Antibody, IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	MYCOM
CPT Code	86738
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.1 mL serum</pre>
Rejection Criteria:	Severely lipemic, contaminated, heat-inactivated, icteric or hemolyzed specimens.
Reference Range	<pre> 0.76 U/L or less: Negative - No clinically significant amount of M. pneumoniae IgM antibody detected. 0.77-0.95 U/L: Low Positive - M. pneumoniae-specific IgM presumptively detected. Collection of a follow-up sample in one to two weeks is recommended to assure reactivity. 0.96 U/L or greater: Positive - Highly significant amount of M. pneumoniae-specific IgM antibody detected. However, low levels of IgM antibodies may occasionally persist for more than 12 months post-infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Mycoplasma pneumoniae Antibody, IgG , Serum
Methodology	Enzyme-Linked Immunosorbent Assay

Mycoplasma pneumoniae by PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	MYCOPPCR
CPT Code	87581
Collection Medium	Miscellaneous container; contact laboratory
Minimum	Adult/Peds Minimum: 2 mL respiratory specimen in sterile container or in viral transport media (Microtest M4 media) or 1 mL CSF in sterile container. (Absolute Minimum: 0.5 mL)
Rejection Criteria:	Nonsterile or leaking containers. Respiratory aspirates in collection containers with tubing. Samples tend to leak from these containers, compromising the specimen.
Reference Range	<pre> Negative: Mycoplasma pneumoniae DNA not detected by PCR. Positive: Mycoplasma pneumoniae DNA detected by PCR.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Polymerase Chain Reaction
Analytic Time	4 days upon receipt at reference laboratory

Myelin Basic Protein

Laboratory	Commercial Mail-out Laboratory
Order Code	MBP
CPT Code	83873
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL CSF Absolute Minimum: 0.3 mL CSF Avoid hemolysis.
Reference Range	0.00-1.10 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Hemolysis is associated with falsely-elevated levels of MBP in the cerebrospinal fluid. CSF should be free from contamination with blood, if possible. If all available CSF is bloody, centrifuge the sample and separate supernatant from cells prior to freezing the sample.
Methodology	Quantitative Enzyme-Linked Immunosorbent Assay
Testing Schedule	1-4 days upon receipt at reference laboratory.

Myeloperoxidase Antibodies, IgG

Laboratory	Chemistry
Order Code	MPO
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL; red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	Negative: < 0.4 antibody index (AI) Equivocal: 0.4-0.9 Positive: 1.0 AI or greater
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 5, 2013. <u>References</u>: Russel KA et al. Detection of anti-neutrophil cytoplasmic antibodies under actual clinical testing conditions. Clin Immunol 2002; 103:196-203.
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Myoglobin

Laboratory	Chemistry
Order Code	MYO
CPT Code	83874
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers
Reference Range	<pre> Males: 28-72 ng/mL Females: 25-58 ng/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Myoglobin test instituted 1/26/2004
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Myoglobin

Laboratory	Commercial Mail-out Laboratory
Order Code	MYOGU
CPT Code	83874
Collection Medium	<table> <tr> <td align=center></td><td <td align=center><a href="javascript:larger_tube('26.jpg')"><img src="/pa <tr> <td width="110" valign="top" align="center">Urine (Random)-BD Vacutainer, <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 1.0 mL urine Absolute Minimum: 0.5 mL urine
Reference Range	<pre> 0-1 mg/L Patients with urine myoglobin greather than 15 mg/L are at risk of acute renal failure. Usual results are less than 1 mg/L. Results between 1 and 15 mg/L are associated with vigorous exercise, myocardial infarct, mild muscle injury and other conditions.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Requires Pathology Resident pager 131-3724 [Chemistry Resident Pager] approval. 24 hour urine sample tube must have time of collection and volume on transport tube.</pre>
See Appendix	See Additional Information: Collection and Preservation of 24-Hour Urine Specimens Urine Tests Requiring no Preservatives
Methodology	Electrochemiluminescent Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Myositis Specific Antibody Profile

Laboratory	Commercial Mail-out Laboratory
Order Code	MABCP
CPT Code	86235/Anti-Jo 1 Ab 83516/MI-2 83516/PL-7 83516/PL-12 83516/EJ 83516/OJ 83516/KU 83516/SRP 83516/U2 SNRNP 83520/PM/SCL
Collection Medium	<table> \<tr> \<td align=center></td></tr> \<tr> \<td width="110" valign="top" align="center">Red top tube</td> \</tr> \</table>
Minimum	3 mL serum
Reference Range	<pre> \Jo 1: Reference Range: Negative Negative <20 units Weak Positive 20-39 units Moderate Positive 40-80 units Strong Positive >80 units \MI-2, PL-7, PL-12, EJ, OJ, SRP, KU, PM/SCL, U2 SN RNP: Reference Range: Negative</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Immunoprecipitation (IPP) and Enzyme Immunoassay (EIA)
Analytic Time	2 weeks upon receipt at reference laboratory

Mysoline

See:	 Primidone And Metabolite Drug Level, Plasma

N

N-Acetyl Procainamide (NAPA)

See:
Procainamide and NAPA Drug Level, Plasma or Serum

N-Acetyl-Laspartate Acid

Laboratory: Commercial Mail-out Laboratory
Order Code: NASP
CPT Code: 82543
Collection Medium:
```
<table>
<tr>
<td align=center><a href="javascript:larger_tube('41.jpg')"></a></td></tr
<tr>
<td width="110" valign="top" align="center">Yellow top conical tube (no a
</tr>
</table>
```
Minimum: 5 mL urine without preservatives
Reference Range: See report
Order Form: A-1a Miscellaneous Request or Epic Req
Methodology: Column Chromatography
Analytic Time: 2 weeks upon receipt at reference laboratory

N-Telopeptide, Cross-Linked

Laboratory: Commercial Mail-out Laboratory
Order Code: NTP
CPT Code: 82523
Collection Medium:
```
<table>
<tr>
<td align=center><a href="javascript:larger_tube('26.jpg')"></a></td></tr
<tr>
<td width="110" valign="top" align="center">Urine - 24 hour/timed plastic
</tr>
</table>
```
Minimum:
```
Preferred minimum: 1.0 mL<br />
Absolute minimum 0.5 mL<br />
<br />
<strong class="style_red">Collect second morning void or 24 hr urine.
Sample must be refrigerated during collection and submission to
laboratory.  No preservative.</strong>
```
Rejection Criteria: Specimens contaminated with blood or having extensive hemolysis.
Reference Range:
```
<pre>
Age                  Male                          Female
7-9 yrs       167-578 nM BCE/mM creatinine 201-626 nM BCE/mM creatinine
10-12 yrs     152-505 nM BCE/mM creatinine 173-728 nM BCE/mM creatinine
13-15 yrs     103-776 nM BCE/mM creatinine  38-515 nM BCE/mM creatinine
16-17 yrs      34-313 nM BCE/mM creatinine  20-144 nM BCE/mM creatinine
18 yrs & older  21-83 nM BCE/mM creatinine
Premenopausal                                17-94 nM BCE/mM creatinine
Postmenopausal                               26-124 nM BCE/mM creatinine

NTx Units = nM BCE/mM creatinine

A decrease of 30-40% from the NTx baseline after three months of
therapy is a typical response to anti-resorptive therapy.

NTx = Cross-linked N-telopeptide of Type I Collagen
BCE = Bone Collagen Equivalent </pre>
```
Order Form: A-1a Miscellaneous Request or Epic Req
See Appendix:
```
See Additional Information: <br />
Urine Tests Requiring Preservatives, Refrigeration or Special
Containers<br />Urine Tests Requiring no Preservatives
```
Methodology: Quantitative Chemiluminescent Immunoassay
Analytic Time: 1-4 days upon receipt at reference laboratory

N-Telopeptide, X-Linked

Laboratory	Commercial Mail-out Laboratory
Order Code	NTXS
CPT Code	82523
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Minimum: 0.5 mL Absolute Minimum: 0.2 mL</pre>
Rejection Criteria:	Severely hemolyzed specimens.
Reference Range	<pre> Adult Male: 5.4-24.2 nM BCE Premenopausal, Adult Female: 6.2-19.0 nM BCE</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Enzyme-Linked Immunosorbent Assay
Analytic Time	4 days upon receipt at reference laboratory

N-terminal-pro-BNP

Laboratory: Chemistry
Order Code: PBNP
CPT Code: 83880
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Plasma Separator Tube</td>
</tr>
</table>

Minimum: 3 mL plasma separator tube top or TWO microtainers.

Reference Range:

<pre>
Age Reference Range (pg/mL)
<u>Pediatric (boys and girls)</u>
0-30 days 263 - 6500
1 month - 11 months 37 - 1000
12 months - 35 months 39 - 675
3 years to 6 years 23 - 327
7 years to 14 years 10 - 242
15 years to 18 years 6 - 207

<u>Males</u>
19-44 years 0 - 93
45-54 years 0 - 138
55-64 years 0 - 177
65-74 years 0 - 229
75 years or older 0 - 852

<u>Females</u>
19-44 years 0 - 178
45-54 years 0 - 192
55-64 years 0 - 226
65-74 years 0 - 353
75 years or older 0 - 624

Reference ranges in adults reflect 95th percentiles for NT-pro-BNP levels in patients without congestive heart failure (CHF). Knowledge of each individual patient’s NT-proBNP range may be more useful than using similar cut-points for every patient.

For adult chronic CHF patients according to New York Heart Association (NYHA) Functional Class for NT-proBNP levels in pg/mL:

	Mean	5th percentile	95th percentile
Class I:	1015	33	3410
Class II:	1666	103	6567
Class III:	3029	126	10449
Class IV:	3465	148	12188

Pediatric reference ranges for patients 18 years and younger are from reference (1).

Among patients with dyspnea, NT-proBNP is highly sensitive for the detection of acute CHF. In addition, a NT-proBNP < 300 pg/mL effectively rules out acute CHF, with 99% negative predictive value. Elevations in NT-proBNP levels may be observed in states other than left ventricular congestive failure including: acute coronary syndromes, right heart strain/failure (including pulmonary embolism and cor pulmonale), critical illness, and renal failure. Falsely low NT-proBNP in CHF patients may be observed in increased body mass index.

<u>References</u>:
(1) Nir A et al. Pediatr Cardiol 30:3-8, 2009.</pre>

Order Form: A-1a General Lab or Epic Req

Comments:

<pre>
The N-terminal Pro-Brain Natriuretic Peptide (Pro-BNP) is an assay used as an aid in the diagnosis of individuals suspected of having congestive heart failure. The test is further indicated for the risk stratification of patients with acute coronary syndrome and congestive heart failure. The test may also be used as an aid in the assessment of increased risk of cardiovascular events and mortality in patients at risk for heart failure who have stable coronary artery disease.

NT-Pro-BNP is stable for three days at 2-8°C, s
be added to existing PST tubes during those three da

Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)

Natalizumab Antibodies

Laboratory	Commercial Mail-out Laboratory
Order Code	NATALAB
CPT Code	83516
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum in a red top tube
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Qualitative Bridging Enzyme-Linked Immunosorbent Assay
Analytic Time	3-8 days upon receipt at reference laboratory
Testing Schedule	Varies

NATP Package

See:	 Neonatal Alloimmune Thrombocytopenia Purpura, Whole Blood & Serum

Natural Killer (NK) Cells, Enhanced

Laboratory	VA Diagnostic Immunology Lab
Minimum	10 mL; sodium heparin green top. Do not use a needle smaller than 21 gauge.
Reference Range	Internal control and normal range reported with each sample.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This assay is run Monday through Thursday during working hours and Friday 8 a.m. to noon. This assay is run using viable lymphocytes. This assay examines the ability of the patient’s NK cells to enhance their killing activity in response to stimulation with Interleukin-2 (IL-2).

Natural Killer (NK) Cells, Fresh

Laboratory	VA Diagnostic Immunology Lab
Minimum	10 mL; sodium heparin green top. Do not use a needle smaller than 21 gauge.
Reference Range	Internal control and normal range reported with each sample.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This assay is run Monday through Thursday during working hours and Friday 8 a.m. to noon. This assay is run using viable lymphocytes. This assay examines the ability of the patient’s NK cells to kill a standard tumor target.

Neisseria (GC) Culture

See:	 Neisseria gonorrhoeae Culture

Neisseria gonorrhoeae Culture

Laboratory	Microbiology
Order Code	C GC
CPT Code	87081
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Collect specimen using a culturette and swab directly to a Jembec plate if available. Place white tablet in hole of the Jembec plate (to provide CO2 atmosphere) and place in the Ziploc bag provided. If Jembec plate is not available, transport culturette to the laboratory immediately.
Analytic Time	Cultures are completed within 3-5 days.
Testing Schedule	0700-2200, 7 days a week, including holidays.

Neisseria gonorrhoeae Detection by PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	NGPCR
CPT Code	87591
Collection Medium	Sterile container
Minimum	Specimens must be collected using the multi-Collect Specimen Collection Kit (Hospital Stores No. 46161).
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Refer to the multi-Collect Specimen Collection product insert for detailed sample collection instructions.
Methodology	Polymerase Chain Reaction (PCR)
Analytic Time	6 days
Testing Schedule	Tests are run three times weekly (Monday, Wednesday and Friday).

Neisseria Meningitidis IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	NMENIG
CPT Code	86741 (x4)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	0.3 mL serum
Reference Range	<pre> Serogroup A: < 4.0 ug/mL Serogroup C: < 5.0 ug/mL Serogroup Y: < 4.0 ug/mL Serogroup W-135: < 3.0 ug/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. This assay measures serum IgG antibodies recognizing polysaccharide antigens from the four Neisseria meningitidis serogroups included in the licensed meningococcal vaccine. The meningococcal vaccine response is best evaluated by testing pre-vaccination and post-vaccination samples in parallel. A two-fold or greater increase for at least two serogroups is expected when comparing post-vaccination to pre-vaccination results. N. meningitidis IgG levels peak approximately one month post-vaccination, but decline markedly by two years.
Testing Schedule	8 days upon receipt at reference laboratory

Nembutal

See:	 Pentobarbital (Nembutal) (As a Therapeutic Agent), Plasma

Neonatal Alloimmune Thrombocytopenia Purpura

Laboratory	Commercial Mail-out Laboratory
Order Code	NATP
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Mother: 30 mL EDTA whole blood (FOUR 8.5 mL yellow top tubes) PLUS FOUR 5 mL red top tubes Father: 30 mL EDTA whole blood (FOUR 8.5 mL yellow top tubes)
Reference Range	By Report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Includes Platelet Genotyping, Mother Platelet Genotyping, Father Platelet Antibody Screen, Serum Platelet Antibody Identification This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.</pre> Please print, complete, and submit the <a href="http://www.bcw.edu/cs/gro Immunology Test Requisition from Blood Center of Wisconsin with the samples and the A-1a Miscellaneous Request or Epic Req.
Methodology	Flow Cytometry, ELISA, PCR
Analytic Time	10 days upon receipt in reference laboratory

Neonatal Screen

Comments	<pre> Testing performed at State Hygienic Lab. Need dried blood on Neonatal Screening Form. Includes screening for: Phenylketonuria (PKU), Hypothyroidism, Galactosemia, Maple Syrup Urine Disease (MSUD), Hemoglobinopathies, and Congenital Adrenal Hyperplasia (CAH).</pre>
See:	 Newborn Metabolic Screen, Dried Blood

Neopterin

Laboratory	Commercial Mail-out Laboratory
Order Code	NEOP
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">CSF Collection Tubes</td> </tr> </table>
Minimum	Absolute Minimum: 0.5 mL CSF
Reference Range	See report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit to the lab, the <a href= "http://www.me Metabolic Test Order Form from Medical Neurogenetics, with the specimen and the A-1a Miscellaneous Request.
Analytic Time	2 weeks upon receipt at reference laboratory

Nerve Biopsy

Laboratory	Surgical Pathology Laboratory
CPT Code	<pre> 88305 Light Microscopy (technical and professional) 88348 Electron Microscopy (technical and professional 88362 Nerve Teasing (technical and professional)</pre>
Minimum	One nerve biopsy at least 4-6 cm long.
Reference Range	The pathologist will provide an intrepretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	Place fresh tissue in saline moistened gauze for transporting to the Surgical Pathology Laboratory 5804 JPP. Do Not place tissue in formalin or glutaraldehyde fixative.
Methodology	Light microscopy, electron microscopy, and teased fibers
Analytic Time	1 week
Testing Schedule	0800-1700 Monday through Friday; For additional services, contact Dr. S.

Neurokinin A (Substance K)

Laboratory	Commercial Mail-out Laboratory
Order Code	NEUROA
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">GI preservative collection tu </tr> </table>
Minimum	1 mL plasma from a Special Z-GI preservative collection tube obtained from reference laboratory. Mailouts has these tubes, call 356-8593.
Reference Range	Up to 40 pg/ml
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Contact Commercial Mailouts at 356-8593 to obtain collection tubes for this testing. No other specimen collection container is acceptable by the reference laboratory. Patients should be fasting for 10-12 hours prior to specimen collection. Antacid medications or medications that affect intestinal motility should be discontinued, if possible, for at least 48 hours prior to collection. Neurokinin A is a ten amino acid putative transmitter synthesized in the neurons it is present in. Neurokinin A is a member of the family called Tachykinins which also include Neurokinin B, Substance P, Physalaemin, and Eledoisin. Neurokinin A shares 6 of 10 peptide homologies with Neurokinin B even though they are produced by different genes. Neurokinin A is also very similar in structure to Substance P and produces some of the same biological actions as Substance P. Neurokinin A is a potent bronchoconstrictor. In the gut, Neurokinin A is produced by the intrinsic enteric nervous system.</pre>
Methodology	Direct Radioimmunoassay
Analytic Time	2 weeks upon receipt at reference laboratory
Testing Schedule	Varies

Neurology Myasthenia Gravis Reflexive Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	MGEA
CPT Code	83519-59 - ACh receptor (muscle) binding antibody 83519-59 - ACh receptor (muscle) modulating antibodies 83520 - Striational (striated muscle) antibodies 83519-59 - AChR ganglionic neuronal antibody (if appropriate) 83519-59 - Neuronal VGKC autoantibody (if appropriate) 84182-CRMP-5 - IgG Western blot (if appropriate) 86341 - GAD65 antibody assay (if appropriate)
Collection Medium	<table> \<tr> \<td align=center></td></tr> \<tr> \<td width="110" valign="top" align="center">Red top tube</td> \</tr> \</table>
Minimum	3 mL serum
Reference Range	ACh RECEPTOR (MUSCLE) BINDING ANTIBODY < or =0.02 nmol/L ACh RECEPTOR (MUSCLE) MODULATING ANTIBODIES 0-20% (reported as __% loss of AChR) STRIATIONAL (STRIATED MUSCLE) ANTIBODIES \<1:60
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires Neurology attending approval. Mailouts staff will not process order without approval. If approval is given, the name of the Neurology attending can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Depending on results of initial testing, the reference laboratory performing this mailout test can initiate further reflex testing that will involve additional charges for the patient. If muscle AChR modulating antibody value is (or exceeds) 90% acetylcholine receptor (AChR) loss and striational antibody is detected, thymoma is likely. Reflexive testing will include CRMP-5-lgG Western blot, ganglionic AChR antibody, GAD65 antibody, and VGKC antibody (which are frequent with thymoma).
Methodology	ARBI/8338, ARMO/83378, GANG/84321, GD65S/81596, VGKC/89165: Radioimmunoassay (RIA) STR/8746: Enzyme Immunoassay (EIA) CRMWS/83107: Western Blot
Analytic Time	3 days upon receipt at reference laboratory
Testing Schedule	\<u>ACh receptor (muscle) binding antibody\</u>: Monday through Thursday; 6 p.m., Saturday; 10 a.m. \<u>ACh receptor (muscle) modulating antibodies\</u>: Monday through Thursday; 11 a.m. \<u>Striational (striated muscle) antibodies\</u>: Monday through Thursday, Sunday; 10:30 p.m. \<u>CRMP-5-IgG Western blot\</u>: Monday through Friday; 6 a.m. \<u>AChR ganglionic neuronal antibody\</u>: Tuesday, Thursday, Sunday; 6 a.m \<u>Neuronal VGKC autoantibody\</u>: Tuesday, Thursday, Sunday; 6 a.m. \<u>GAD65 antibody assay\</u>: Monday through Thursday, Sunday; 8 a.m.

Neuromyelitis Optica (NMO) Autoantibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	NMOIGG
CPT Code	83520, 86255 (if appropriate)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	2.0 mL serum in a red-top tube
Rejection Criteria:	Specimens other than serum.
Reference Range	NMO/AQP4-IgG: <1.6 U/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful For</u>: Establishing the diagnosis of an neuromyelitis optica spectrum disorder and distinguishing one of these disorders from multiple sclerosis early in the course of disease, allowing early initiation, and maintenance, of optimal therapy. <u>Cautions</u>: Seronegativity does not exclude the diagnosis of a neuromyelitis optica spectrum disorder (current seronegativity rate is 23%). Seronegativity may reflect immunosuppressant therapy.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	NMO/AQP4-IgG Enzyme-Linked Immunosorbent Assay; Indirect Immunofluorescence
Analytic Time	10 days upon receipt in reference laboratory

Neuromyelitis Optica, IgG, CSF

Laboratory	Commercial Mail-out Laboratory
Order Code	NMOIGGCSF
CPT Code	86255
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	Preferred Minimum: 2.0 mL of spinal fluid Absolute Minimum: 1.0 mL of spinal fluid
Reference Range	Negative. All positive results reported as "Positive".
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Indirect Immunofluorescence (IFA)
Analytic Time	10 days upon receipt in reference laboratory

Neuron Specific Enolase, CSF

Laboratory	Commercial Mail-out Laboratory
Order Code	NSECSF
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	<pre> Requested Minimum: 0.5 mL CSF Absolute Minimum: 0.3 mL CSF</pre>
Reference Range	<pre> Normal: <=15 ng/mL Indeterminate: 15-30 ng/mL Elevated: >30 ng/mL Elevated results may indicate the need for additional work-up. Possible causes may be NSE-secreting CNS/Leptomeningeal tumor or rapid neuronal destruction from a variety of causes. In the context of dementia, elevated results may be suggestive of Creutzfeldt-Jakob disease.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Homogeneous Time Resolved Fluorescence (HTRF) on the BRAHMS Kryptor Compact
Analytic Time	4 days upon receipt in reference laboratory

Neuron Specific Enolase

Laboratory	Commercial Mail-out Laboratory
Order Code	NSES
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred minimum: 0.5 mL serum Absolute minimum: 0.20 mL serum</pre>
Rejection Criteria:	Neuron Specific Enolase is high in platelets and red blood cells, therefore, plasma and hemolyzed specimens are not acceptable.
Reference Range	<pre> < or =15 ng/mL Serum markers are not specific for malignancy, and values may vary by method.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Homogeneous Time Resolved Fluorescence (HTRF) on the BRAHMS Kryptor.
Analytic Time	4 days upon receipt in reference laboratory

Neurontin

See:	 Gabapentin (Neurontin) Drug Level, Blood

Neurotransmitter Metabolites

Laboratory	Commercial Mail-out Laboratory
Order Code	NEUTRAN
CPT Code	82492
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">CSF Collection Tubes</td> </tr> </table>
Minimum	<pre> Absolute Minimum: 0.5 mL CSF</pre>
Reference Range	<pre> Age (years) 5HIAA (nmol/L) HVA (nmol/L) 30MD (nmol/L) 0-0.2 209-1159 337-1299 <300 0.2-0.5 179-711 450-1132 <300 0.5-2.0 129-520 294-1115 <300 2.0-5.0 74-345 233-928 <150 5.0-10 66-338 218-852 <100 10-15 67-189 167-563 <100 Adults 67-140 145-324 <100</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit to the lab, the <a href= "http://www.me Metabolic Test Order Form from Medical Neurogenetics, with the specimen and the A-1a Miscellaneous Request.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	2 weeks upon receipt at reference laboratory

Neutrophil Antibodies Level-1

Laboratory	Commercial Mail-out Laboratory
Order Code	NEUAB1
CPT Code	86021
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	5 mL serum
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the Platelet & Neutrophil Immunology Test Requisition from the Blood Center of Wisconsin with the appropriate signature, the correct sample type and the A-1a Miscellaneous Request. <pre> NEUAB1 testing acts as a screen. The reference laboratory will add on additional testing per their testing algorithm. Additional testing that may be performed as additional cost to patient. NEAUAB2 Neutrophil Antibody 2 Includes Neutrophil Antibody Screen and HLA PRA detection CPT codes: 86021, 86808, 86849 NEAUAB3 Neutrophil Antibody 3 Includes Neutrophil Antibody Identification and HLA PRA detection CPT codes: 86021 (x2), 86808, 86849</pre>
Methodology	Flow Cytometry
Analytic Time	7 days upon receipt at reference laboratory

Neutrophil Cytoplas.Screen (ANCA)

Laboratory	Immunopathology
Order Code	ANCAS
CPT Code	86255 ANCA screen, 86255-26 ANCA screen interpretation, 86256 ANCA titer, 86256-26 ANCA titer interpretation, 83520 PR3, 83520 MPO
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL; red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	ANCA screen and titer: <1:40 Titer, includes interpretative report.
Order Form:	A-1a Immunopathology or Epic Req
Comments	<pre> Please include relevant clinical information on test order form. Test includes both C-ANCA and P-ANCA screening and titering. MPO and PR3 confirmatory tests are performed if screen is positive or inconclusive. Anti-neutrophil cytoplasmic antibodies are associated primarily with two groups of diseases: systemic necrotizing vasculitis/glomerulonephritis and inflammatory bowel and liver disease. Because the laboratory testing strategies are different for these two groups of disease, different tests must be ordered for each of these workups. "ANCA" is the test to be ordered when vasculitis/ glomerulonephritis is in the differential diagnosis. "UC-ANCA" is the test to order to evaluate patients with suspected inflammatory bowel or liver disease (see UC-ANCA listing for more testing information). The "ANCA" test starts with immunofluorescence screening for both C-ANCA (primarily associated with Wegner’s granulomatosis) and p-ANCA (primarily associated with microscopic polyarteritis and pauci-immune GN). If the ANCA screen is positive, titration to end-point is performed. It is strongly recommended that confirmatory testing for anti-proteinase 3 (PR3) and anti-myeloperoxidase (MPO) be performed at the time of initial identification of ANCA. P-ANCA can be confused with "UC-ANCA" or ANA on IFA screening. Approximately 5% of patients with either "C-ANCA" or "P-ANCA" will have a specificity different from that usually associated with the ANCA IFA pattern (eg: P-ANCA may have PR3 specificity and the C-ANCA may have MPO specificity).</pre>
See:	 Myeloperoxidase Antibodies, IgG, Serum Proteinase 3 Antibodies, IgG, Serum UC-ANCA Screen and Interpretation, Serum
Methodology	<pre> ANCA screen and titer: Indirect Immunofluorescence MPO and PR3: Multiplex flow immunoassay</pre>
Analytic Time	3 days
Testing Schedule	Daily - Batch analysis performed daily excluding weekends and university holidays.

Neutrophil Oxidative Burst (DHR)

Laboratory	VA Diagnostic Immunology Lab
Minimum	10 mL; sodium heparin green top. Do not use a needle smaller than 21 gauge.
Reference Range	Internal control and normal range reported with each sample.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This assay is run using viable lymphocytes. This assay is used to determine whether the NADPH Oxidase of phagocytic cells in a certain individual is normal. This is done by flow cytometry using the probe dihydrorhodamine 123 (DHR). This assay replaces the Nitro Blue Tetrazolium test (NBT). This assay is the gold standard to rule out Chronic Granulomatous disease (CGD).
Testing Schedule	This assay is run Monday through Thursday during working hours and Friday 8 a.m. to noon.

Neutrophil Oxidative Burst

Laboratory	Commercial Mail-out Laboratory
Order Code	DHR
CPT Code	86352
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>plus control</t <td align=center><img src="/path_handbook/gifs/tubes/green_4ml.png" class <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	Adult/Pediatric Preferred Minimum: One 4 mL green (sodium heparin) and one normal control in a 4 mL green (sodium heparin) from a healthy unrelated individual.
Rejection Criteria:	Refrigerated or frozen samples or samples in transport longer than 48 hours.
Reference Range	By report
Comments	If sample shows abnormal results when stimulated, and no control was sent, test should be resubmitted with control sample to validate the conditions of collection, processing and transport.
Methodology	Flow Cytometry
Analytic Time	3 working days upon receipt at reference laboratory

Newborn Metabolic Screen

Laboratory	Critical Care Laboratory
Order Code	U70001
CPT Code	84999
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Filter paper from collection </tr> </table>
Minimum	Five completely filled circles of dried blood on SHL/UHL-INMSP requisition. Collected and shipped to SHL/UHL from Critical Care Lab/Special Care Nursery Lab.
Reference Range	By report; directly into Epic via SHL/UHL - Epic interface.
Order Form:	Whatman 903-Iowa Newborn Metabolic Screen Filter Spot Form
Comments	<pre> Iowa Neonatal Screening Program protocol detects primary hypothyroidism, galactosemia, hemoglobin disorders, and congenital adrenal hyperplasia. Effective 1/1/10, the Iowa Neonatal Screening Program offers an Expanded Screening Disorders: ANALYTES SCREENED: Analytes refer to amino acids: (ARG) Arginine, (ASA) Argininosuccinic Aciduria, (CIT) Citrulline, (LEU) Leucine, (MAA) Multiple Amino Acids, (MET) Methionine, (PHE) Phenylalanine, (SA) Succinlyacetone, (TYR) Tyrosine, (VAL) Valine and acylcarnitines: LOW C0, HI C0, C3, C3-DC, C4, C4-DC, C4-OH, C5, C5:1, C5-DC, C5-OH, C6, C6-DC, C8, C10, C10:1, C14, C14:1, C16, C16-OH, C16-OH/C16, C16:1-OH, C0/C16, C18:1, C18-OH, C18:1-OH, (MAC) multiple acylcarnitines. UHL requisition form MUST have the following information completed on the form before delivery to laboratory: Collector’s initials, infant’s last name and first name, sex, first or repeat specimen, physician name, date and time of birth, feeding method (bottle/breast/ NPO/parenteral nutrition), mother’s first and last name, mother’s date of birth, date and time of collection, weight at time of collection, gestational age in weeks, transfusion within the last eight weeks and date of transfusion.</pre>
Analytic Time	1 week upon receipt at reference laboratory

NF1 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	NFT1
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	<pre> Adult Minimum: 5-10 mL whole blood Absolute Pediatric Minimum: 3 mL whole blood</pre>
Rejection Criteria:	<pre> *No label (patient’s full name and date of collection) on the specimens *No referring physician’s or genetic counselor’s names and addresses *No billing information, informed consent or phenotypic checklist</pre>
Reference Range	Upon Report.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete all pages of the <a href="http://services.medicine the University of Alabama Medical Genomics Laboratory with the appropriate signature, the correct sample type and the A-1a Miscellaneous Request. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Analytic Time	5-6 weeks

Niacin (Vitamin B3)

Laboratory	Commercial Mail-out Laboratory
Order Code	NIACIN
CPT Code	84591
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 4 mL plasma Absolute Minimum: 1 mL plasma
Rejection Criteria:	Thawed specimens or specimens not protected from light. Grossly hemolyzed or lipemic specimens.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Protect specimen from light. Specimen must be delivered to Specimen Control so that it can be frozen within 15 minutes of time of collection.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative High Performance Liquid Chromatography
Analytic Time	5-11 days upon receipt at reference laboratory.

Nicotine & Metabolite

Laboratory	Commercial Mail-out Laboratory
Order Code	NICOU
CPT Code	83887
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 4 mL random urine with no additives or preservatives Absolute Minimum: 2 mL random urine with no additives or preservatives
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles.
Reference Range	<pre>

	Unexposed non-tobacco user	Passive exposure
Nicotine	Less than 2 ng/mL	Less than 20 ng/mL
Cotinine	Less than 5 ng/mL	Less than 20 ng/mL
3-OH-Cotinine	Less than 50 ng/mL	Less than 50 ng/mL
Nornicotine	Less than 2 ng/mL	Less than 2 ng/mL
Anabasine	Less than 3 ng/mL	Less than 3 ng/mL

	Abstinent user for greater than 2 weeks	Active tobacco product use
Nicotine	Less than 30 ng/mL	1000 - 5000 ng/mL
Cotinine	Less than 50 ng/mL	1000 - 8000 ng/mL
3-OH-Cotinine	Less than 120 ng/mL	3000 - 25000 ng/mL
Nornicotine	Less than 2 ng/mL	30 - 900 ng/mL
Anabasine	Less than 3 ng/mL	3 - 500 ng/mL*

	Reference: Clinical Chemistry 2002;48:1460-1471</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Random urine collections acceptable.
Methodology	Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	4 days upon receipt at reference laboratory

Nicotine and Metabolite, Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	NICO
CPT Code	83887
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Collect TWO full red top tubes. Recommended minimum: 4.0 mL serum Absolute minimum: 2.0 mL serum</pre>
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles. Serum separator tubes and plasma/whole blood from light blue (sodium citrate).
Reference Range	<pre> Unexposed non-tobacco user Passive exposure Nicotine Less than 2 ng/mL Less than 2 ng/mL Cotinine Less than 2 ng/mL Less than 8 ng/mL 3-OH-Cotinine Less than 2 ng/mL Less than 2 ng/mL Abstinent user for more than 2 weeks Active tobacco product use Nicotine Less than 2 ng/mL 30 - 50 ng/mL Cotinine Less than 2 ng/mL 200 - 800 ng/mL 3-OH-Cotinine Less than 2 ng/mL 100 - 500 ng/mL Reference range source: Clinical Chemistry 48:9 1460-1471, 2002</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	No gel separator tubes.
Methodology	Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	4 days upon receipt at reference laboratory

Nitroprusside

See:	 Thiocyanate, Plasma

NMDA Receptor Antibodies

Laboratory	Commercial Mail-out Laboratory
Order Code	NMDAS
CPT Code	86255 NMDA; if reflexed add 86256 NMDA titer
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	2 mL in red top tube
Rejection Criteria:	CSF or plasma. Contaminated, hemolyzed, or severely lipemic specimens.
Reference Range	Effective May 21, 2012 < 1:10
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Paraneoplastic Autoantibodies, Serum, Serum Voltage-Gated Calcium Channel Antibodies, Serum Voltage-Gated Potassium Channel Antibodies, Serum
Methodology	Semi-Quantitative Indirect Fluorescent Antibody
Analytic Time	1-8 days upon receipt at reference laboratory.

NMDA Receptor Antibodies

Laboratory	Commercial Mail-out Laboratory
Order Code	NMDACSF
CPT Code	86255 NMDA IgG CSF; if reflexed add 86256 NMDA IgG CSF titer
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL CSF Absolute Minimum: 0.15 mL CSF
Rejection Criteria:	Contaminated, hemolyzed, or severely lipemic specimens.
Reference Range	Effective May 21, 2012 < 1:1
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	NOTE: If NMDA CSF antibody IgG is positive, then an NMDA CSF antibody IgG titer will be added. Additional charges apply.
Methodology	Semi-Quantitative Indirect Fluorescent Antibody
Analytic Time	1-8 days upon receipt at reference laboratory.

Non-HDL Cholesterol Calculation

Comments	<pre> Beginning October 1, 2009, the "Lipid Panel" orderable within Epic will include a calculation for non-high density lipoprotein (non-HDL-C). Non-HDL-C is calculated as total cholesterol minus HDL. The addition of non-HDL-C to the Lipid Panel reflects the recognition of this calculated value as a predictive factor in cardiovascular disease based on the National Cholesterol Education III studies. The reference ranges for non-HDL-C are based on National Cholesterol Education III guidelines: Desirable: < 130 mg/dL Borderline high: 139-159 mg/dL High: 160-189 mg/dL Very high: > or = 190 mg/dL Because non-HDL-C is simply a calculated parameter, there are no changes to the sample requirements for the "Lipid Panel".</pre>

Norovirus Group 1/2 Detection by RT-PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	NORPCR
CPT Code	87798 x2
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Feces specimen, stool contain </tr> </table>
Minimum	Preferred Minimum: 1 mL Random stool in a clean, unpreserved transport vial
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Qualitative Reverse Transcription Polymerase Chain Reaction
Analytic Time	5 days upon receipt at reference laboratory
Testing Schedule	Test perform on Monday, Wednesday and Friday at reference laboratory.

Norpace

See:	 Disopyramide Drug Level, Serum

NRAS Mutation Analysis with Interpretation

Laboratory	Molecular Pathology
Order Code	NRAS
Minimum	Tumor cells more than 50% of the total tissue and greater than 10mm² in surface area on the block.
Rejection Criteria:	Specimens fixed in B5 fixative or that have been decalcified will not be accepted. Tumor specimens containing less than 50% tumor cells or are less than 10mm² in area may be unacceptable.
Reference Range	Negative for mutations (normal).
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The tissue should be reviewed by a pathologist prior to testing to identify that it contains at least 50% tumor. This assay detects mutations in codons 12, 13 and 61 (20 mutations in total).
Methodology	Polymerase Chain Reaction and Single Nucleotide Primer Extension
Analytic Time	7-10 working days
Testing Schedule	Weekly

5'NT

See:	 5 'Nucleotidase, Serum

5 'Nucleotidase

Laboratory	Commercial Mail-out Laboratory
Order Code	5NT
CPT Code	83915
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Red top tube</td></tr></table>
Minimum	<pre>Adult preferred minimum: 1 mL Adult absolute minimum: 0.2 mL Pediatric minimum: 0.2 mL</pre>
Reference Range	0 - 15 U/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzymatic
Analytic Time	2 working days upon receipt at reference laboratory

Nucleotidase

See:	 5 'Nucleotidase, Serum

O

O2 Affinity

See:
Oxygen Dissociation P50, RBC, Blood

Occult Blood, Fecal Guaiac Screen

See:
Fecal Occult Blood, Guaiac Screen, Fecal

Gastroccult, Gastric Aspirate or Vomitus

Octreotide Drug Level

Laboratory: Commercial Mail-out Laboratory
Order Code: OCTREO
CPT Code: 83519
Collection Medium: <table>
<tr>
<td align=center></td></tr
<tr>
<td width="110" valign="top" align="center">GI preservative collection tu
</tr>
</table>

Minimum: 1 mL plasma from a Special Z-GI preservative collection tube obtained from reference laboratory. Mailouts has these tubes, call 356-8593.
Reference Range: <pre>
Long-acting repeatable (LAR) dose-response levels: mean octreotide level ± 2SD for patients on octreotide LAR for 3 or more months (steady-state). The following represent trough levels measured immediately before an injection of LAR.

Octreotide administered by pump:
60 mg/month: 10,000 pg/ml +/- 2,500 pg/ml
30 mg/month: 5,000 pg/ml +/- 2,500 pg/ml

Octreotide administered as Sandostatin(R) LAR:
120 mg/month: 9,000 pg/ml +/- 2,000 pg/ml
60 mg/month: 5,000 pg/ml +/- 2,000 pg/ml
30 mg/month: 2,500 pg/ml +/- 1,500 pg/ml

Octreotide administered by subcutaneous injection:
Measurement of plasma octreotide is not recommended for individuals using multiple daily octreotide injections due to the short half life of octreotide in the plasma (approximately 90-120 minutes)</pre>
Order Form: A-1a Miscellaneous Request or Epic Req
Comments: <pre>
Contact Commercial Mailouts at 356-8593 to obtain collection tubes for this testing. No other specimen collection container is acceptable by the reference laboratory.

This test is useful only for those patients being treated with octreotide acetate. No special preparation is needed for this test. For optimal results, blood for this test should be drawn immediately before the patient's next injection of octreotide LAR (trough levels).</pre>

Methodology: Octreotide is measured by direct radioimmunoassay. There is no cross-reactivity with native somatostatin-14 or somatostatin-28. The also is no cross-reactivity with lanreotide, and this test should not be used to measure blood levels of this drug.
Analytic Time: 1 week upon receipt at reference laboratory

Ocular Pathology Biopsy

Laboratory: Ocular Pathology Laboratory
Order Form: Ocular Pathology Consultation

OD at 450

See:
Amniotic Fluid Bilirubin (Delta Abs 450)

17-OH-Pregnenolone

Laboratory	Commercial Mail-out Laboratory
Order Code	17PREG
CPT Code	84143
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.3 mL serum (no repeat anlaysis with this volume)
Rejection Criteria:	Ambient and refrigerated specimens.
Reference Range	<u>Females</u> Premature (26-28 weeks): 1219-9799 ng/dL Premature (29-36 weeks): 346-891l ng/dL Full Term (1-5 months): 229-3104 ng/dL 6 months - 364 days: 46-1499 ng/dL 1-2 years: less than or equal to 401 ng/dL 3-6 years: less than or equal to 281 ng/dL 7-9 years: less than or equal to 212 ng/dL 10-12 years: less than or equal to 398 ng/dL 13-15 years: less than or equal to 407 ng/dL 16-17 years: less than or equal to 423 ng/dL 18 years and older: Less than 226 ng/dL Tanner Stage I: less than or equal to 235 ng/dL Tanner Stage II: less than or equal to 367 ng/dL Tanner Stage III: less than or equal to 430 ng/dL Tanner Stage IV-V: less than or equal to 412 ng/dL <u>Males</u> Premature (26-28 weeks): 1219-9799 ng/dL Premature (29-36 weeks): 346-891l ng/dL Full Term (1-5 months): 229-3104 ng/dL 6 months - 364 days: 46-1499 ng/dL 1-2 years: less than or equal to 482 ng/dL 3-6 years: less than or equal to 290 ng/dL 7-9 years: less than or equal to 187 ng/dL 10-12 years: less than or equal to 392 ng/dL 13-15 years: 35-465 ng/dL 16-17 years: 32-478 ng/dL 18 years and older: Less than 442 ng/dL Tanner Stage I: less than or equal to 208 ng/dL Tanner Stage II: less than or equal to 355 ng/dL Tanner Stage III: less than or equal to 450 ng/dL Tanner Stage IV-V: 35-478 ng/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	5 days upon receipt at reference laboratory

Olanzapine

Laboratory	Commercial Mail-out Laboratory
Order Code	OLAN
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2.0 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	5 - 75 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatorgraphy-Tandem Mass Spectrometry
Analytic Time	5 working days upon receipt at reference laboratory

Oligoclonal Bands

See:	 Multiple Sclerosis Screen Panel, Serum & CSF

Oligosaccharides

Laboratory	Commercial Mail-out Laboratory
Order Code	OLIGU
CPT Code	84376
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 3.0 mL from a random urine collection Abslute Minimum: 1.0 mL from a random urine collection
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Oligosaccharides (carbohydrate compounds) are routinely excreted in the urine. There is an increased accumulation of oligosaccharides in the urine of individuals with the any of the mucolipidoses and certain glycoprotein storage disorders. Glycoprotein storage disorders are caused by deficiencies of enzymes required for the degradation of oligosaccharide chains (see table below). Oligosaccharidoses clinically resemble mucopolysaccharidoses and may present on a spectrum from almost normal to any of the following clinical symptoms: coarse facial features, bone and joint dysplasia, hepatosplenomegaly, and mental regression. Not all oligosaccharidoses have detectable oligosaccharides, depending on the amount excreted in the urine. Patients with alpha-mannosidosis, alpha-fucosidosis, and aspartylglucosaminuria may have very subtle excretions. Patients with beta-mannosidosis, mucolipidosis II, and mucolipidosis III, generally do not have detectable oligosaccharides in urine. Urinary oligosaccharides may also be detected in Pompe disease (a glycogen storage disease), Gaucher disease (a lysosomal storage disease), and Sandhoff disease (a sphingolipidosis). Clinical correlation is strongly recommended. <pre> <u>Disorder</u> <u>Defective enzyme</u> Alpha-mannosidosis Alpha-mannosidase Beta-mannosidosis Beta-mannosidase Alpha-fucosidosis Alpha-fucosidase Sialidosis Alpha-neuraminidase Galactosialidosis Beta-galactosidase and neuraminidase Aspartylglucosaminuria Aspartylglycosaminidase Schindler disease Alpha-N-acetylgalactosaminidase Mucolipidosis II (I-cell disease) N-acetylglycosmaine-1- phosphotransferase Mucolipidosis III N-acetylglycosmaine-1- (pseudo-Hurler polydystrophy) phosphotransferase</pre> <u>Cautions</u>: The test can give false-negative results, especially in older patients with mild clinical presentations. Patients with sialidosis or mucolipidosis II or III are not reliably detected. In infants, many oligosaccharide bands are often detected and the clinical significance of the results may be uncertain. Retesting between the ages of 6 months to 1 year is recommended. Enzyme analysis is required to confirm suspected diagnosis.</pre>
Methodology	Thin Layer Chromatography (TLC)
Analytic Time	2 working days upon receipt at reference laboratory

Opiate, Urine Confirmation

Laboratory	Commercial Mail-out Laboratory
Order Code	DAUCOPI
CPT Code	83925
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Minimum	Preferred Minimum: 4 mL random urine with no additives or preservatives Absolute Minimum: 1 mL random urine with no additives or preservatives
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles.
Reference Range	Positive cutoff: 20 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	4 days upon receipt in reference laboratory

Opiates Confirmation

Laboratory	Commercial Mail-out Laboratory
Order Code	OPICON
CPT Code	83925
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Collect TWO full 6 mL pink K2 EDTA top tubes. Adult Preferred Minimum: 4.0 mL plasma Adult/Pediatric Absolute Minimum: 2.0 mL plasma</pre>
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles. Separator tubes and plasma or whole blood from lt. blue (sodium citrate).
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	5 days upon receipt at reference laboratory

Opiates-Urine Screen

Laboratory	Chemistry
Order Code	OPIU
CPT Code	80101
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Urine (Random)-BD Vacutainer, no additive yellow top
Minimum	5 mL random urine
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Screen includes opiates only. For full drug of abuse-urine panel, see "Drugs of Abuse Screen".

If confirmation is needed for opiates, call the Laboratory at 356-3527. Allow up to seven days for confirmatory results. Confirmation is at an additional charge.

Approximate cut-off concentrations (ng/mL)

Buprenorphine	No cross-reactivity
Codeine	224
6-Acetylmorphine (heroin metabolite)	386
Fentanyl	No cross-reactivity
Heroin	366
Hydrocodone	1,086
Hydromorphone	1,425
Meperidine	> 100,000
Methadone	No cross-reactivity
Morphine	300
Oxycodone*	> 75,000

*Therapeutic use of oxycodone in the absence of any other opiates is unlikely to result in a positive opiates screen.

References:

Belson MG, Simon HK, Sullivan K, Geller RJ. The Utility of Toxicologic Analysis in Children with Suspected Ingestion. Pediatr Emerg Care 1999;15:383-387.

Bast RP, Helmer SD, Henderson SR, Rogers MA, Shapiro WM, Smith RS. Limited Utility of Routine Drug Screening in Trauma Patients. South Med J 2000;93:397-399.

Hammett-Stabler CA, Pesce AJ, Cannon DJ. Urine Drug Screening in the Medical Setting. Clinica Chimica Acta 2002;315:125-135.

Schiller MJ, Shumway M, Batki SL. Utility of Routine Drug Screening in a Psychiatric Emergency Setting. Psychiatric Services 2000;51:474-478.

Sugarman JM, Rodgers GC, Paul RI. Utility of Toxicology Screening in a Pediatric Emergency Department. Pediatric Emergency Care. Pediatric Emergency Care 1997;13(3):194-197.</pre>

See:	 Drugs of Abuse-Urine + Confirm, Urine Drugs of Abuse-Urine, Urine
See Appendix	See Additional Information: Cross Reacting Drugs
Methodology	Assay is based on the kinetic interaction of microparticles in a solution (KIMS) as measured by changes in light transmission.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Opportunistic Pulmonary Infection

See:	 Bronchioalveolar Lavage (BAL) for Cancer Evaluation, Bronchioalveolar Lavage Spontaneous Sputum for Cancer Evaluation, Sputum

Orfadin Level

Laboratory	Commercial Mail-out Laboratory
Order Code	NTBC
CPT Code	83789
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/green_4ml.png" class <tr> <td width="110" valign="top" align="center">Light Green top tube (Lithium <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	Preferred Minimum: 1 mL Absolute Minimum: 0.5 mL
Reference Range	40 - 60 umol/L Therapeutic reference range was established in patients with tyrosinemia type I and may not apply to patients with other disorders who are taking nitisinone.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Test Requisition from Seattle Chilren’s Hospital (Biochemical Genetics Lab) with the specimen and the Ala Miscellaneous Request or Epic Req. For monitoring therapeutic drug levels in patients being treated with orfadin (nitisinone).
Methodology	LC/MS/MS
Analytic Time	1 week upon receipt at reference laboratory

Organ-Tissue Donor Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	ORGTMN
CPT Code	<pre>
	Antibody to Trypanosoma cruzi (Anti-T.cruzi) EIA screen: CPT = 86753
	Confirmation testing RIPA confirmed CPT = 86753
	Chlamydia trachomatis CPT = 87491
	CMV Antibody CPT = 86644 (screen)
	Reflex CMV IgG CPT = 86644
	Reflex CMV IgM CPT = 86645
	Hepatitis B Core Antigen CPT = 86704
	Hepatitis B Surface Antigen CPT = 87340
	(Hepatitis B Surface Antigen Confirmatory testing done
	automatically if positive. CPT code = 87340)
	Hepatitis C Antibody CPT = 86803
	(Hepatitis C Antibody Confirmatory testing done automatically
	if positive. CPT code = 86804)
	HIV 1/2 Antibody plus O CPT = 86703
	(HIV 1/2 Antibody Immunoblot will be confirmed on any reactive
	specimen; CPT code = 86689. Confirmatory scheme includes the
	following testing: Anti HIV-1 Western Blot (Bio-Rad),
	HIV-2 EIA (if Western blot negative--Bio-Rad), and
	HIV-2 Immunoblot (if HIV-2 EIA positive--Viromed).
	MPX (HIV/HCV/HBV PCR-NAT) - Combination Test as a screen has the
	following CPT’s:
	HIV = 87535
	HCV = 87521
	HBV = 87516
	Confirmatory testing will be performed on all positive samples using
	the following CPT’s:
	HIV = 87535
	HCV = 87521
	HBV = 87516
	Additional charges apply to confirmatory testing.
	HTLV I/II Antibody: HTLV I CPT code = 86687; HTLV II CPT code =
	86688 (screen only test, no confirmation will be performed).
	Neisseria Gonorrhoeae CPT = 87491
	Syphilis TP CPT code = 86592 If positive, confirmatory
	test is performed FTA-ABS = 86781 at Viromed.
	West Nile Virus (WNV NAT) CPT code = 87798</pre>
Collection Medium	<table>
	<tr>
	<td align=center></td><td rowspan=2 width=20 align=center>and</td>
	<td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt
	<td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt
	<td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm
	<td align=center><a href="javascript:larger_tube(’23.jpg’)"><img src="/pa
	<tr>
	<td width="110" valign="top" align="center">Pink top tube</td>
	<td width="110" valign="top" align="center">Pink top tube</td>
	<td width="110" valign="top" align="center">Pink top tube</td>
	<td width="110" valign="top" align="center">Red top tube</td>
	<td width="110" valign="top" align="center">Urine</td>
	</tr>
	</table>
Minimum	<pre>
	3 full 6 mL pink K2 EDTA top tube
	1 full 6 mL red top tube
	0.5 mL of clean catch urine if testing is needed
	for chlamydia/or gonorrhea is preferred (Male or Female)</pre>
Reference Range	<pre>
	Antibody to Trypanosoma cruzi (Anti-T.cruzi)-Red top tube

```
                    Negative
                  Chlamydia trachomatis (Chlamydia)-Urine preferred or
                    Negative
                  1) CMV Antibody (No reflective testing occurs)-Pink
                     Negative (Positive result suggest current or past
                     Cytomegalovirus (CMV).  The presence of Anti-CMV
                     immunity to the disease.)
                  2) CMV Total Antibody with Reflex to IgG & IgM-Pink
                     Negative
                     Positive Antibodies screens will be determined by
                     CMVTG-CMV IGG
                     CMVTM-CMV IGM</pre>
                  <strong class="style_red">
                  This particular version of CMV testing is for gestat
                  determined by the IVF OBG Department and protocol.</
                  <pre>
                  Antibody to Hepatitis B Core Antigen, Total (detects
                      and IgM)-Pink EDTA tube
                    Negative
                  Hepatitis B Surface Antigen-Pink EDTA tube
                    Non-reactive
                  Hepatitis C Antibody-Pink EDTA tube
                    Non-reactive
                  HIV 1/2 Antibody plus O-Pink EDTA tube
                    Non-reactive
                  HTLV I/II Antibody Screen-Pink EDTA tube
                    Non-reactive
                  MPX (HIV/HCV/HBV PCR-NAT)-Pink EDTA tube
                    These 3 tests are done together, they cannot be se
                    Non-reactive
                    *If the MPX results is negative then the associate
                     state that there is no evidence of exposure to HI
                     HBV, HCV.
                    *If the MPX test is positive, the results will ind
                     Further discriminary testing will subsequently be
                     HIV-1, HCV and HBV to identify the positive marke
                  Neisseria Gonorrhoeae (Gonorrhea)-Urine preferred or
                    Negative
                  Syphilis TP (TPPA)-Pink EDTA tube
                    Non-reactive
                  West Nile Virus (WNV NAT)-Pink EDTA tube
                    Negative</pre>
Order Form:       A-1a Miscellaneous Request or Epic Req
   Comments       <pre>
                  CMV testing is determined by protocol.  Two version
                  1) Screen with no reflex.
                  2) Screen with reflex to IgG and IgM.

                  If you require Antibody to Trypanosoma cruzi (Anti-T
                  (TCRUZIMN) this must be ordered on the requisition a
                  ORGTMN.

                  If you require West Nile Virus nucleic acid testing
                  be ordered on the requisition along with the ORGTMN.

                  These tests may be ordered only if the patient is pa
                  network, sperm, egg or embryo donor, autologous bloo
                  cell donor.
```

Chlamydia/Gonorrhoeae: clean catch urine is preferre
</pre>

Methodology <pre>
1) CMV antibody with no reflex: Immucor Capture-CMV-
   automated.
2) CMV antibody with reflex to IgG and IgM: Capture-
   automated.
Reflex CMV IgG: Chemiluminescence; ELISA II
Reflex CMV IgM: Captia Enzyme Immunoassay; ELISA II

Antibody to Hepatitis B Core Antigen, Hepatitis B Su
Hepatitis C Antibody, HIV 1/2 Antibody plus O, CMV-I
HTLV I/II Antibody Screen use Abbott Prism HTLV-1/HT
for testing.

HIV 1/2 plus O series Antibody Immunoblot will be co
reactive specimen. Confirmatory scheme includes the
testing:
Anti HIV-1 Western Blot (Bio-Rad Western blot), HIV-
blot negative) (Bio-Rad), and HIV-2 Immunoblot (if H
(Viromed).

MPX series (HIV/HCV/HBV PCR-NAT) and West Nile Virus
Acid Testing (NAT) Roche Molecular method.

Syphilis Treponema Pallidum uses microhemagglutinati
PK system.

Trypanosoma cruzi (T. cruzi) uses Ortho EIA screenin

Confirmatory Testing:
Hepatitis B Surface Antigen Confirmation: Neutraliz
performed by BioRad - EIA.

Hepatitis C Antibody Confirmation: Recombinant Immu
RIBA: Chiron-SIA-v.3.0)

HIV-1 Group O or HIV-2. These results should be eva
context of the individual’s risk factors and other c
  MPX: (Roche Multiplex PCR)
  HBV-PCR: (Roche HBV-PCR)
Discriminatory testing performed at Lifesource Testi
  HCV-PCR: (Roche HCV-PCR)
Discriminatory testing performed at Lifesource Testi
  HIV-1PCR: (Roche HIV-1-PCR)
Discriminatory testing performed at Lifesource Testi

Syphilis Treponema Pallidum (Syphilis TP) confirmato
Fluorescent Treponemal Antibody (FTA-ABS) sent to Vi

Chlamydia trachomatis (Chlamydia): uses the Gen-Pro
kit; transferred by Mailouts to this kit for submiss
laboratory

Neisseria Gonorrhoeae (Gonorrhea): uses the Gen-Pro
kit; transferred by Mailouts to this kit for submiss
laboratory.

	Trypanosoma cruzi (T. cruzi) uses: RIPA (radioimmunoprecipitationassay) at a reference labora results in 12 days, set-up on Mondays and Thursdays.<
Analytic Time	1 week upon receipt at reference laboratory

Organic Acids

Laboratory	Commercial Mail-out Laboratory
Order Code	ORGAU
CPT Code	83919
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 10 mL random urine collected in TWO Yellow top conical tubes (no additives) Absolute Minimum: 4 mL random urine collected in a Yellow top conical tube (no additives)
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful For</u>: Diagnosis of inborn errors of metabolism <u>Cautions</u>: The diagnostic specificity of organic acid analysis under acute and asymptomatic conditions may vary considerably. Informative profiles may not always be detected in disorders where the excretion of diagnostic metabolites is a reflection of the residual activity of the defective enzyme, the dietary load of precursors, and the anabolic/catabolic status of a patient. In some cases, methods of higher specificity and sensitivity such as acylcarnitine determination by tandem mass spectrometry and acylglycine determination by gas chromatography-mass spectrometry stable isotope dilution analysis can effectively overcome the limitations of standard organic acid analysis for the investigation of non-acutely ill patients.
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Gas Chromatography-Mass Spectrometry (GC-MS)
Analytic Time	5 days upon receipt in reference laboratory (not reported on Saturday or Sunday)

Ornithine

See:	 Amino Acids, Quantitative, Plasma Amino Acids, Quantitative, Random Urine

Orotic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	OROTAU
CPT Code	83921
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	<pre> 10 mL random or timed urine collected in TWO Yellow top conical tubes (no additives). Absolute Minimum: 3.0 mL</pre>
Reference Range	<pre> <2 weeks: 1.4-5.3 mmol/mol creatinine 2 weeks-1 year: 1.0-3.2 mmol/mol creatinine 2-10 years: 0.5-3.3 mmol/mol creatinine > or = 11 years: 0.4-1.2 mmol/mol creatinine</pre>
Comments	<u>Useful For</u>: Evaluation of the differential diagnosis of hyperammonemia and hereditary orotic aciduria When orotic acid is measured after a protein load or administration of allopurinol, excretion of orotic acid is a very sensitive indicator of ornithine transcarbamylase (OTC) activity. An allopurinol challenge may be helpful in determining whether a female patient may be a carrier of an OTC mutation if molecular genetic testing was not informative. <u>Cautions</u>: Pregnant women will normally excrete up to twice the upper limit of the adult reference range.
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Colorimetric
Analytic Time	5 days upon receipt at reference laboratory

Osmolality

Laboratory	Chemistry
Order Code	OSMS
CPT Code	83930
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green tope tube or ONE microtainer for pediatric patients.
Reference Range	Adult males 280-300 mOsm/kg; adult females 275-295 mOsm/kg
Order Form:	A-1a General Lab or Epic Req
See:	 Osmolality-Other, Body Fluid
See Appendix	See Additional Information: Osmolality Gap - Calculation and Interpretation Osmolality Gap Calculator
Methodology	Freezing Point Depression
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Osmolality Gap

See:	 Osmolality, Plasma
See Appendix	See Additional Information: Osmolality Gap - Calculation and Interpretation

Osmolality-Other

Laboratory	Chemistry
Order Code	OSMSO
CPT Code	83930
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Osmolality, Plasma
Methodology	Freezing point depression
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Osmolality-Urine

Laboratory	Chemistry
Order Code	UROS
CPT Code	83935
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL urine; do not collect in acid
Reference Range	<pre> Dependent upon diet and state of hydration. Commonly: 350-1050 mOsm/kg</pre>
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Freezing Point Depression
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Osmotic Fragility, Erythrocyte

Laboratory	Commercial Mail-out Laboratory
Order Code	ROSF
CPT Code	85555
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Alternate Collection Media:	Light Green top tube (Lithium Heparin)
Minimum	<pre> Preferred Minimum: 5 mL whole blood and TWO unfixed air-dried, and unstained smears Adult/Pediatric Absolute Minimum: 1 mL whole blood and TWO unfixed, air-dried, and unstained smears</pre>
Rejection Criteria:	Grossly hemolyzed specimens.
Reference Range	Within normal curve limits. A graph will accompany laboratory report.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Deliver specimen to lab before 1200 (Sunday through Thursday only)-referred to reference laboratory. Pertinent clinical information should accompany the request. Analysis cannot be done on patients transfused in the preceding three months since the presence of transfused cells may render the interpretation ambiguous.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Spectrophotometry
Analytic Time	5 days upon receipt at reference laboratory

Osteocalcin by ECIA

Laboratory	Commercial Mail-out Laboratory
Order Code	OSTEO
CPT Code	83937
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.3 mL serum
Rejection Criteria:	Hemolyzed specimens.
Reference Range	<pre>

Age	Male	Female
6 months-6 years	39-121 ng/mL	44-130 ng/mL
7-9 years	66-182 ng/mL	73-206 ng/mL
10-12 years	85-232 ng/mL	77-262 ng/mL
13-15 years	70-336 ng/mL	33-222 ng/mL
16-17 years	43-237 ng/mL	24-99 ng/mL
18 years and older	11-50 ng/mL	11-50 ng/mL </pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Electrochemiluminescent Immunoassay
Analytic Time	1-4 days upon receipt at reference laboratory

OTOF (Deafness Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	OTOF
CPT Code	83891, 83894, 83898 (x38), 83903 (x8), 83904 (x48)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Screening for OTOF is performed by DHPLC and sequencing. Oligonucleotide primers have been designed to amplify each exon. Amplified samples are run on the DHPLC; abnormal elution profiles are sequenced to determine the specific mutation. Exons carrying known SNPs are directly sequenced.
Analytic Time	3 months

OtoSCOPE® Genetic Testing Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	OTOSCOPE
CPT Code	81252, 81254, 81400, 81401 x2, 81404, 81405, 81406, 81407 x3, 81408 x2, 81479
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	8-10 mL whole blood
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href= "http://www.healthcare.uic Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. REASONS FOR TESTING: Genetic testing for hearing loss can provide important answers to many questions. By determining the cause of hearing loss, information can be given on recurrence risk for future children, prognosis (whether hearing loss will worsen over time), and best method of treatment (such as cochlear implants or hearing aids).
Methodology	The OtoSCOPE® platform relies on the newest DNA sequencing methods.
Analytic Time	3 months

Ova and Parasite Examination - UHL

Laboratory	State Hygienic Laboratory
Minimum	Pea sized portion of stool
Comments	Within 1 hour of collection transfer a few grams of stool to each vial of O&P SHL collection kit (923450 available from Hospital Stores). Send inoculated collection kit along with Epic order requisition to Specimen Control. Minimum information needed includes the patient name, date of birth, ordering physician, date of collection, test requested and specimen type. Both sample vials must be labeled. The vials must be labeled with two patient identifiers. A minimum of three stool specimens collected on alternate days is recommended. Onset of diarrhea in patients hospitalized for >3 days is usually not attributed to a parasitic infection. <pre>Ordering Options: UHL, Routine O&P (concentration) UHL, Routine O&P with Trichrome Stain UHL, Cryptosporidium Stain (Add-on to O&P) UHL, Cyclospora Stain (Add-on to O&P)</pre> Requests for Microsporidia detection must be specified on the SHL requisition. Please refer to the Ova and Parasite Stool Collection information and the State Hygienic Laboratory website.
Methodology	Direct examination
Analytic Time	1 week
Testing Schedule	5 days a week M-F.

Ovarian Antibodies

Laboratory	Commercial Mail-out Laboratory
Order Code	OVARAB
CPT Code	86255; if reflexed, add 86256
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Recommended Minimum: 1 mL serum
Rejection Criteria:	Plasma. Contaminated, hemolyzed, or severely lipemic specimens.
Reference Range	Less than 1:10
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	If ovarian antibodies are detected, then a titer will be performed and additional charges apply.
Methodology	Semi-Quantitative Indirect Fluorescent Antibody
Analytic Time	Testing schedule varies; reported in 1-9 days upon receipt at reference laboratory.

Oxalate

Laboratory	Commercial Mail-out Laboratory
Order Code	OXALU
CPT Code	83945
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 4.0 mL of well mixed 24 hr urine sample; random accepted. Refrigerate during collection and submission to lab.
Rejection Criteria:	Urines not refrigerated during collection.
Reference Range	<pre> Components Reference Interval Creatinine (24-hours) Male 3-8 years: 140-700 mg/d 9-12 years: 300-1300 mg/d 13-17 years: 500-2300 mg/d 18-50 years: 1000-2500 mg/d 51-80 years: 800-2100 mg/d 81 years and older: 600-2000 mg/d Female 3-8 years: 140-700 mg/d 9-12 years: 300-1300 mg/d 13-17 years: 400-1600 mg/d 18-50 years: 700-1600 mg/d 51-80 years: 500-1400 mg/d 81 years and older: 400-1300 mg/d Oxalate, Urine 0-12 years: 13-38 mg/d Male 13 years and older: 7-44 mg/d Female 13 years and older: 4-31 mg/d</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Quantitative Spectrophotometry
Analytic Time	4 days upon receipt in reference laboratory

Oxcarbazepine (10-Hydroxy Met) Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	OXCBZ
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	Therapeutic Range: 15 - 35 μg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-2 days upon receipt at reference laboratory

Oxycodone

See:	 Opiate, Urine Confirmation, Random Urine

Oxycodone-Urine Screen

Laboratory	Chemistry
Order Code	OXYCU
CPT Code	80101
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Urine (Random)-BD Vacutainer, no additive yellow top
Minimum	5 mL random urine
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Screen includes oxycodone and oxymorphone only. For full drugs of abuse-urine panel, see "Drugs of Abuse Screen". If confirmation is needed for oxycodone or oxymorphone, call the Laboratory at 356-3527. Allow up to seven days for confirmatory results. Confirmation is at an additional charge. Approximate cut-off concentrations (ng/mL)* ---------- Oxycodone 300 Oxymorphone 291 *Assay does not cross-react with other opiates such as buprenorphine, codeine, heroin, hydrocodone, hydromorphone, and morphine, or with synthetic opioids such as fentanyl, meperidine, methadone, or propoxyphene. References: Belson MG, Simon HK, Sullivan K, Geller RJ. The Utility of Toxicologic Analysis in Children with Suspected Ingestion. Pediatr Emerg Care 1999;15:383-387. Bast RP, Helmer SD, Henderson SR, Rogers MA, Shapiro WM, Smith RS. Limited Utility of Routine Drug Screening in Trauma Patients. South Med J 2000;93:397-399. Hammett-Stabler CA, Pesce AJ, Cannon DJ. Urine Drug Screening in the Medical Setting. Clinica Chimica Acta 2002;315:125-135. Schiller MJ, Shumway M, Batki SL. Utility of Routine Drug Screening in a Psychiatric Emergency Setting. Psychiatric Services 2000;51:474-478. Sugarman JM, Rodgers GC, Paul RI. Utility of Toxicology Screening in a Pediatric Emergency Department. Pediatric Emergency Care. Pediatric Emergency Care 1997;13(3):194-197.</pre>
See:	 Drugs of Abuse-Urine + Confirm, Urine Drugs of Abuse-Urine, Urine
See Appendix	See Additional Information: Cross Reacting Drugs
Methodology	Assay is based on the kinetic interaction of microparticles in a solution (KIMS) as measured by changes in light transmission.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Oxygen

See:	 Blood Gases (Arterial), Blood (syringe only) Blood Gases (Capillary Stick), Blood Blood Gases (Venous), Blood (syringe only)

Oxygen Dissociation P50, RBC

Laboratory	Commercial Mail-out Laboratory
Order Code	OXDIS50
CPT Code	82820
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>plus control</t <td align=center><img src="/path_handbook/gifs/tubes/green_10ml.png" clas <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Minimum	Preferred Minimum: 5.0 mL in a green-top tube Absolute Minimum: 1.0 mL
Reference Range	24-30 mm Hg
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Abnormal oxygen-affinity is demonstrated in the presence of some hemoglobin variants: -High oxygen-affinity causes erythrocytosis -Low oxygen-affinity causes cyanosis Increased oxygen-affinity of hemoglobin, reflected in a low p50, left-shifted oxygen dissociation curve, and loss of normal sigmoidal configuration, is characteristic of many hemoglobin variants that are responsible for polycythemia. Measurement of oxygen-affinity is the most important method for diagnosis of these disorders. <u>Cautions</u>: To ensure valid results, the specimen must be < or =72 hours old.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Hemox-Analyzer Measures and Plots 0(2) Saturation
Analytic Time	3 days upon receipt at reference laboratory

Oxygen Saturation (Arterial)

Laboratory	Critical Care Laboratory
Order Code	AOS
CPT Code	82810
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Lithium/Sodium Heparin syring </tr> </table>
Minimum	0.5 mL in Lithium/Sodium Heparin syringes ONLY. No air bubbles in syringe.
Reference Range	94-100%
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required); all needles must be removed from the syringe before delivery. Samples that contain greater than 25% air to sample volume ratio will not be analyzed.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Oximetric
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Oxygen Saturation (Venous)

Laboratory	Critical Care Laboratory
Order Code	VOS
CPT Code	82810
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Lithium/Sodium Heparin syring </tr> </table>
Minimum	0.5 mL in Lithium/Sodium Heparin syringes ONLY. No air bubbles in syringe.
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required). All needles must be removed from the syringe before delivery. Samples that contain greater than 25% air to sample volume ratio will not be analyzed.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Oximetric
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Oxyhemoglobin

See:	 Oxygen Saturation (Arterial), Blood (syringe only) Oxygen Saturation (Venous), Blood (syringe only)

Oxyhemoglobin Dissociation

See:	 Oxygen Dissociation P50, RBC, Blood

P

Pancreastatin

Laboratory	Commercial Mail-out Laboratory
Order Code	PAN
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">GI preservative collection tu </tr> </table>
Minimum	1 mL plasma from a Special Z-GI preservative collection tube obtained from reference laboratory. Mailouts has these tubes, call 356-8593
Reference Range	Up to 135 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Contact Commercial Mailouts at 356-8593 to obtain collection tubes for this testing. No other specimen collection container is acceptable by the reference laboratory. Patients should be fasting for 10-12 hours prior to specimen collection. Antacid medications or medications that affect intestinal motility should be discontinued, if possible, for at least 48 hours prior to collection.</pre>
Methodology	Pancreastatin is measured by direct radioimmunoassay.
Analytic Time	within 10 days upon receipt at reference laboratory

Pancreatic Elastase, Monoclonal

Laboratory	Commercial Mail-out Laboratory
Order Code	MONOELAST
CPT Code	82656
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Feces specimen, stool contain </tr> </table>
Minimum	<pre> 40 g random, formed stool Absolute minimum: 10 g random, formed stool</pre>
Rejection Criteria:	Ambient longer than 5 days.
Reference Range	<pre> > 200 ug PE1/g stool Normal 100-200 ug PE1/g stool Mild to moderate exocrine pancreatic insufficiency < 100 ug PE1/g stool Severe exocrine pancreatic insufficiency Reference ranges applicable for children > 2 weeks of age.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Enzyme substitution therapy does not influence the determination of Pancreatic Elastase. Recommendations Prior to Collection: 3 days before the test *It is recommended if taking antibiotics or antifungals that you wait at least 3 days after your last does before beginning the test (unless instructed otherwise by your physician). *It is recommended that you discontinue use of all the following substances: barium enemas, bentonite clay, castor oil, mineral oil, betaine HCl or digestive enzymes, rectal suppositories, vitamin C supplements and beneficial flora supplements (acidophilus, etc.) (unless requested to continue by your physician). *It is recommended that you eat your usual diet during the 2-3 days prior to stool collection, ideally including some fatty foods (e.g. butter or salad oils) and protein-rich foods. 2 days before the test *It is recommended that your discontinue use of aspirin or ibuprofen (Advil, Motrin, Nuprin) (unless requested to continue by your physician).</pre>
Methodology	Enzymed-Linked Immunosorbent Assay (ELISA)/Monoclonal Assay
Analytic Time	10 days upon receipt at reference laboratory

Pancreatic Elastase

Laboratory	Commercial Mail-out Laboratory
Order Code	PANELAST
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Feces specimen, stool contain </tr> </table>
Minimum	Preferred Minimum: 5 gram stool Absolute Minimum: 1 gram stool
Rejection Criteria:	Stool in media or preservative. Sample cannot be ambient temperature for more than 4 hours.
Reference Range	<pre> Normal: 201 μg/g or greater Moderate to mild exocrine pancreatic insufficiency: 100-200 μg/g Severe exocrine pancreatic insufficiency: 99 μg/g or less</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-4 days upon receipt at reference laboratory

Pancreatic Polypeptide

Laboratory	Commercial Mail-out Laboratory
Order Code	PANP
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum from a 10 hour fasting patient. Absolute Minimum: 0.5 mL serum from a 10 hour fasting patient.
Rejection Criteria:	Plasma. Severely hemolyzed or lipemic specimens.
Reference Range	0 - 435 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient must be fasting for ten hours prior to collection of sample.
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Radioimmunoassay (RIA)
Analytic Time	11 days upon receipt at reference laboratory

Pandy's Test

Comments	Done by M.D. on ward.

Pap Smear

Laboratory	Cytopathology
CPT Code	<pre> Screening Pap Smear HCPCS codes: P3000 (technical) P3001 (physician code if abnormal) Diagnostic Pap Smear CPT codes: 88164 (technical) 88141 (physician code if abnormal) </pre>
Minimum	1 smear; fix immediately (without air-drying) with spray fixative.
Reference Range	Normal result is: Negative for intraepithelial lesion or malignancy.
Order Form:	H-2 Cytopathology or Epic Req
Comments	<pre> The requisition with complete patient history must accompany the specimen: Provide age, last menstrual period, type of hormones being received, IUD, abnormal bleeding, previous abnormal smears, chemotherapy and/or radiation. Pencil patient’s name and hospital number on the frosted end of the glass slide.</pre>
See:	 Pap Test-Liquid Based Collection, Cervical/Endocervical/Vaginal Cells in Fluid Collection Media
Methodology	Manual screening by cytotechnologist under physician supervision.
Analytic Time	5 working days

Pap Test-Liquid Based Collection

Laboratory	Cytopathology
CPT Code	<pre> Screening Liquid Based Pap test HCPCS codes: G0123 (technical) G0124 (physician code if abnormal) Diagnostic Liquid Based Pap test CPT codes: 88142 (technical) 88141 (physician code if abnormal)</pre>
Minimum	<pre> One collection vial with detached Cervex-brush(broom)head in proprietary fixative solution. Collection kits (SUREPATH) are available from Processed Stores #924046. See collection video link listed below. This video is 9 min 45 seconds and will take you through the step by step collection procedure.</pre>
Reference Range	Normal Result is: Negative for intraepithelial lesion or malignancy.
Order Form:	H-2 Cytopathology or Epic Req
Comments	<pre> The requisition with complete patient history must accompany the specimen: Provide age, last menstrual period, type of hormones being received, IUD, abnormal bleeding, previous abnormal smears, chemotherapy and/or radiation. Be sure and label the collection container with the patient’s name and medical record number. The sample container should contain the detached head of the broom (see Sample Collection Instruction Video). <script type="text/javascript" src="http://collections.uiowa.edu/opp/openPlayer/script.js"></script> <script type="text/javascript"><!-- url="com/WIN/pathology/pap_x264.mp4"; start(); //--></script></pre>
See:	 Pap Smear, Cervical/Vaginal Smear
Methodology	Cervical/Endocervical/Vaginal cells collected in a preservative fluid, automated liquid based preparation (AutoCyte PREP); manual screening under physician supervision.
Analytic Time	5 working days

Paraneoplastic Autoantibodies, Serum

Laboratory	Commercial Mail-out Laboratory
Order Code	NEOPLAS
CPT Code	86255 x2
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	2 mL serum in red top tube
Rejection Criteria:	Contaminated, heat-inactivated, hemolyzed, or lipemic specimens.
Reference Range	<pre> Components Reference Interval Purkinje Cell/Nuclear IgG Scm None Detected Neuronal Nuclear Antibody (ANNA) IFA Titer, IgG < 1:10 Purkinje Cell Antibody, Titer < 1:10 Neuronal Nuclear (Hu, Ri, Yo, and Amphiphysin) Antibodies IgG by Immunoblot None Detected</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	PCCA/ANNA antibodies are screened by IFA. If the IFA screen is positive at 1:10, then a specific titer (PCCA or ANNA) and immunoblot will be added. Additional charges apply.
See:	 NMDA Receptor Antibodies, Serum Voltage-Gated Calcium Channel Antibodies, Serum Voltage-Gated Potassium Channel Antibodies, Serum
Methodology	Semi-Quantitative Indirect Fluorescent Antibody/Qualitative Immunoblot
Analytic Time	1-9 days upon receipt at reference laboratory

Paraneoplastic Autoantibody

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                  Laboratory  Commercial Mail-out Laboratory
                  Order Code  PNCSF
                    CPT Code  <pre>
                              86256 AGNAC, 86256 Amphiphysin, 86256 ANNA-1, 86256 ANNA-2,
                              86256 ANNA-3, 86256 CRMP-5-IgG, 86256 PCA-1, 86256 PCA-2,
                              86256 PCA-Tr, 84182 Paraneoplastic autoantibody Western blot
                                 confirmation (if appropriate),
                              84182 CRMP5 Western blot confirmation (if appropriate),
                              86341 GAD65 confirmation (if appropriate)
                              84182 Amphiphysin Western Blot confirmation (if appropriate)</pre>
            Collection Medium  <table>
                              <tr>
                              <td align=center><a href="javascript:larger_tube('24.jpg')"></a></td></tr
                              <tr>
                              <td width="110" valign="top" align="center">CSF container</td>
                              </tr>
                              </table>

                     Minimum  Preferred Minimum:  4 mL spinal fluid (CSF)<br />
                              Absolute Minimum:  3 mL spinal fluid (CSF)
              Reference Range  <pre>
                              ANTINEURONAL NUCLEAR ANTIBODY-Type 1 (ANNA-1)
                                 Negative at <1:2
                              ANTINEURONAL NUCLEAR ANTIBODY-Type 2 (ANNA-2)
                                 Negative at <1:2
                              ANTINEURONAL NUCLEAR ANTIBODY-Type 3 (ANNA-3)
                                 Negative at <1:2
                              PURKINJE CELL CYTOPLASMIC ANTIBODY, Type 1 (PCA-1)
                                 Negative at <1:2
                              PURKINJE CELL CYTOPLASMIC ANTIBODY, Type 2 (PCA-2)
                                 Negative at <1:2
                              PURKINJE CELL CYTOPLASMIC ANTIBODY, Type Tr (PCA-Tr)
                                 Negative at <1:2
                              AMPHIPHYSIN ANTIBODY
                                 Negative at <1:2
                              CRMP-5-IgG
                              Negative at <1:2

                              Note:  Titers lower than 1:2 are detectable by recombinant CRMP-5
                              Western blot analysis. CRMP-5 Western blot analysis will be done on
                              request on stored spinal fluid (held 4 weeks). This supplemental
                              testing is recommended in cases of chorea, vision loss, cranial
                              neuropathy and myelopathy. Call the Clinical Pathology Core Laboratory
                              at 356-3527 to request CRMP-5 Western blot.

                              Neuron-restricted patterns of IgG staining that do not fulfill criteria
                              for the listed autoantibodies may be reported as "unclassified
                              antineuronal IgG." If detected, newly identified autoantibody
                              specificities may be reported. Complex patterns that include
                              non-neuronal elements may be reported as "uninterpretable."</pre>
                 Order Form:  A-1a Miscellaneous Request or Epic Req
                    Comments  This mailout test requires pathologist approval for orders during
                              inpatient encounters.  Mailouts staff will not process order without
                              approval.  The pathologist covering mailouts approval can be reached at
                              pager #5379.  If approval is given, the name of the pathologist can be
                              selected in the drop-down menu to the right of the approval warning in
                              Epic when ordering the test.<br />
                              <br />
                              <u>Testing Algorithm</u><br />
                              If IFA is indeterminate, paraneoplastic autoantibody Western blot is
                              performed at an additional charge.<br />
                              <br />
                              If IFA pattern is suggestive of neuromyelitis optica (NMO), then
                              NMO-IgG is performed at an additional charge.<br />
                              <br />
                              If client requests or if IFA patterns suggest CRMP-5-IgG, CRMP-5-IgG
                              Western blot is performed at an additional charge.<br />
                              <br />
                              If IFA patterns suggest GAD65 antibody, GAD65 antibody
                              radioimmunoprecipitation assay is performed at an additional
                              charge.<br />
                              <br />
                              If IFA patterns suggest amphipysin antibody, amphiphysin Western blot
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	is performed at an additional charge.
See:	 NMDA Receptor Antibodies, CSF
Methodology	<pre> Indirect Immunofluorescence Assay (IFA) Radioimmunoprecipitation Assay (RIA) Western Blot</pre>
Analytic Time	8 days upon receipt at reference laboratory

Paraneoplastic Reflexive Panel

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                Laboratory  Commercial Mail-out Laboratory
                Order Code  PNSER
                  CPT Code  <pre>
                            83519-59/ACh receptor (muscle) binding antibody
                            83519-59/AChR ganglionic neuronal antibody
                            83519-59/N-type calcium channel antibody
                            83519-59/P/Q-type calcium channel antibody
                            83520/Striational (striated muscle) antibodies
                            86256/AGNA-1
                            86256/Amphiphysin
                            86256/ANNA-1
                            86256/ANNA-2
                            86256/ANNA-3
                            86256/CRMP-5-IgG
                            86256/PCA-1
                            86256/PCA-2
                            86256/PCA-Tr
                            83519-59/ACh receptor (muscle) blocking antibodies (if appropriate)
                            83519-59/ ACh receptor (muscle) modulating antibodies (if appropriate)
                            83519-59/Neuronal (V-G) K Channel Ab, S (if appropriate)
                            84182/CRMP-5-IgG Western blot (if appropriate)
                            84182/Paraneoplastic autoantibody Western blot confirmation (if
                              appropriate)
                            86341/GAD65 antibody assay (if appropriate)
                            84182/Amphiphysin Western Blot (if appropriate)</pre>
        Collection Medium   <table>
                            <tr>
                            <td align=center></td><td rowspan=2 width=20 align=center>and</td>
                            <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm
                            <tr>
                            <td width="110" valign="top" align="center">Red top tube</td>
                            <td width="110" valign="top" align="center">Red top tube</td>
                            </tr>
                            </table>

                    Minimum  <pre>
                            Adult minimum: 12 mL whole blood in two 6 ml red top tubes to yield
                              (min: 4.0 mL serum)

                            Pediatric minimum: 6 mL whole blood in one red top tube to yield
                              (min: 2.0 mL serum)</pre>
          Reference Range   <pre>
                            NEURONAL NUCLEAR ANTIBODIES
                                  Antineuronal Nuclear Antibody-Type 1 (ANNA-1)
                                              <1:240
                                  Antineuronal Nuclear Antibody -Type 2 (ANNA-2)
                                              <1:240
                                  Antineuronal Nuclear Antibody -Type 3 (ANNA-3)
                                              <1:240
                                  Anti-Glial/Neuronal Nuclear Antibody-Type 1 (AGNA-1)
                                              <1:240

                            NEURONAL AND MUSCLE CYTOPLASMIC ANTIBODIES
                                  Purkinje Cell Cytoplasmic Antibody, Type 1 (PCA-1)
                                              <1:240
                                  Purkinje Cell Cytoplasmic Antibody, Type 2 (PCA-2)
                                              <1:240
                                  Purkinje Cell Cytoplasmic Antibody, Type Tr  (PCA-Tr)
                                              <1:240
                                  Amphiphysin Antibody
                                              <1:240
                                  CRMP-5-IgG
                                              <1:240
                            Note:  Titers lower than 1:240 are detectable by recombinant CRMP-5
                            Western blot analysis. CRMP-5 Western blot analysis will be done on
                            request on stored serum (held 4 weeks). This supplemental testing is
                            recommended in cases of chorea, vision loss, cranial neuropathy, and
                            myelopathy. Call the Neuroimmunology Laboratory at 800-533-1710 or
                            507-266-5700 to request CRMP-5 Western blot.
                                  Striational (Striated Muscle) Antibodies
                                              <1:60

                            CATION CHANNEL ANTIBODIES
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                                N-Type Calcium Channel Antibody
                                           < or = 0.03 nmol/L
                                P/Q-Type Calcium Channel Antibody
                                           < or = 0.02 nmol/L
                                ACh Receptor (Muscle) Binding Antibody
                                           < or = 0.02 nmol/L
                                AChR Ganglionic Neuronal Antibody
                                          < or = 0.02 nmol/L
                                Voltage-Gated Potassium Channel Antibody
                                          < or = 0.02 nmol/L
                                GAD65 Antibody
                                          < or = 0.02 nmol/L

                           Neuron-restricted patterns of IgG staining that do n
                           for amphiphysin, ANNA-1, ANNA-2, ANNA-3, PCA-1, PCA-
                           CRMP-5-IgG may be reported as "unclassified antineur
                           patterns that include non-neuronal elements may be r
                           "uninterpretable."</pre>
                 Order Form:  A-1a Miscellaneous Request or Epic Req
                    Comments  Testing Algorithm<br />
                           If IFA  patterns are indeterminate, paraneoplastic a
                           blot is performed at an additional charge.<br />
                           <br />
                           If client requests or if IFA patterns suggest CRMP-5
                           Western blot is performed at an additional charge. <
                           <br />
                           If IFA pattern is suggestive of neuromyelitis optica
                           performed at an additional charge. <br />
                           <br />
                           If IFA patterns suggest amphiphysin antibody, amphip
                           is performed at an additional charge. <br />
                           <br />
                           If IFA patterns suggest GAD65 antibody, GAD65 antibo
                           is performed at an additional charge. <br />
                           <br />
                           If ACh receptor binding antibody is >0.02 or if stri
                           are > or = 1:60, ACh receptor modulating antibodies
                           Western blot are performed at an additional charge.<
                           <br />
                           Please refer to the <a href= "http://www.mayoreferen
                           from the Mayo Medical Laboratories.

                          See:  <br />Paraneoplastic Autoantibody, CSF
                 Methodology  <pre>
                           Indirect Immunofluorescence (IFA)
                           Enzyme Immunoassay (EIA)
                           Radioimmunoassay (RIA)
                           Western Blot</pre>
               Analytic Time  10 days upon receipt at reference laboratory
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Paraprotein Screen

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See:  <br />Immunofixation Electrophoresis, Serum
      <br />Urine Immunofixation Electrophoresis, Urine
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Parathyroid Hormone (Intact)

Laboratory	Chemistry
Order Code	PTHP
CPT Code	83970
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	6 mL whole blood in pink top tube
Rejection Criteria:	Grossly hemolyzed or lipemic specimens
Reference Range	<pre> cord blood: <3.0 pg/mL 2-20 years: 9-52.0 pg/mL adults: 10-65 pg/ml</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Please refer to the Intact PTH figures in the article <a href= http://www Sensitive Two-Site Immunoradiometric Assay of Parathyrin, and Its Clinical Utility in Evaluating Patients with Hypercalcemia found on page 1366 of Clinical Chemistry, Vol. 33, No. 8, 1987.
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Parathyroid Hormone-Other

Laboratory	Chemistry
Order Code	PTHO
CPT Code	83970
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Parathyroid Hormone (Intact), Plasma
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Parietal Cell Antibody and Reflex Titer

Laboratory	Immunopathology
Order Code	APCA
CPT Code	<pre> 86255 Parietal Cell Antibody 86256 Parietal Cell Antibody Titer</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL; red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	<pre> <1:40 Titer If the screen is positive at 1:40, APCA titer is automatically performed.</pre>
Order Form:	A-1a Immunopathology or Epic Req
Methodology	Indirect Immunofluorescence
Analytic Time	1 week
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Paroxetine Quantitation

Laboratory	Commercial Mail-out Laboratory
Order Code	PAROXE
CPT Code	80299
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.4 mL serum</pre>
Rejection Criteria:	Gel separator tubes
Reference Range	By report.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	5 working days upon receipt at reference laboratory

Paroxysmal Nocturnal Hemoglobinuria (PNH) Screen

Laboratory	Flow Cytometry Service
CPT Code	<pre> Technical: 88184 x1 and 88185 x3 Professional: 88187 - 26</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	Adult or pediatric: 10 mL; yellow top tube (ACD-A)
Reference Range	An interpretative report will be provided by the pathologist.
Order Form:	A-1a Immunopathology or Epic Req
Comments	<pre> Ham’s acid hemolysin and sucrose lysis tests have been replaced by flow cytometric testing for glycosylphosphatidyl inositol (GPI)-anchored proteins CD14 and CD24, and aerolysin binding. These proteins are not expressed on PNH white blood cells and their lack of expression is determined by flow cytometric assay. The channel-forming toxin, aerolysin, and its inactive precursors, proaerolysin, bind selectively with a high affinity to the GPI anchor itself. The lack of CPI anchor on blood cell surface will decrease the ability of fluorescently labeled protein aerolysin (FLAER) to bind to nucleated blood cells in patients with PNH. Paroxysmal nocturnal hemoglobinuria (PNH) is a stem cell disorder in which the affected cells are deficient in GPI-anchored proteins. GPI-anchored proteins include a number of important molecules on the surfaces of blood cells of all lineages. These include CD14 on monocytes and CD24 on granulocytes. Determination of CD14 and CD24 must be performed on fresh whole blood. Both monocytes and granulocytes are analyzed for CD14/CD24 expression and aerolysin bindings. Granulocytes are the most sensitive population in which to detect GPI-anchored protein deficiency. Two additional markers are performed for gating purposes, CD45 (leukocyte common antigen) and CD15 (myeloid antigen). Results are issued as a Bone Marrow (H-6) report interpreted by a pathologist. The number of GPI-anchored protein deficient cells can vary widely from case to case. Those patients with the highest relative numbers of GPI-anchored protein deficient cells are most likely to have classical PNH symptoms, while those with small relative numbers are more likely to present with aplastic anemia or myelodysplastic syndrome. About 20-25% of patients with aplastic anemia and MDS have been found to demonstrate small clones of PNH cells, so studies for PNH may also be indicted in patients with these diagnoses. REFS: 1)Richards, S et al. Application of Flow Cytometry to the Diagnosis of Paroxysmal Noctural Hemoglobinuria. Cytometry 2000; 42:223-233. 2)Dunn, D, et al. Paroxysmal Nocturnal Hemoglobinuria in Patients with Bone Marrow Failure Syndromes. Ann Int Med 1999; 131:401-408. 3) Brodsky RA, et al. Improved detection and characterization of paroxysmal nocturnal hemoglobinuria using fluorescent aerolysin. Am J Clin Pathol 2000; 114:459-66. </pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow Cytometry
Analytic Time	2 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Partial Thromboplastin Time

See:	 Activated Partial Thromboplastin Time (aPTT), Plasma

Parvovirus B-19, PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	PARVPCRB
CPT Code	87798
Collection Medium	Miscellaneous container; contact laboratory
Minimum	Preferred Minimum: 1 mL bone marrow Absolute Minimum: 0.5 mL bone marrow
Rejection Criteria:	Frozen specimens. Heparinized specimens.
Reference Range	<pre> Negative - Parvovirus B19 DNA not dected by PCR Positive - Parvovirus B19 DNA dected by PCR A negative result does not rule out the presence of PCR inhibitors in the patient specimen or parvovirus DNA in concentrations below the level of detection by the assay.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Parvovirus, PCR, Human, Amniotic Fluid, Synovial, CSF, Vesicle Fluid, Tissue-Snap Frozen
Methodology	Qualitative Polymerase Chain Reaction (PCR)
Analytic Time	2-5 days upon receipt at reference laboratory

Parvovirus B19 IgG/IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	PARVO
CPT Code	86747(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum
Rejection Criteria:	Contaminated, heat-inactivated, hemolyzed, hyperlipemic, or icteric serum.
Reference Range	<pre> Parvovirus B19 IgG Index IV = Index Value 0.89 IV or less: Negative - No significant level of detectable Parvovirus B19 IgG antibody 0.90 - 1.10 IV: Equivocal - Repeat testing in 10-14 days may be helpful 1.11 IV or greater: Positive - IgG antibody to Parvovirus B19 detected, which may indicate a current or past infection. Parvovirus B19 IgM Index IV = Index Value 0.89 IV or less: Negative - No significant level of detectable Parvovirus B19 IgM antibody 0.90 - 1.10 IV: Equivocal - Repeat testing in 10-14 days may be helpful 1.11 IV or greater: Positive - IgM antibody to Parvovirus B19 detected, which may indicate a current or recent infection. However, low levels of IgM antibodies may occasionally persist for more than 12 months post-infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Mark specimens as "acute" or "convalescent" specimen. Parallel testing is preferred and convalescent samples must be received within 30 days from receipt of acute samples.
See:	 Parvovirus, PCR, Human, Amniotic Fluid, Synovial, CSF, Vesicle Fluid, Tissue-Snap Frozen
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-3 days upon receipt at reference laboratory

Parvovirus B19 Quantitative by PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	PB19QTO
CPT Code	87799
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Sterile container</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	CSF or Amniotic Fluid: 2 mL collected in a sterile, screw top tube. Bone Marrow: 2 mL collected in EDTA tube. Tissue: Place in sterile, screw top container; add small amount of sterile saline to keep moist.
Rejection Criteria:	Whole blood frozen
Reference Range	100 copies/mL to 1 x 10¹⁰ copies/mL Tissue specimen results will be normalized to copies/1,000 cells
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Parvovirus B19 manifests itself as an acute or chronic hematological disorder in immunocompromised patients. It can cause persistent anemia, sometimes associated with leukopenia and thrombocytopenia. Pediatric transplant patients are at risk for chronic infections, which can be associated with lung and/or renal disorders. Quantitative DNA PCR can be used to detect the presence of the virus, track the course of infection, and monitor response to treatment.
Methodology	Real-time, Quantitative PCR
Analytic Time	24 hours upon receipt at reference laboratory
Testing Schedule	Testing performed Monday through Saturday.

Parvovirus B19 Quantitative by RT-PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	PB19QTB
CPT Code	87799
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	2 mL plasma
Rejection Criteria:	Whole blood frozen
Reference Range	100 copies/mL to 1 x 10¹⁰ copies/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Parvovirus B19 manifests itself as an acute or chronic hematological disorder in immunocompromised patients. It can cause persistent anemia, sometimes associated with leukopenia and thrombocytopenia. Pediatric transplant patients are at risk for chronic infections, which can be associated with lung and/or renal disorders. Quantitative DNA PCR can be used to detect the presence of the virus, track the course of infection, and monitor response to treatment.
Methodology	Real-time, Quantitative PCR
Analytic Time	24 hours upon receipt at reference laboratory
Testing Schedule	Testing performed Monday through Saturday.

Parvovirus, PCR, Human

Laboratory	Commercial Mail-out Laboratory
Order Code	VPARVPCR
CPT Code	87798
Collection Medium	Sterile container
Minimum	Preferred Minimum: 1 mL amniotic or synovial fluid in a sterile container. Fresh tissue, snap frozen. Absolute Minimum: 0.5 mL amniotic or synovial fluid in a sterile container. Fresh tissue, snap frozen.
Rejection Criteria:	Nonsterile or leaking containers. Heparinized or hemolyzed samples. Frozen whole blood. Tissues only in formalin or other preservatives.
Reference Range	Qualitative testing reported as Detected/Not Detected.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Fresh tissue (snap frozen) or formalin fixed and/or paraffin embedded tissue are also accepted specimen types. Formalin fixed or paraffin embedded tissue can be submitted but it is not an optimal sample. Sterile technique required for handling samples.
See:	 Parvovirus B-19, PCR, Bone Marrow Parvovirus B19 IgG/IgM, Serum
Methodology	Qualitative Polymerase Chain Reaction (PCR)
Analytic Time	4 working days upon receipt at reference laboratory

Parvovirus, PCR, Human

Laboratory	Commercial Mail-out Laboratory
Order Code	PARBL
CPT Code	87798
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Preferred Minimum: 1 mL serum or plasma Absolute Minimum: 0.5 mL serum or plasma
Rejection Criteria:	Heparinized or hemolyzed samples. Frozen whole blood.
Reference Range	Qualitative testing reported as Detected/Not Detected.
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Parvovirus B-19, PCR, Bone Marrow Parvovirus B19 IgG/IgM, Serum
Methodology	Qualitative Polymerase Chain Reaction (PCR)
Analytic Time	4 working days upon receipt at reference laboratory

Pathologist Cytospin Review

Laboratory	Hematology
Order Code	BFCYTO
CPT Code	88104 (Technical) 88104 (Professional)
Collection Medium	Miscellaneous container; contact laboratory
Minimum	0.7 mL; lavender top
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> This test only performed in conjunction with BFX (cell counts). This test is a pathologist’s examination of a wright-stained slide prepared on a cytospin. The specific reason for the examination must be noted on the requisition. A written interpretation by a pathologist is reported by computer. Specimens suspicious for malignancy should be confirmed with PAP stained millipore cytology or tissue biopsy. These slides are held in a permanent file for future reference. A Body Fluid Count is necessary to order this test.</pre>
See:	 Body Fluid Cell Count and Differential, Miscellaneous Body Fluids
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Pathologist Cytospin Review

Laboratory	Hematology
Order Code	CFCYTO
CPT Code	88104 (Technical) 88104 (Professional)
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	0.7 mL; CSF
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> This test only performed in conjunction with CFX (cell counts). This test is a pathologist's examination of an air-dried wright-stained slide prepared on a cytospin. The specific reason for the examination must be noted on the requisition. A written interpretation by a pathologist is reported by computer. Specimens suspicious for malignancy should be confirmed with pap stained millipore cytology or tissue biospy. These slides are held in a permanent file for future reference. A CSF Cell Count is necessary to order this test.</pre>
See:	 Cell Count and Differential, CSF
Methodology	Wright Stain
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Paxil

See:	 Paroxetine Quantitation, Serum

PBG

See:	 Porphobilinogen, Qualitative, Urine, Random

PCA3 Prostate Cancer Biomarker

Laboratory	Commercial Mail-out Laboratory
Order Code	PCA3
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 5 mL random urine in Yellow top conical tube (no additive). Urine submitted to lab will be transferred into TWO Aptima® tubes; with 2 mL urine in each Aptima® tube.
Rejection Criteria:	Specimens not collected in a PCA3 urine collection kit. Less than 2 mL of urine in each tube.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test is FDA approved for men 50 year of age or older who have had one or more previous negative prostate biopsies, and for whom a repeat biopsy would be recommended by a urologist based on current standard of care, before considering the use of the PCA3 Assay. The test should not be used for men with atypical small acinar proliferation (ASAP) on their most recent biopsy.
Methodology	Transcription-Mediated Amplification/Hybridization Protection Assay
Analytic Time	3-6 days upon receipt at reference laboratory.

PCP (Phencyclidine)

See:	 Phencyclidine Quant, Random Urine

PEG Insulin Assay

Laboratory	Chemistry
Order Code	INSL*
CPT Code	83525
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tubes or TWO microtainers from a fasting patient.
Reference Range	2.6 - 24.9 micro U/mL (fasting)
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> This assay will allow measurement of free insulin by removal of anti-insulin antibodies with PEG (polyethylene glycol). This assay is intended for patients where it is suspected that the insulin assay is interfered with by auto-antibodies to insulin. This most commonly occurs with patients treated with non-human insulins (e.g., cow or pig) and is very rare for patients treated with the modern recombinant human insulins. An analysis of data in the Chemistry laboratory from 2006-2009 indicated that the rate of antibody interference with the insulin assay is less than 1 in 3,000 patients. The laboratory will report results both with PEG precipitation (free insulin) and without PEG precipitation (total insulin). A glucose will be automatically done on each specimen at no additional charge. This insulin assay does NOT measure the insulin analogs lispro (Humalog), aspart (NovoLog), and glargine (Lantus). Please contact the laboratory if an assay with cross-reactivity to these insulin analogs is required. </pre>
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	Monday-Friday

Pemphigus/Pemphigoid/EBA Antibodies Screen, Titer and Interpretation

Laboratory	Immunopathology
Order Code	PGGS
CPT Code	<pre> 88347 Pemphigus/Pemphigoid/EBA Screen (Technical) 88347-26 Pemphigus/Pemphigoid/EBA (Professional Interpretation)</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult: 5 mL; red top tube Pediatric: 2 mL; red top tube</pre>
Reference Range	<1:10 Titer
Order Form:	A-1a Immunopathology or Epic Req
Comments	All three antibodies are detected by this assay. Include relevant clinical information and consultation request.
Methodology	Indirect Immunofluorescence on monkey esophagus. Salt split skin or rat bladder may also be used if EBA or paraneoplastic pemphigus is indicated.
Analytic Time	1 week
Testing Schedule	Bi-weekly (Mon and Thurs) - Batch analysis performed twice weekly on Mondays and Thursdays excluding university holidays.

Pentagastrin Stimulation Test

See:	 Calcitonin, Serum

Pentobarbital (Nembutal) (As a Therapeutic Agent)

Laboratory	Chemistry
Order Code	PENT
CPT Code	82205
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or THREE light green top microtainers for pediatric patients.
Reference Range	Used in treatment of increased intracranial pressure with target concentrations of approximately 25-40 mcg/mL.
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Methodology	Fluorescence Polarization Immunoassay
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	7 days per week. Sample must be received by 1000 for same day service. F

Pepsinogen II

Laboratory	Commercial Mail-out Laboratory
Order Code	PEPSIN2
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Red top tube
Minimum	<pre> Preferred Minimum: 3 mL K2 EDTA plasma or serum Absolute Minimum: 1 mL K2 EDTA plasma or serum</pre>
Reference Range	Up to 22 ng/ml
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient should be fasting 10 - 12 hours prior to collection of specimen. Antacids or other medications affecting stomach acidity or gastrointestinal motility should be discontinued, if possible, for at least 48 hours prior to collection.
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Radioimmunoassay (RIA)
Analytic Time	5-7 working days

Perianal Rapid Strep Screen Panel

Laboratory	Chemistry
Order Code	RSPOCO
CPT Code	87880
Collection Medium	<table> <tr> <td align=center></td><t <td align=center><a href="javascript:larger_tube('74.jpg')"><img src="/pa <tr> <td width="110" valign="top" align="center">ESwab Collection & Transport <td width="110" valign="top" align="center">Aerobic Culturette</td> </tr> </table>
Minimum	Collect: ONE ESwab (Product #74541) and ONE perianal Swab (Aerobic Culturette, Product #922349) Send the ESwab and requisition for Microbiology: Tissue/Wound to Microbiology and send the perianal swab (Aerobic Culturette) and requisition for Rapid Strep Screen-Perianal to Specimen Control.
Comments	This panel is available only in Epic.
See:	 Bacterial Culture

Pericardial, Peritoneal, Or Pleural Fluid

See:	 Cytologic Evaluation, Body Fluid

Peripheral Blood Smear Morphology

See:	 Blood Smear, Path Morphologic Exam, (Wright Stain) Blood Smear, Technologist Review, (Wright Stain) Body Fluid Cell Count and Differential, Miscellaneous Body Fluids

Peritoneal Wash

Laboratory	Cytopathology
Minimum	Specimen obtained in the O.R. (Operating Rooms).
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
Comments	The requisition with complete patient history must accompany the specimen. Deliver fresh to the lab in a clean, secure container(s), appropriate to quantity of material obtained. Label container(s) with patient name.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	2 days

pH

Laboratory	Chemistry
Order Code	PHO
CPT Code	83986
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	5 mL
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Glass Electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Phenytoin

Laboratory	Chemistry
Order Code	DPH
CPT Code	80185
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL; light green top tube or ONE microtainer.
Reference Range	<pre> 10-20 mcg/mL Critical value: >40 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	Fosphenytoin is a pro-drug that is metabolized to phenytoin. The inactive pro-drug is cross-reactive with serum phenytoin when measured by immuno analytic assays. To avoid significant false elevations in serum phenytoin or serum free phenytoin, phenytoin serum specimens should not be drawn for 2 hours following completion of an I.V. fosphenytoin infusion, or 4 hours following an I.M. fosphenytoin dose.
See:	 Phenytoin, Free, Plasma
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Kinetic Interaction of Microparticles in Solution (KIMS)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Phosphatase, Alkaline

Laboratory	Chemistry
Order Code	ALP
CPT Code	84075
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients.
Reference Range	<pre> AGE MALES FEMALES 1 - 30 days 75-316 U/L 48-406 U/L 31 days - 1 year 82-383 U/L 124-341 U/L 1 - 3 years 104-345 U/L 108-317 U/L 4 - 6 years 93-309 U/L 96-297 U/L 7 - 9 years 86-315 U/L 69-325 U/L 10 - 12 years 42-362 U/L 51-332 U/L 13 - 15 years 74-390 U/L 50-162 U/L 16 - 18 years 52-171 U/L 47-119 U/L Adults 40-129 U/L 35-104 U/L</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	New assay as of (9/5/02). See reference range change.
See:	 Alkaline Phosphatase-Other, Body Fluid
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Phosphatidylglycerol (PG)

Laboratory	Chemistry
Order Code	PG
CPT Code	84081
Collection Medium	Miscellaneous container; contact laboratory
Minimum	<pre> Preferred minimum: 5 mL amniotic fluid Absolute minimum: 1 mL amniotic fluid</pre>
Reference Range	<pre> Negative: PG absent or <0.5 mcg/mL. Significant risk of RDS Low Positive: PG > or = to 0.5 mcg/mL. Low risk of RDS High Positive: PG > 2 mcg/mL. Mature</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Test performed only if amniotic fluid is contaminated with meconium or blood.
Methodology	Latex Agglutination
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Phosphorus

See:	 Inorganic Phosphorus (Phosphate), Urine, Quantitative Inorganic Phosphorus (Phosphate), Urine, Random Phosphorus, Inorganic, Plasma

Phosphorus, Inorganic

Laboratory	Chemistry
Order Code	PO4
CPT Code	84100
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green tope tube or ONE microtainer for pediatric patients.
Reference Range	<pre> Newborn to 11 months: 4.2 - 9.0 mg/dL 12 months to 15 years: 3.2 - 6.3 mg/dL 16+ years: 2.7 - 4.5 mg/dL Significant value < 1.0 mg/dL Reference ranges updated 6/30/2011.</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Phosphorus-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Critical Lab Values Chemistry Pediatric Reference Ranges
Methodology	End Point Testing
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

pH

Laboratory	Chemistry
Order Code	URPH
CPT Code	83986
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	Random specimen (must be 5 mL), must be collected under oil.
Order Form:	A-1a General Lab or Epic Req
Comments	Reported to nearest 0.01 unit.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	Glass Electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Phencyclidine Quant

Laboratory	Commercial Mail-out Laboratory
Order Code	PCPQ
CPT Code	83992
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	<pre> Preferred Minimum: 10 mL random urine collected from TWO yellow top conical tubes (no additive) Adult and Pediatric Absolute minimum: 2.0 mL random</pre>
Reference Range	<pre> By report Positive cutoff: 10 ng/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Drugs covered: phencyclidine (PCP)
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-7 days upon receipt at reference laboratory

Phenobarbital

Laboratory	Chemistry
Order Code	PHEB
CPT Code	82205
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	2 mL; light green top tube or ONE microtainer.
Reference Range	<pre> Therapeutic range: 15-40 ug/mL Toxic concentration > 60 ug/mL Coma without reflexes may occur at concentrations > 100 ug/mL.</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Kinetic Interaction of Microparticles in Solution (KIMS)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Phenylalanine

See:	 Amino Acids, Quantitative, Plasma Amino Acids, Quantitative, Random Urine

Phenylalanine, Screen (Guthrie Test)

Comments	Testing performed at State Hygienic Lab. Need dried blood on PKU test card.
See:	 Newborn Metabolic Screen, Dried Blood

Phenytoin, Free

Laboratory	Chemistry
Order Code	FDPH
CPT Code	80186
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood from light green top tube or TWO microtainers.
Reference Range	<pre> 1.0-1.9 mcg/mL Average percent free is 9.6% with a range of 7.0-14.6% (N=91).</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	<pre> Note: Phenytoin plasma specimens should not be drawn for 2 hours following completion of an I.V. fosphenytoin infusion or 4 hours following an I.M. fosphenytoin dose (See Fosphenytoin). To accurately determine the percentage of free phenytoin, a total phenytoin should be ordered on the same sample.</pre>
See:	 Phenytoin, Plasma
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	EIA (Enzymatic Immunoassay)
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	Monday-Friday. Sample must be in the lab by 1200; results available by 1500.

Phosphate

See:	 Inorganic Phosphorus (Phosphate), Urine, Random

Phosphorus-Other

Laboratory	Chemistry
Order Code	PO4O
CPT Code	84100
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Phosphorus, Inorganic, Plasma
Methodology	Endpoint
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Pinworm Exam (Scotch Tape Preparation)

Laboratory	Microbiology
Order Code	C PIN
CPT Code	87172
Collection Medium	Sterile container
Minimum	Submit scotch tape prep.
Rejection Criteria:	Use of nontransparent scotch tape (frosted tape).
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Methodology	Microscopy
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	Weekdays

Pipecolic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	PIPAPU
CPT Code	82543
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	<pre> Preferred Minimum: 5.0 mL from a random urine Absolute Minimum: 2.0 mL</pre>
Reference Range	<pre> < or = 6 months: 9.81-84.5 nmol/mg creatinine >6 months: 0.15-13.6 nmol/mg creatinine</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient’s age is required on request form for processing.
Methodology	Gas Chromatography-Mass Spectrometry (GC-MS)
Analytic Time	4 weeks

Pipecolic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	PIPAPS
CPT Code	82543
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Draw 1.5 mL from a fasting patient (4 hours or more, infants just before next feeding). Absolute Minimum: 1.0 mL</pre>
Reference Range	<pre> < or =1 week: 3.75-10.8 nmol/L >1 week: 0.7-2.5 nmol/L</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient’s age is required on request form for processing.
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Gas Chromatography-Mass Spectrometry (GC-MS)
Analytic Time	31 days upon receipt at reference laboratory

Pituitary Glycoprotein Hormone, Alpha-Subunit of

See:	 Alpha Subunit, Serum

PKU Cofactor Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	PKUCOFACT
CPT Code	82492, 82657
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Filter paper (Lot #W-051)</td </tr> </table>
Minimum	3 blood spots and 3 urine spots
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Allow spots to air dry. Do not expose to heat, stack samples, or allow spots to touch other surfaces while drying. (Protect drying urine spots from light).
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Tandem Mass Spectrometry
Analytic Time	2 weeks upon receipt at reference laboratory

PKU Test

See:	 Neonatal Screen Newborn Metabolic Screen, Dried Blood Phenylalanine, Screen (Guthrie Test)

Plasma Renin Activity

See:	 Renin Activity, Plasma

Plasminogen Activator Inhibitor 1, Activity

Laboratory	Commercial Mail-out Laboratory
Order Code	PAI1
CPT Code	85415
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	<pre> Preferred Minimum: 1.5 mL platelet poor plasma. Absolute Minimum: 1.0 mL platelet poor plasma (light blue tube top).</pre>
Rejection Criteria:	Serum, hemolyzed specimens; specimens that have been thawed and refrozen
Reference Range	<pre> 0.0 - 22.0 IU/mL The reference interval was established based on fasting samples drawn between 0800-1200. Plasminogen activator inhibitor 1 has diurnal variation, with higher values in the morning and decreased values in the afternoon.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Bioimmunoassay
Analytic Time	8 working days upon receipt at reference laboratory

Plasminogen

Laboratory	Commercial Mail-out Laboratory
Order Code	PLG
CPT Code	85420
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lt_blue_2.7ml.png" c <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	1.0 mL platelet poor plasma
Rejection Criteria:	Serum. Specimens collected in sodium fluoride, EDTA, or heparin. Non-frozen, hemolyzed, or icteric specimens.
Reference Range	71-144%
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Chromogenic Assay
Analytic Time	1-4 days upon receipt at reference laboratory

Platelet Aggregates

Comments	No testing is offered for hyperfunctional platelets. This does not designate a laboratory test.
See:	 Platelet Aggregation Studies, Platelets

Platelet Aggregation Studies

Laboratory	Hemostasis/Thrombosis
Order Code	PLTAGG
CPT Code	<pre> Epinephrine CPT Code: 85576 ADP CPT Code: 85576 Collagen CPT Code: 85576 Arachidonate CPT Code: 85576 Ristocetin CPT Code: 85576 Pathologist interpretation: CPT Code: 85576 -26</pre>
Collection Medium	Miscellaneous container; contact laboratory
Minimum	15 mL blood with platelet count >150,000/mm3 in order to recover a platelet rich plasma with a platelet count 250,000.
Reference Range	<pre> Collagen Aggregation 75-93% Collagen ATP Release 0.84-2.85 Epinephrine Aggregation 67-88% Epinephrine ATP Release 0.19-2.63 ADP Aggregation 67-97& ADP ATP Release 0.00-2.15 Arachidonate Aggregation 82-94% Arachidonate ATP Release 0.00-1.27 Ristocetin Aggregation 73-104% </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Must have Hematology Consult approval from pager 4326. A modified platelet aggregation can be performed for Left Ventricular Assist Device (LVAD) patients. Aspirin, NSAIDS, antihistamines, and aspirin-like drugs taken within the last seven days may invalidate results.
Methodology	Optical density changes and chemiluminescence.
Analytic Time	8 hours (upon receipt in laboratory)
Testing Schedule	To be scheduled and drawn by the Hemostasis/Thrombosis technologist only. Please call 356-3573 to schedule. Scheduled: 8 AM - Noon.

Platelet Antibodies Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	PLTABS
CPT Code	86022(x4)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 5 mL serum Pediatric Minimum: 1 mL serum
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Used by Ob/Gyn to determine maternal/paternal platelet anitbody issues.
See:	 Platelet Antibody Screen, Blood
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow Cytometry
Analytic Time	2 days upon receipt at reference laboratory

Platelet Antibody Screen

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	PLTAB
CPT Code	86022
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult minimum: 5 mL Pediatric minimum: 2 mL</pre>
Rejection Criteria:	Specimen must be labeled with patient's first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Reference Range	This is a screening test to detect IgG antibodies to platelet antigens. Negative results indicate no detection of allo- or auto-antibodies to platelets. Positive results indicate detection of anti-platelet allo- and/or auto-antibodies. Additional testing is required to identify the antibody specificity, and if requested, is performed by an outside reference laboratory.
Order Form:	DeGowin Blood Center Requisition
Comments	<pre> This testing is used by the Blood Bank to determine whether platelet refractoriness is immune-mediated.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Solid phase assay
Testing Schedule	0700-1400 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404. Sample should be delivered by 10:00 a.m. for same-day testing. Result is accompanied by professional consultation.

Platelet Count

Laboratory	Hematology
Order Code	PLT
CPT Code	85049
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lt_blue_2.7ml.png" c <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range	<pre> 150-400 k/mm3 Critical value: <u><</u>10 k/mm3 and <u>></u>1000 k/mm3</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	For patients who repeatedly have platelet clumps which preclude determination of an accurate platelet count, it is now possible to order a platelet count from a citrate tube. In many cases the EDTA in a lavender top tube causes the platelet clumping which does not occur in a blue top (citrate tube). Use order code PLTB to order the Platelet Count, Blue Top (Citrate) Tube. The Epic order code is LAB7882. This test is available 24 hours a day, 7 days a week. This test cannot be done on a citrate tube drawn for coagulation testing.
See Appendix	See Additional Information: Hematology Critical Lab Values
Methodology	Flow Cytometry
Analytic Time	Routine turnaround time is approximately 1 hour.
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Platelet Crossmatch

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	PLTXM
CPT Code	86022
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult minimum: 5 mL Pediatric minimum: 2 mL</pre>
Rejection Criteria:	Specimen must be labeled with patient’s first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Order Form:	DeGowin Blood Center Requisition
See:	 Platelet Antibody Screen, Blood
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Solid phase assay
Analytic Time	6 hours (upon receipt in laboratory)
Testing Schedule	Testing schedule: 0700-1400 Monday through Friday. Platelet Crossmatchi

Platelet Function Analysis

Laboratory	Hemostasis/Thrombosis
Order Code	PFA
CPT Code	85576 x2
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw of 2.7 mL light blue Sodium Citrate tube.
Reference Range	<pre> Collagen/Epinephrine = 66-169 secs. Collagen/ADP = 67-120 secs.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test needs a separate tube! It CANNOT be done with any other coagulation tests.
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw Specimens Requiring Immediate Delivery
Methodology	Citrated blood is forced through a capillary system to a membrane with a central aperature coated with collagen and either epinephrine or ADP. The time required to obtain full occlusion of the aperture by a platelet plug is the closure time and is reported in seconds.
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

PM-Sc1 (PM1) Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	PM100
CPT Code	83516 PM/Scl-100; if reflexed add 86039 ANA IFA
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Plasma. Contaminated, hemolyzed, or severely lipemic specimens.
Reference Range	Less than 11 Units
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	If PM/Scl-100 is greater than or equal to 11 Units, then Anti-Nuclear Antibody (ANA) by IFA, IgG will be added. Additional charges apply.
Methodology	Semi-Quantitative Immunoblot/Semi-Quantitative Immunofluorescence Antibody
Analytic Time	1-9 days upon receipt at reference laboratory.

PML/RAR Alpha t(15;17) Translocation Analysis

Laboratory	Commercial Mail-out Laboratory
Order Code	PML
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube
Minimum	<pre> Preferred minimum: 5 mL whole blood Absolute minimum: 1 mL whole blood Remarks: Specimens must be received at reference laboratory within 48 hours of collection due to lability of RNA.</pre>
Rejection Criteria:	Serum or plasma. Frozen or clotted whole blood. Specimens collected in preservatives other than EDTA. Severely hemolyzed specimens.
Reference Range	By report.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Reverse Transcription Polymerase Chain Reaction (RT-PCR)
Analytic Time	2-7 days upon receipt at reference laboratory

PML/RARA

See:	 Fluorescence In-Situ Hybridization (FISH-Bone Marrow), Bone Marrow Fluorescence In-Situ Hybridization (FISH-Hematological Blood), Peripheral Blood

PML/RARA t(15;17), Bone Marrow

Laboratory	Commercial Mail-out Laboratory
Order Code	PMLBM
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube
Minimum	<pre> Preferred minimum: 3 mL bone marrow Absolute minimum: 1 mL bone marrow Remarks: Specimens must be received at reference laboratory within 48 hours of collection due to lability of RNA.</pre>
Rejection Criteria:	Serum or plasma. Frozen or clotted bone marrow. Specimens collected in preservatives other than EDTA. Severely hemolyzed specimens.
Reference Range	By report.
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Reverse Transcription Polymerase Chain Reaction (RT-PCR)
Analytic Time	2-7 days upon receipt at reference laboratory

Pneumococcal Antibodies, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	PNEUMO
CPT Code	86317(x23)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.5 mL serum
Rejection Criteria:	Plasma or other body fluids. Contaminated, hemolyzed, or severely lipemic specimens.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Note: Includes Serotypes 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, and 33F. (Conjugated Serotypes: 1, 3, 4, 5, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F.) This assay is designed to use both pre-and post-immunization specimens to assess immune responsiveness to pneumococcal vaccine. This test is not designed to determine protection to Streptococcus pneumoniaebased on a single specimen.
Methodology	Quantitative Multi-Analyte Fluorescent Detection
Analytic Time	1-8 days upon receipt at reference laboratory.

Pneumocystis Carinii Pneumonia (PCP)

Laboratory	Microbiology
Order Code	C PCPDFA
CPT Code	87281
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Specimens must be collected in a sterile specimen container. 1.0 ml bronchoalveolar lavage (BAL) or 1.0 ml bronchial wash/brush/biopsy (if no accompaning BAL). Sputum specimen must have prior laboratory approval (pager #4903).
Methodology	Direct Fluorescent Antibody (DFA) examination
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0700-1630, 7 days a week, including holidays.

PNH

See:	 Paroxysmal Nocturnal Hemoglobinuria (PNH) Screen, Peripheral Blood

PO4

See:	 Phosphorus, Inorganic, Plasma

PO4-ohter

See:	 Phosphorus-Other, Body Fluid

Polio Virus Ab

Laboratory	Commercial Mail-out Laboratory
Order Code	POLIO
CPT Code	86658(x3)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult minimum: 1 mL serum or CSF Pediatric minimum: 0.3 mL serum or CSF</pre>
Rejection Criteria:	Plasma. Contaminated, hemolyzed, or severely lipemic specimens.
Reference Range	Less than 1:10: No detectable poliovirus antibodies. 1:10 or greater: Antibody to poliovirus detected, which may represent prior immunization or current or past infection.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The presence of poliovirus antibodies may represent prior immunization or acute infection. The clinical significance of and the criteria for interpretation of results may require consultation with an Infectious Disease Specialist.
Methodology	Semi-Quantitative Serum Neutralization
Analytic Time	6-9 days upon receipt at reference laboratory

POMGNT1 Full Gene Sequence with Interpretation

Laboratory	Molecular Pathology
Order Code	POMGNT1
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult minimum: 3 mL whole blood in lavender top (EDTA) tube. Children minimum: 2 mL whole blood in lavender top (EDTA) tube. Optional specimen type: Formalin Fixed paraffin embedded tissue; Fresh Frozen tissue. Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing.</pre>
Rejection Criteria:	Testing requires a dedicated collection tube.
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	Mutations in the protein O-mannose beta-1,2-N-acetylglucosaminyltransferase-1 gene (POMGNT1, OMIM #606822) cause muscle-eye-brain disease (MEB disease, OMIM #253280). MEB disease is a severe form of congenital muscular dystrophy which is genetically distinct from Fukuyama CMD and Walker-Warburg syndrome. Mutation in POMGNT1 can also result in Limb Girdle Muscular Dystrophy dystroglycanopathy, type C3 (previously known as LGMD, type 2O).
Methodology	Sequence analysis of the coding region of the POMGnT1 gene.
Analytic Time	21 days
Testing Schedule	Weekly

POMT1 Full Gene Sequence with Interpretation

Laboratory	Molecular Pathology
Order Code	POMT1
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult minimum: 3 mL whole blood in lavender top (EDTA) tube. Children minimum: 2 mL whole blood in lavender top (EDTA) tube. Optional specimen type: Formalin Fixed paraffin embedded tissue; Fresh Frozen tissue. Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing.</pre>
Rejection Criteria:	Testing requires a dedicated collection tube.
Reference Range	Normal
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Mutations in the protein O-mannosyltransferases-1 gene (POMT1, OMIM #607423) cause disorders in the dystroglycanopathy spectrum, all with autosomal recessive inheritance. At the severe end of the spectrum is muscular dystrophy-dystroglycanopathy type A,1 (OMIM #236670; formerly referred to as Walker-Warburg syndrome (WWS)) a congenital muscular dystrophy associated with defects in neuronal migration that produce complex brain and eye abnormalities. At the less severe end of the spectrum is muscular dystrophy-dystroglycanopathy type C,1 (OMIM #609308; formerly referred to as limb-girdle muscular dystrophy type 2K (LGMD2K)).
Methodology	PCR followed by sequence analysis of the coding regions of the POMT1 gene.
Analytic Time	21 days
Testing Schedule	Weekly

POMT2 Full Gene Sequence with Interpretation

Laboratory	Molecular Pathology
Order Code	POMT2
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult minimum: 3 mL whole blood in lavender top (EDTA) tube. Children minimum: 2 mL whole blood in lavender top (EDTA) tube. Optional specimen type: Formalin Fixed paraffin embedded tissue; Fresh Frozen tissue. Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing.</pre>
Rejection Criteria:	Testing requires a dedicated collection tube.
Reference Range	Normal
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Mutations in the POMT2 gene (OMIM #607439) cause a form of congenital muscular dystrophy with structural brain abnormalities called muscular dystrophy-dystroglycanopathy type A2 (OMIM #613150; formerly referred to as Walker-Warburg Syndrome (WWS)). Fukutin and FKRP gene mutations have also been implicated in WWS and, along with POMT1 account for approximately 20% of all WWS. The protein encoded by this gene, protein 0-mannosyltransferase-2, is an enzyme involved in glycosylation of alpha dystroglycan. Mutation in POMT2 can also result in muscular dystrophy-dystroglycanopathy type C2 (OMIM #613158; formerly call Limb Girdle Muscular Dystrophy (LGMD) type 2N).
Methodology	PCR followed by sequence analysis of the coding regions of the POMT2 gene.
Analytic Time	21 days
Testing Schedule	Weekly

Porphobilinogen, Qualitative

Laboratory	Chemistry
Order Code	PBG
CPT Code	84106
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	1 mL random urine
Reference Range	Negative
Order Form:	A-1a General Lab or Epic Req
Comments	Screen uses the Hoesch test and can be done on random specimen. If screening results are positive and if clinically indicated, quantitative fractionation of porphyrins and porphobilinogen can be determined by the mail-out test Porphyrins & Porphobilinogen (PBG) (see link below).
See:	 Porphyrins & Porphobilinogen, Urine (24 hr or random)
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers Urine Tests Requiring no Preservatives
Methodology	Colorimetric
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	<pre> 0700-2200 Monday through Friday. 0600-1400 Saturday, Sunday and holidays. For additional services contact Clinical Pathology Resident on-call at pager #3404.</pre>

Porphyrins & Porphobilinogen

Laboratory	Commercial Mail-out Laboratory
Order Code	PBGPU
CPT Code	84120 Porphyrins, urine; 84110 PBG, urine
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed dark pl </tr> </table>
Minimum	24 hr collection in <u>dark plastic container</u> and refrigerate during entire collection and submission to Univesity of Iowa Hospitals and Clinics laboratory. Containers available from Pharmacy. <pre> 24 hr collection or random urine Preferred Minimum: 8 mL aliquot of urine Absolute Minimum: 4 mL aliquot or urine</pre>
Rejection Criteria:	Body fluids other than urine.
Reference Range	<pre>

Components: Reference Interval:

Uroporphyrin	0-4 μ mol/mol crt	
Heptacarboxylate Porphyrin	0-2 μ mol/mol crt	
Coproporphyrin I	0-6 μ mol/mol crt	
Coproporphyrin III	0-14 μ mol/mol crt	
Porphobilinogen, Urine	0.0-8.8 μ mol/L	
Porphobilinogen, Urine (24-hour)	0.0-11.0 μ mol/d	
Creatinine (24-hour)	Male (mg/d)	Female (mg/d)
	3-8 yrs: 140-700	3-8 yrs: 140-700
	9-12 yrs: 300-1300	9-12 yrs: 300-1300
	13-17 yrs: 500-2300	13-17 yrs: 400-1600
	18-50 yrs: 1000-2500	18-50 yrs: 700-1600
	51-80 yrs: 800-2100	51-80 yrs: 500-1400
	81+ yrs: 600-2000	81+ yrs: 400-1300

	Note: Urine porphyrins are useful for the evaluation of cutaneous photosensitivity to exclude porphyria cutanea tarda (PCT). Urine porphobilinogen (PBG) is useful for the evaluation of neurologic and/or psychiatric symptoms to exclude acute porphyrias such as acute intermittent porphyria (AIP).</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Submit collection dates and times on requisition. Includes Uroporphyrins, Heptacarboxylporphyrins, Coproporphyrins, Porphobilinogens, and Creatinine value. Protect from strong light; refrigerate during collection. The most important aspect of specimen preparation is adequate refrigeration during collection, storage, and transport. Samples collected according to refrigerated guidelines are viable for 4 days ONLY refrigerated.</pre>
See:	 Aminolevulinic Acid, Urine (24 hour or random) Porphobilinogen, Qualitative, Urine, Random
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration or Special Containers
Methodology	High Performance Liquid Chromatography/Ion Exchange Chromatography/ Quantitative Spectrophotometry
Analytic Time	2-4 days upon receipt at reference laboratory

Posaconazole Bioassay

Laboratory	Commercial Mail-out Laboratory
Order Code	POSA
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum in red top tube
Rejection Criteria:	Serum separator tubes. Hemolyzed or lipemic specimens.
Reference Range	Effective August 15, 2011 Therapeutic Range (trough): Greater than 0.7 μg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-6 days upon receipt in referene laboratory
Testing Schedule	Testing performed on Tuesdays and Fridays at the reference laboratory.

Post Bone Marrow Transplant Monitoring

Laboratory	Flow Cytometry Service
CPT Code	<pre> CPT Codes: 88184 x1, 88185 x7 - Technical 881887 - Professional (varies due to the number of antibodies performed)</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	Adult and Pediatric: Peripheral Blood, 10 mL; yellow top tube (ACD solution A)
Rejection Criteria:	<pre> Specimens with absolute lymphocyte counts of <100/mm3 will not be tested.</pre>
Reference Range	<pre> The pathologist will provide an interpretative report. Antibodies routinely included are: CD3, CD4, CD8, CD14, CD16+56, CD19, CD20 and CD45. Adult reference ranges for peripheral blood by whole blood lysis method using flow cytometry: B cells (CD20) 6-22% 53-726/mm3 T cells (CD3) 65-85% 569-2804/mm3 T Cells (CD4) 34-62% 298-2045/mm3 T cells (CD8) 14-42% 122-1386/mm3 NK cells (CD16+/CD56+/CD3-) 5-31% 44-1023/mm3 CD4/CD8 ratio 0.7-2.7 Age specific pediatric reference ranges will be provided with the interpretive report.</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	Include pertinent clinical information on the reqisition.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow Cytometry-Whole Blood Lysis
Analytic Time	2 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Potassium-Urine, Random

Laboratory	Chemistry
Order Code	URK
CPT Code	84133
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL urine, random sample; no preservatives
Reference Range	Units are mEq/L. No established reference range for random urine potassium measurement.
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Ion Selective Electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Potassium

Laboratory	Chemistry
Order Code	UK
CPT Code	84133
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> 24 hr collection; no preservative. Collections other than 24 hr will not be calculated for mEq/24 hr.</pre>
Reference Range	25-125 mEq/24 hr
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Ion Selective Electrode
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Potassium

Laboratory	Critical Care Laboratory
Order Code	KC
CPT Code	84132
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Heparinized syringe or Green </tr> </table>
Alternate Collection Media:	Light Green top tube (Lithium Heparin)
Minimum	0.5 mL in green top tube (Na Heparin)
Reference Range	<pre> 3.5 - 5.0 mEq/l Critical Care Lab Value: Adults > 16 years <2.8 mEq/l and >6.2 mEq/l Peds (0-15 years) <3.0 mEq/l and >6.5 mEq/l Special Care Nurseries Critical Value: <3.0 mEq/l and >6.5 mEq/l</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required); all needles must be removed from the syringe before delivery.
See Appendix	See Additional Information: Chemistry Pediatric Reference Ranges Critical Care Critical Lab Values Special Care Nurseries Critical Lab Values
Methodology	Ion Selective Electrode
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Potassium

Laboratory	Chemistry
Order Code	K
CPT Code	84132
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients.
Reference Range	<pre> 3.5 - 5.0 mEq/l Pediatric Reference Ranges: Age Range Units <10 days 3.5-6.0 mEq/l >10 days 3.5-5.0 mEq/l Critical value: Adults >16 years <2.8 mEq/l and >6.2 mEq/l Pediatric (0-15 years) <3.0 mEq/l and >6.5 mEq/l</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Avoid hemolysis. False elevations may occur in specimens which are not processed promptly (to separate serum from RBC's). Plasma samples drawn in heparin tubes have values slightly lower than serum.
See:	 Potassium-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Critical Lab Values Chemistry Pediatric Reference Ranges
Methodology	Ion Selective Electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Potassium-Other

Laboratory	Chemistry
Order Code	KO
CPT Code	84132
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Potassium, Plasma
Methodology	Ion selective electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

POU3F4 (Deafness Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	POU3F4
CPT Code	83891, 83894, 83898 (x20), 83904 (x6)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Screening for POU3F4 is performed by sequencing and STRP analysis. The initial screening test uses oligonucleotide primers that amplify the exon of POU3F4 followed by direct sequencing to determine whether mutations lie within the POU3F4 gene. In the absence of a POU3F4 coding mutation, the upstream region of POU3F4 is screened for a possible deletion by running 8 STSs that cover approximately 1200 kB of genomic DNA at regularly spaced intervals. These markers are PCR amplified, resolved by gel electrophoresis and scored as present or absent.
Analytic Time	3 months

PRA

Comments	<pre> This abreviation is used/confused for one of the following: Progesterone Receptor, Tissue or FNA Renin Activity (PRA), Plasma</pre>
See:	 Progesterone Receptor, Tissue or FNA Renin Activity, Plasma

PR

See:	 Progesterone Receptor, Tissue or FNA

Prader-Willi/Angelman Syndrome

See:	 Chromosomal Analysis, Peripheral Blood, Cord Blood Fluorescence In-Situ Hybridization (FISH-Microdeletion), Peripheral Blood, Bone Marrow, Fibroblasts, Other Tissue

Prealbumin

Laboratory	Chemistry
Order Code	PREALB
CPT Code	84134
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Plasma Separator Tube</td></tr></table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer.
Reference Range	18-45 mg/dL (adults). Values for pediatric patients vary with age.
Order Form:	A-1a General Lab or Epic Req
Methodology	Immunoturbidimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Predictive Value Theory

See Appendix	See Additional Information: Predictive Value Theory

Pregnancy Screen, Qualitative

Laboratory	Hematology
Order Code	PGPOC
CPT Code	84703
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Yellow top conical tube (no a</td></tr></table>
Minimum	5 mL
Reference Range	<pre>Positive = pregnant; negative = not pregnant (or <2 weeks) Positive if over 20 mIU/mL</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 HCG, Quant-Hum Chor Gon, Plasma Pregnancy Test, Qualitative, Plasma
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Rapid Immunoassay
Analytic Time	30 minutes
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Pregnancy Screening

See:	 HCG, Quant-Hum Chor Gon, Plasma Pregnancy Screen, Qualitative, Urine Pregnancy Test, Qualitative, Plasma

Pregnancy Test, Qualitative

Laboratory	Chemistry
Order Code	SPGPOC
CPT Code	84703
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Minimum	3 mL whole blood in light green top tube or TWO microtainers.
Reference Range	<pre> Positive = pregnant; negative = not pregnant Positive if over 10 mIU/mL</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 HCG, Quant-Hum Chor Gon, Plasma
Methodology	Electrochemiluminescent Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Prenatal FSHD

See:	 FSHMD1A Prenatal Detection of Abnormal Alleles with Interpretation, Fetal Sample (Amniotic or Chorionic Villus), Parental Samples (Whole Blood)

Primary Biliary Cirrhosis Screen (PBC Antibody Screen)

Laboratory	Immunopathology
Order Code	PBC
CPT Code	83516
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL; red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	<pre> Negative <u><</u> 20.0 units Equivocal 20.1 - 2.49 units Positive <u>></u> 25 units</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	The PBC Antibody Screen is an enzyme-linked immunosorbent assay (ELISA) for the semi-quantitative detection of mitochondrial antibodies, gp210 antibodies and sp100 antibodies of the IgG and/or IgA class in human serum. The presence of mitochondrial, gp210 and sp100 antibodies can be used in conjunction with clinical findings and other laboratory tests to aid in the diagnosis of primary biliary cirrhosis. The results will be obtained with the INOVA QUANTA Lite™ ELISA. Assay values obtained with different manufacturers’ methods may not be used interchangeably. The magnitude of the reported antibody levels can not be correlated to an endpoint titer.
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	1 week
Testing Schedule	Weekly - Batch analysis performed weekly excluding university holidays.

Primidone And Metabolite Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	PRIM
CPT Code	80188 Primidone; 80184 Phenobarbital
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL plasma Absolute Minimum: 0.8 mL plasma</pre>
Rejection Criteria:	Separator tubes
Reference Range	<pre> Phenobarbital 0-2 months: 15.0-30.0 μg/mL Toxic: 40.1 μg/mL or greater 3 months and older: 15.0-40.0 μg/mL Toxic: 50.1 μg/mL or greater Primidone 5-12 μg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Fluorescence Polarization Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Procainamide and NAPA Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	PANAPA
CPT Code	80192
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Alternate Collection Media:	Red top tube
Minimum	<pre> Preferred Minimum: 1 mL plasma or serum Absolute Minimum: 0.5 mL plasma or serum</pre>
Rejection Criteria:	EDTA plasma. Specimens collected in separator tubes, gels, or gray (sodium fluoride/potassium oxalate).
Reference Range	<pre> Components Reference Interval N-acetylprocainamide (NAPA) 6.0-20.0 mcg/mL Toxic: 35.1 mcg/mL or greater Procainamide 4.0-10.0 mcg/mL Toxic: 12.1 mcg/mL or greater</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Fluorescence Polarization Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Progesterone Receptor

Laboratory	Immunopathology
Order Code	IPRF
CPT Code	<pre> 88342 (Technical) 88342-26 Professional Interpretation)</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	<pre> Please send a Surgical Pathology H-1 form to Immunopathology with this request. If PR studies are desired on previous surgical material, please send a requisition to Immunopathology, 5238 RCP. Provide the patient’s name, hospital number and surgical pathology specimen number. Please send a Surgical Pathology H-1 form to Immunopathology with this request. Progesterone Receptor (PR) expression in breast carcinomas, similar to estrogen receptor positivity, has been associated with tumor responsiveness to hormonal therapy. Immunohistochemical (IHC) staining of formalin-fixed, paraffin-embedded tumor sections has proven to be a sensitive means of defining positivity. An immunohistochemical score is generated by the interpreting pathologist. A score >2 has been used to define PR positivity.</pre>
See:	 Estrogen Receptor, Tissue or FNA
Methodology	Immunohistochemistry
Analytic Time	2 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Progesterone

Laboratory	Chemistry
Order Code	PRGS
CPT Code	84144
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers.
Reference Range	<pre> Females: Adult females: Follicular phase: 0.2 - 1.5 ng/mL Ovulation phase: 0.8 - 3.0 ng/mL Luteal phase: 1.7 - 27.0 ng/mL Post-menopausal: < 0.2 - 0.8 ng/mL Pediatric females: < 2 years old: 0.87 - 3.37 ng/mL 2-9 years old: 0.20 - 0.24 ng/mL 10-17 years old: adult levels generally achieved by puberty Males: Adult males: 0.2 - 1.4 ng/mL < 2 years old 0.87 - 3.37 ng/mL 2-9 years old < 0.2 ng/mL 10-17 years old adult levels generally achieved by puberty Reference: Lippe BM, LaFranchi SH, Lavin N, et al: Serum 17-alpha-hydroxyprogesterone, progesterone, estradiol, and testosterone in the diagnosis and management of congenital adrenal hyperplasia. J Pediatr 1974;85:782-787.</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	New analytical immunoassay with different reference ranges instituted 3/13/00 at 0700.
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Prograf

See:	 Tacrolimus, Whole Blood

Proinsulin

Laboratory	Commercial Mail-out Laboratory
Order Code	PINS
CPT Code	84206
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Preferred Minimum: 1.5 mL of EDTA plasma. Draw blood in an ice-cooled lavender-top (EDTA) tube(s) from a fasting patient. Absolute Minimum: 0.7 mL of EDTA plasma. Draw blood in an ice-cooled lavender-top (EDTA) tube(s) from a fasting patient.
Reference Range	3-20 pmol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful</u>: For Suggests clinical disorders or settings where the test may be helpfulAs part of the diagnostic workup of suspected insulinoma. As part of the diagnostic workup of patients with suspected PC1/3 deficiency. As part of the diagnostic workup of patients with suspected proinsulin mutations. <u>Cautions</u>: Discusses conditions that may cause diagnostic confusion, including improper specimen collection and handling, inappropriate test selection, and interfering substancesTo avoid misdiagnoses, all proinsulin measurements used in the diagnostic workup of patients with hypoglycemia must be interpreted in the context of coexisting illnesses, the blood glucose concentration at the time of sampling, and other test results (ie, insulin, C-peptide, beta-hydroxybutyrate, and sulfonylurea drug screen). For example, patients with chronic renal failure or type 2 diabetes mellitus can have increased proinsulin, C-peptide and insulin values, but usually without suppressed (<45 g/dL) blood glucose.
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Immunochemiluminescent Assay
Analytic Time	1 week upon receipt at reference laboratory
Testing Schedule	Weekly

Prolactin

Laboratory	Chemistry
Order Code	PROL
CPT Code	84146
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood light green top tube or TWO microtainers.
Reference Range	<pre> Males: 4.0 - 15.2 ng/mL Females (not pregnant): 4.8 - 23.3 ng/mL Age-based references ranges in children have not been established. References ranges by Tanner stage: Males Stage I: < or = 10.0 ng/mL Stage II-III: < or = 6.1 ng/mL Stage IV-V: 2.8 - 11.0 ng/mL Females: Stage I: 3.6 - 12.0 ng/mL Stage II-III: 2.6 - 18.0 ng/mL Stage IV-V: 3.2 - 20.0 ng/mL Other References Ranges: Cord Blood: 45 - 539 ng/mL Pregnancy, 3rd trimester: 95 - 473 ng/mL</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	As of September 14, 2010, samples that produce results above the upper limit of the gender-specific reference range are no longer screened for the presence of macroprolactin by PEG (polyethylene glycol) precipitation. If screening for macroprolactin is desired, see "Macroprolactin Check". Immunoassay method instituted 3/21/00.
See:	 Macroprolactin Check, Plasma
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Prolixin

See:	 Fluphenazine Drug Level, Serum

Prolymphocytic Leukemia

See:	 Chronic Lymphocytic Leukemia, Various

Pronestyl

See:	 Procainamide and NAPA Drug Level, Plasma or Serum

Propylene Glycol

See:	 Ethanol/Volatiles Screen (EVS), Plasma Glycols (Ethylene and Propylene), Plasma

Prostate Biopsy Rectal Screen

Laboratory	Microbiology
Order Code	C PBRS
CPT Code	87070
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">ESwab Collection & Transport </tr> </table>
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Culture is a screen for Ciprofloxacin resistant gram negative rods only. Prostate biopsy rectal screen may only be ordered on patients prior to transrectal ultrasound guided prostate biopsy.
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Prostate Specific Antigen (PSA), Free (Unbound)

Laboratory	Chemistry
Order Code	FPSA
CPT Code	84154
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers.
Reference Range	No accepted reference range. There is an increased probability of prostate cancer with lower %FPSA.
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> Prostate-specific antigen (PSA) is a glycoprotein (molecular weight 30,000-34,000 daltons) having a close structural relationship to glandular kallikrein. It has the function of a serine protease. The proteolytic activity of PSA in blood is inhibited by the irreversible formation of complexes with proteinase inhibitors such as alpha-1-antichymotrypsin, alpha-2-macroglobulin and other acute phase proteins. In addition to being present in these complexes, PSA is also present in blood in the free form, but is proteolytically inactive. PSA tests lack sufficient sensitivity and specificity to be considered ideal or absolutely diagnostic for screening or early detection because PSA is not specific for prostate cancer. PSA is organ specific, being produced primarily by prostatic secretory epithelium, but has long been known to be elevated in non-malignant conditions such as benign prostatic hyperplasia (BPH). A number of studies have found that the % free PSA was significantly lower in patients having prostate cancer than those with benign disease or normal controls. The ratio fPSA/tPSA has been demonstrated to improve the sensitivity and specificity in patients with tPSA values in the "gray zone" of 4-10 ng/mL. An equimolar tPSA determination is the prerequisite for reliable ratios. In patients receiving therapy, particularly hormone withdrawal therapy, the fPSA/tPSA ratio cannot be utilized to differentiate prostate hyperplasia from cancer of the prostate. Combining tests from different manufacturers to determine tPSA and fPSA can produce erroneous values, since total PSA tests may be standardized by differing methods or detect free PSA to differing degrees. The free PSA immunoassay is indicated for measurement of fPSA in conjunction with the total PSA assay to develop a ratio of fPSA to tPSA (%fPSA). This ratio is useful when used in conjunction with the Total PSA test as an aid in distinguishing prostate cancer from benign prostatic conditions in men age 50 years or older who have a digital rectal examination (DRE) that is not suspicious for prostate cancer and an total PSA value in the range 4-10 ng/mL. Prostate biopsy is required for the diagnosis of prostate cancer. </pre>
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Prostate-Specific Antigen (PSA), Screening

Laboratory	Chemistry
Order Code	PSAS
CPT Code	CPT codes: G0103, 84153
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top or TWO microtainers.
Reference Range	<pre> Age Reference Range Up to 50 0.00-2.50 ng/mL 50 - 59 0.00-3.50 ng/mL 60 - 69 0.00-4.50 ng/mL > 70 0.00-6.50 ng/mL Age specific normal values from the literature for PSA are provided as a guide only. No one decision level is appropriate when utilizing PSA in screening situation. Age, family history, previous values, and other factors should be used in decisions involving PSA values.</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> See: "PSA, Total" to order monitoring PSA test. PSA measurement used in conjunction with DRE (digital rectal exam) is indicated as an aid for the detection of prostate cancer in men aged 50 years or older, must be identified as PSA for screening. It is also useful in monitoring patients with known prostate cancer. PSA is specific to the prostate gland and is present in normal, hyperplastic and neoplastic prostatic epithelium. Plasma elevations are detected in not only prostate carcinoma, but also in benign prostatic hypertrophy and inflammatory conditions of the prostate and adjacent genitourinary tissues. Diagnosis of prostate cancer requires biopsy and histopathologic examination. Effective 12-31-99, changed Total PSA method. New immunoassay is equimolar and gives results slightly lower than Hybritech immunoassay.</pre>
See:	 Prostate-Specific Antigen (PSA), Total, Plasma
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Prostate-Specific Antigen (PSA), Total

Laboratory	Chemistry
Order Code	PSA
CPT Code	84153
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers.
Reference Range	<pre> Age Reference Range Up to 50 0.00-2.50 ng/mL 50 - 59 0.00-3.50 ng/mL 60 - 69 0.00-4.50 ng/mL > 70 0.00-6.50 ng/mL Age specific normal values from the literature for PSA are provided as a guide only. No one decision level is appropriate when utilizing PSA in screening situation. Age, family history, previous values, and other factors should be used in decisions involving PSA values.</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> Prostate-Specific Antigen (PSA) measurement used in conjunction with Digital Rectal Exam (DRE) is indicated as an aid for the detection of prostate cancer in men aged 50 years or older. It is also useful in monitoring patients with known prostate cancer. PSA is specific to the prostate gland and is present in normal, hyperplastic and neoplastic prostatic epithelium. Serum elevations are detected in not only prostate carcinoma, but also in benign prostatic hypertrophy and inflammatory conditions of the prostate and adjacent genitourinary tissues. Diagnosis of prostate cancer requires biopsy and histopathologic examination. Effective 12-31-99, changed Total PSA method. New immunoassay is equimolar and gives results slightly lower than Hybritech immunoassay.</pre>
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Prostatic Acid Phosphatase

Laboratory	Commercial Mail-out Laboratory
Order Code	PAPH
CPT Code	84066
Minimum	<pre> Preferred Minimum: 1 mL serum Absolute Minimum: 0.5 mL serum</pre>
Rejection Criteria:	Specimens ambient greater than 3 hours or refrigerated greater than 24 hours.
Reference Range	0.0-3.5 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Chemiluminescent Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Protein C, Functional

Laboratory	Hemostasis/Thrombosis
Order Code	PCFX
CPT Code	85303
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	64-116%
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient must be off anticoagulant medication (i.e. coumadin) for TWO weeks.
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw Thrombotic Evaluation
Methodology	Activity detection by chromogenic substrate.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Protein Electrophoresis, Timed

Laboratory	Chemistry
Order Code	UPET
CPT Code	84166 and 84166-26
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine</td> </tr> </table>
Minimum	24 hr urine collection; no preservatives are acceptable.
Reference Range	No monoclonal proteins detected.
Comments	The 24 hr UPEP report will include quantitation of the concentration of the monoclonal protein (if present), calculation of the 24 hr excretion of the monoclonal protein, and an interpretative pathologist report. Urine protein electrophoresis methodology switched from traditional gel electrophoresis to capillary electrophoresis on November 1, 2012.
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Capillary Electrophoresis
Testing Schedule	Weekly

Protein S, Functional

Laboratory	Hemostasis/Thrombosis
Order Code	PSFX
CPT Code	85306
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top (mix well).
Reference Range	Males: 77-143% Females: 55-123%
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	If the patient is known to be either a LA or APA, a free Protein S level is a more accurate assessment.
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw Specimens Requiring Immediate Delivery Thrombotic Evaluation
Methodology	Activity by optical density clot detection.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Protein

Laboratory	Chemistry
Order Code	UPR
CPT Code	84156
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> 24 hr collection; no preservative. Collections other than 24 hr will not be calculated for g/24 hr.</pre>
Reference Range	.05-.15 g/24 hr (Timed)
Order Form:	A-1a General Lab or Epic Req
Comments	Do not collect in acid.
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Spectrophotometric
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Protein Electrophoresis

Laboratory: Chemistry
Order Code: SPE
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>

Minimum: 2 mL whole blood or one microtube for pediatric patients includes total protein.

Reference Range:

<pre>
Males

Albumin	4.2 - 5.2 g/dl
Alpha1	0.3 - 0.5 g/dl
Alpha2	0.3 - 0.6 g/dl
Beta1	No range
Beta2	No range
Beta-total	0.6 - 1.0 g/dl
Gamma	0.5 - 1.3 g/dl

Females

Albumin	3.7 - 5.0 g/dl
Alpha1	0.3 - 0.5 g/dl
Alpha2	0.5 - 0.6 g/dl
Beta1	No range
Beta2	No range
Beta-total	0.6 - 0.9 g/dl
Gamma	0.5 - 1.3 g/dl</pre>

Order Form: A-1a General Lab or Epic Req

Comments: Serum protein electrophoresis methodology switched from traditional gel electrophoresis to capillary electrophoresis on September 24, 2012. This includes reference range changes (now additionally split into male and female-specific ranges) for the individual fractions resolved by electrophoresis. Capillary electrophoresis is able to resolve separate beta-1 and beta-2 fractions, although a reference range is only available for the total beta fraction.

The table below shows the proteins that predominantly make up the fractions of electrophoresis:

<pre>

Fraction	Protein	Major or minor protein visible by electrophoresis

Albumin	Albumin	Major
Alpha-1	Alpha-1 antitrypsin	Major
	Alpha-1 lipoprotein	Minor
	Alpha-1 acid glycoprotein	Minor
Alpha-2	Alpha-2 macroglobulin	Major
	Haptoglobin	Major
	Ceruloplasmin	Minor
	Fibronectin	Minor
Beta-1	Transferrin	Major
Beta-2	C3	Major
	C4	Minor
	Beta-lipoprotein	Minor
Beta-2 / Beta-gamma	Fibrinogen	Major
	IgA	Major*
	IgM	Major*
Gamma	Most immunoglobulins	Major
	C-reactive protein	Minor

*IgA and IgM are normally not very visible in individuals without a

plasma cell dyscrasia by electrophoresis, but are de
present as M-proteins. Polyclonal IgA can be seen i

Radiocontrast dyes used in imaging can produce small
electrophoresis. Iohexol and iopamidol show up in t
It is recommended to delay electrophoresis, if possi
days after radiocontrast dye administration.

Gelatin-based plasma substitutes can produce polyclo
in beta-gamma and gamma regions.

Piperacillin-tazobactam can produce a small peak in
region.</pre>

Methodology	Capillary Electrophoresis
Analytic Time	48 Hours
Testing Schedule	Daily - Monday-Friday

Protein-Urine, Random

Laboratory	Chemistry
Order Code	URPR
CPT Code	84156
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL random urine; no preservatives.
Reference Range	No established reference range for random urine protein measurement. See "Comments" for discussion of urine protein/creatinine ratio.
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> The urine protein/creatinine ratio is automatically calculated if a urine protein and urine creatinine are ordered on the same specimen. The urine protein/creatinine ratio allows for an estimation of proteinuria based on a single random urine collection. A 24 hour urine protein determination remains the recommended true measure of proteinuria. The reference range for the urine protein/creatinine ratio is < 0.2 for 2 years or older. Reference range for the ratio is not established for children less than 2 years old. References: Morgenstern BZ, Butini L, Wollan P, et al. Am J Kid Dis 2003 Apr;41(4):760-766 National Kidney Foundation: Am J Kid Dis 2002;39:S93-S102 (suppl1) Wilson DM, Anderson RL. Am J Clin Pathol 1993;100:419-424</pre>
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Protein

Laboratory	Chemistry
Order Code	CFTP
CPT Code	84157
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	1 mL
Reference Range	15-45 mg/dL (CSF)
Order Form:	A-1a General Lab or Epic Req
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Proteinase 3 Antibodies, IgG

Laboratory	Chemistry
Order Code	PR3
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL; red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	Negative: < 0.4 antibody index (AI) Equivocal: 0.4-0.9 AI Positive: 1.0 AI or greater
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 5, 2013. <u>References</u>: Finkielman JD et al. ANCA are detectable in nearly all patients with active severe Wegener's granulomatosis. Am J Med 2007; 643:e9-e14. Russel KA et al. Detection of anti-neutrophil cytoplasmic antibodies under actual clinical testing conditions. Clin Immunol 2002; 103:196-203. Savige J et al. International consensus statement on testing and reporting of antineutrophil cytoplasmic antibodies (ANCA). Am J Clin Pathol 1999; 111:507-513.
See:	 Neutrophil Cytoplas.Screen (ANCA), Serum
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Prothrombin Gene Rearrangement

See:	 Leiden Variant Factor 5 & F2 1199G>A Variant Factor 2 with Interpretation, Whole Blood

Prothrombin Time

Laboratory	Hemostasis/Thrombosis
Order Code	PT
CPT Code	85610
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 1.8 mL (N </tr> </table>
Minimum	Full draw; 1.8 mL light blue top (mix well). Tube must be at least 90% full.
Reference Range	<pre> 9-12 seconds INR Critical Reference Value: greater than 3.9</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	The INR corresponding to the PT is reported to assist in the monitoring of oral anticoagulants. Must be drawn swiftly with a clean venipuncture (no hematoma). Time drawn must be indicated on requisition. A PT can be performed on a sample if it is kept unopened and uncentrifuged at room temperature to be delivered to lab within 24 hours. A special tube from the lab is necessary if the hematocrit is over 55%. Prothrombin Time may be performed on the same collection tube as Activated Partial Thromboplastin time (aPTT) and Fibrinogen.
See:	 Activated Partial Thromboplastin Time (aPTT), Plasma
See Appendix	See Additional Information: Hematology Critical Lab Values International Normalized Ratio (INR) Phlebotomy Tubes and Order of Draw Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Analytic Time	2 hours (upon receipt in laboratory)

Proviral HIV Infant Diagnosis

See:	 HIV-1 Proviral DNA, Qual. PCR, Whole Blood

Proviral HIV Neonatal diagnosis

See:	 HIV-1 Proviral DNA, Qual. PCR, Whole Blood

Prozac

See:	 Fluoxetine and Norfluoxetine Drug Level, Serum

PRSS1 Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	PANC
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Yellow top tube (ACD solution A)
Minimum	Preferred Minimum: 3.0 mL whole blood in (EDTA) tube Absolute Minimum: 1.0 mL whole blood in (EDTA) tube
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful For</u>: Confirming the diagnosis of hereditary pancreatitis (HP) in patients with chronic pancreatitis Ruling out HP in patients with chronic pancreatitis <u>Cautions:</u> A small percentage of individuals who are carriers or have a diagnosis of hereditary pancreatitis (HP) may have a mutation that is not identified by this method (eg, mutations in other exons, promoter mutations). The absence of a mutation(s), therefore, does not eliminate the possibility of positive carrier status or the diagnosis of HP. For carrier testing, it is important to first document the presence of a PRSS1 gene mutation in an affected family member. In some cases, DNA alterations of undetermined significance may be identified. Rare polymorphisms exist that could lead to false-negative or false-positive results. If results obtained do not match the clinical findings, additional testing should be considered. A previous bone marrow transplant from an allogenic donor will interfere with testing. Test results should be interpreted in the context of clinical findings, family history, and other laboratory data. Errors in our interpretation of results may occur if information given is inaccurate or incomplete. Please print, complete, and submit the following with the appropriate signatures and the correct sample type: <a href="http://www.mayoreferenceservices.org/it-mmfiles/MolGenCongenital Congenital Inherited Diseases Patient Information Sheet and the Informed Consent for DNA Testing from Mayo Medical Laboratories with the A-1a Miscellaneous Request.
Methodology	Polymerase Chain Reaction (PCR)/DNA Sequencing
Analytic Time	6 days upon receipt at reference laboratory

PSA

See:	 Prostate-Specific Antigen (PSA), Total, Plasma

Pseudocholinesterase

See:	 Pseudocholinesterase, Total, Serum

Pseudocholinesterase, Total

Laboratory	Commercial Mail-out Laboratory
Order Code	CHE
CPT Code	82480
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum
Rejection Criteria:	Whole blood on clot and hemolyzed samples.
Reference Range	2,900-7,100 U/L
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Cholinesterase, RBC/Hb Ratio, Whole Blood
Methodology	Quantitative Enzymatic
Analytic Time	1-4 days upon receipt at reference laboratory
Testing Schedule	Testing performed Monday-Friday.

PT

See:	 Prothrombin Time, Plasma

PT Mixing Study

Laboratory	Hemostasis/Thrombosis
Order Code	MPT
CPT Code	85611
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top (mix well).
Reference Range	9-12 seconds
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw
Methodology	Optical clot detection.
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

PTH

See:	 Parathyroid Hormone (Intact), Plasma

PTH-Related Protein

Laboratory	Commercial Mail-out Laboratory
Order Code	PTHRP
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	<pre> Preferred Minimum: 0.5 mL Absolute Minimum: 0.3 mL</pre>
Reference Range	14-27 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Immunoassay
Analytic Time	1 week upon receipt at reference laboratory

PTT

See:	 Activated Partial Thromboplastin Time (aPTT), Plasma

Pulmonary Cytopathology

See:	 Bronchial Brush Cytology, Bronchial Brush Bronchial Wash Cytology, Bronchial Wash Bronchioalveolar Lavage (BAL) for Cancer Evaluation, Bronchioalveolar Lavage Spontaneous Sputum for Cancer Evaluation, Sputum

Purine and Pyrimidine

Laboratory	Commercial Mail-out Laboratory
Order Code	PURPYRU
CPT Code	83789
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	<pre> 3.0 mL from a random urine collection Absolute Minimum: 1.0 mL</pre>
Reference Range	URACIL 0-2 years: < or =31 mmol/mol creatinine 3-5 years: < or =30 mmol/mol creatinine 6-11 years: < or =28 mmol/mol creatinine 12-17 years: < or =26 mmol/mol creatinine > or =18 years: < or =35 mmol/mol creatinine URIC ACID 0-2 years: < or =2,249 mmol/mol creatinine 3-5 years: < or =1,900 mmol/mol creatinine 6-11 years: < or =1,398 mmol/mol creatinine 12-17 years: < or =698 mmol/mol creatinine > or =18 years: < or =669 mmol/mol creatinine HYPOXANTHINE 0-2 years: <53 mmol/mol creatinine 3-5 years: <49 mmol/mol creatinine 6-11 years: <43 mmol/mol creatinine 12-17 years: <36 mmol/mol creatinine > or =18 years: <40 mmol/mol creatinine XANTHINE 0-2 years: <49 mmol/mol creatinine 3-5 years: <41 mmol/mol creatinine 6-11 years: <30 mmol/mol creatinine 12-17 years: <16 mmol/mol creatinine > or =18 years: <51 mmol/mol creatinine
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient’s age is required on request form for processing.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)
Analytic Time	within 10 days upon receipt at reference laboratory

Purkinje Cell Cytoplasmic Antibody, Type 1 (PCA-1), Type 2 (PCA-2), Type Tr (PCA-Tr)

See:	 Paraneoplastic Autoantibody, CSF

Pyridoxal 5-Phosphate

Laboratory	Commercial Mail-out Laboratory
Order Code	PYR5CSF
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">CSF Collection Tubes</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1.0 mL CSF Absolute Minimum: 0.5 mL CSF</pre>
Reference Range	<pre> 0-2.5 years 30-80 nM 0.25-1 year 23-64 nM 1-4 years 18-50 nM 4-18 years 10-37 nM</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit to the lab, the <a href= "http://www.me Metabolic Test Order Form from Medical Neurogenetics, with the specimen and the A-1a Miscellaneous Request.
Analytic Time	2 weeks upon receipt at reference laboratory

Pyridoxine

See:	 Vitamin B6, Plasma

Pyruvate Kinase Assay

Laboratory	Commercial Mail-out Laboratory
Order Code	PYRK
CPT Code	84220
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube, Yellow top tube (ACD solution A), Green top tube 4 mL (Na
Minimum	<pre> 3 mL whole blood Adult and Peds Absolute minimum: 1.0 mL</pre>
Reference Range	9.0-22.0 U/g Hemoglobin
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Patients who have recently received transfusions have normal donor cells that may mask PK deficient erythrocytes. If a recent hemolytic episode has occurred wait for at least 30 days for testing so that both young and old erythrocytes will be tested.</pre>
Methodology	Enzymatic
Analytic Time	2 working days upon receipt at reference laboratory

Pyruvate Kinase Screen

Comments	Screen no longer available.
See:	 Pyruvate Kinase Assay, Whole Blood

Pyruvate

Laboratory	Commercial Mail-out Laboratory
Order Code	PYRCF
CPT Code	84210
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL CSF Absolute Minimum: 1 mL CSF
Reference Range	0.06-0.19 mmol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Useful for investigating possible disorders of mitochondrial metabolism, when used in conjunction with cerebrospinal fluid lactate collected at the same time to determine the lactate-to-pyruvate ratio. Evaluating patients with neurologic dysfunction and normal blood lactate-to-pyruvate ratios. Pyruvic acid, an intermediate metabolite, plays an important role in linking carbohydrate and amino acid metabolism to the tricarboxylic acid cycle, the fatty acid beta-oxidation pathway, and the mitochondrial respiratory chain complex. Though pyruvate is not diagnostic in itself, analysis with lactate has diagnostic value as many inborn errors of metabolism present with laboratory findings that include lactic acidosis and/or a high lactate:pyruvate (L:P) ratio. The L:P ratio is elevated in several, but not all, mitochondrial respiratory chain disorders. Determination of lactate, pyruvate, and L:P ratio in cerebrospinal fluid is helpful in directing attention toward a possible mitochondrial disorder in cases with predominantly neurologic dysfunction and normal blood lactate levels. <u>Cautions</u>: Correct specimen collection and handling is crucial to achieve reliable results. Pyruvic acid levels alone have little clinical utility. Abnormal concentrations of pyruvic acid, and lactate-to-pyruvate (L:P) ratios, are not diagnostic for a particular disorder but must be interpreted in the context of the patient’s clinical presentation and other laboratory studies. For the L:P ratio, both analytes should be determined on the same specimen. When comparing blood and cerebrospinal fluid (CSF) L:P ratios, blood and CSF specimens should be collected at the same time.
See:	 Pyruvic Acid, Blood
Methodology	Spectrophotometry (SP)
Analytic Time	4 working days upon receipt at reference laboratory

Pyruvic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	PYR
CPT Code	84210
Collection Medium	<table> <tr> <td align=center></t <tr> <td width="110" valign="top" align="center">T012 Pyruvate Tube</td> </tr> </table>
Minimum	Draw enough blood directly into syringe to add exactly <u>1 mL of blood</u> to the special collection tube (pre-chilled). SHAKE virgorously. This is a specialized collection tube that contains preservative that keeps pyruvic acid stable until analysis is done. The tube can be obtained from Specimen Control at 356-3527.
Rejection Criteria:	Samples collected in any tube other than the special T012 tube will be rejected.
Reference Range	0.08-0.16 mmol/L NIH Unit 0.7-1.4 mg/dL Reference laboratory reports in both mmol/L and mg/dL as of March 31, 2011.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test is useful for investigating possible disorders of mitochondrial metabolism, when used in conjunction with blood lactate collected at the same time to determine the lactate-to-pyruvate ratio. <u>Cautions</u>: Correct specimen collection and handling is crucial to achieve reliable results. Pyruvic acid levels alone have little clinical utility. Abnormal concentrations of pyruvic acid, and lactate-to-pyruvate (L:P) ratios, are not diagnostic for a particular disorder but must be interpreted in the context of the patient's clinical presentation and other laboratory studies. The determination of pyruvic acid is of diagnostic value when lactic acid is measured and the L:P ratio is established in the same specimen. When comparing blood and cerebrospinal fluid (CSF) L:P ratios, blood and CSF specimens should be collected at the same time.
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Spectrophotometry (SP)
Analytic Time	5 days upon receipt in reference laboratory (not reported on Saturday and Sunday)

Q

Q Fever Ab, IgG &IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	QFEVER
CPT Code	86638(x2)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL of serum in a plain, red-top tube Absolute Minimum: 0.3 mL of serum in a plain, red-top tube
Reference Range	<pre> Q FEVER PHASE I ANTIBODY, IgG <1:16 Q FEVER PHASE II ANTIBODY, IgG <1:16 Q FEVER PHASE I ANTIBODY, IgM <1:16 Q FEVER PHASE II ANTIBODY, IgM <1:16</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Indirect Immunofluorescence (IFA)
Analytic Time	3 days upon receipt at reference laboratory

Qnt THC Conf

Laboratory	Commercial Mail-out Laboratory
Order Code	CANNABSP
CPT Code	82542
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Green top tube 4 mL (Na Heparin), Lavender top tube 3 mL (EDTA), Pink top
Minimum	<pre> Adult Preferred Minimum: 4 mL serum or plasma Adult/Pediatric Absolute Minimum: 2.0 mL serum or plasma</pre>
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles. Separator tubes and plasma or whole blood from lt. blue (sodium citrate).
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Gas Chromatography-Mass Spectrometry and/or Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	5 days upon receipt at reference laboratory

Qualitative STR (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	81265
Minimum	THREE 10 mL yellow top (ACD) tubes from patient pre-transplant AND donor pre-transplant.
Comments	<pre> Requires samples from BOTH patient and donor pre-transplant. Baseline STR allele identification of donor and recipient. All HLA Testing is ordered through the University of Iowa Epic System.</pre>
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction (PCR) and Sequence Based Typing (SBT)
Analytic Time	Resulted in Epic by 7 working days.
Testing Schedule	Test performed daily.

QuantiFERON TB Gold

Laboratory	Commercial Mail-out Laboratory
Order Code	QTB
CPT Code	86480
Collection Medium	Miscellaneous container; contact laboratory
Minimum	1 mL per tube (THREE tubes required): NIL, Antigen, Mitogen
Rejection Criteria:	Specimens other than plasma in QTB collection vials.
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Collection kit containing 3 tubes (NIL, Antigen, Mitogen) are the ONLY tube types validated</u>. Contact Core Laboratory at (356-3527) or Mailouts at (356-8593) for the THREE tubes (NIL, Antigen, Mitogen). <u>Cautions</u>: A positive QuantiFERON-TB Gold result may not indicate infection with Mycobacterium tuberculosis; false positives do occur. A negative QuantiFERON-TB Gold result does not preclude the possibility of Mycobacterium tuberculosis infection or tuberculosis disease. Falsely-negative results can be due to the stage of infection (eg, specimen drawn prior to the development of cellular immune response), comorbid conditions that affect immune functions, or other individual immunological factors. A false-negative QuantiFERON-TB Gold result can be caused by incorrect blood specimen drawn or improper handling of the specimen affecting lymphocyte function. Blood must be incubated with stimulation antigens within 16 hours of draw. Delay in incubation may cause false-negative or indeterminate results. The effect of lymphocyte count on reliability is unknown. Lymphocyte counts may vary from person to person. The minimum number required for a reliable result has not been established. QuantiFERON-TB Gold has been evaluated with specimens from patients with culture-confirmed active tuberculosis and from apparently healthy adults with and without identified risk factors for Mycobacterium tuberculosis infection. The performance of QuantiFERON-TB Gold has not been evaluated in specimens from: -Individuals with impaired or altered immune functions (HIV infections, transplant patients, those receiving immunosuppressive drugs such as corticosteroids) and those with other clinical conditions (eg, diabetes, hematological disorders) -Individuals younger than 17 years old -Pregnant women
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	3 working days upon receipt at reference laboratory
Testing Schedule	Test performed at reference laboratory.

Quantitative Bowel Culture

Laboratory	Microbiology
Order Code	C QBOW
CPT Code	87070
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Collect approximately 1 mL of contents from duodenum or jejunum in appropriate sterile container.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	Cultures are completed within 2-5 days.
Testing Schedule	0700-2200, 7 days a week, including holidays.

Quantitative Sputum Culture

See:	 Cystic Fibrosis Sputum Culture, Expectorated sputum (from cystic fibrosis patients only)

Quantitative STR (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	81265, 81266, 81267
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes.
Comments	<pre> Requires pre-transplant donor sample and pre-transplant recipient sample and prior Qualitative STR testing. Engraftment test provides percentage of donor DNA in post-transplant blood or bone marrow sample by quantitative analysis of 1 STR locus. All HLA Testing is ordered through the University of Iowa Epic System.</pre>
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction (PCR) and Sequence Based Typing (SBT)
Analytic Time	Resulted in Epic by 5-7 working days.
Testing Schedule	Test performed daily.

Quantitative STR CD3 Subset Analysis (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	81265, 81266, 81268, 86849, 88184, 88185(x2), 88187
Minimum	THREE - FOUR 10 mL yellow top (ACD) tubes.
Comments	<pre> Requires pre-transplant donor sample AND pre-transplant recipient sample and prior Qualitative STR testing. Engraftment test provides percentage of donor DNA in purified CD3 subset from post-transplant recipient blood sample by quantitative analysis of 1 STR locus. All HLA Testing is ordered through the University of Iowa Epic System.</pre>
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Polymerase Chain Reaction (PCR), magnetic cell separation, flow cytometry and Sequence Based Typing (SBT).
Analytic Time	Results in Epic by 5-7 working days.
Testing Schedule	Test performed daily.

Quinidine Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	QUIN
CPT Code	80194
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL plasma Adult/Pediatric Absolute Minimum: 0.5 mL plasma Call Specimen Control at 319-356-3527for other sample types.</pre>
Rejection Criteria:	Hemolyzed specimens. Specimens collected in separator tubes, lavender (EDTA), or gray (sodium fluoride/potassium oxalate).
Reference Range	<pre> 1.5-4.5 mcg/mL Toxic: 10.1 mcg/mL or greater </pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

R

Rabies Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	RABIES
CPT Code	86790
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum Absolute Minimum: 0.1 mL serum
Rejection Criteria:	Plasma, CSF, hemolyzed, icteric, or lipemic specimens.
Reference Range	0.50 EU/mL or greater: Represents adequate protection against rabies virus following vaccination.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This assay is designed to measure anti-rabies glycoprotein antibodies induced by rabies vaccination only; it should not be used to assess natural exposure to the rabies virus.
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-8 days upon receipt at reference laboratory

Rabies

Comments	Do not kill the animal unless confinement is impossible. If the animal is alive and healthy after 10-14 days, exposure to rabies is excluded. If the animal must be killed, do not club or shoot the head. Send only the head packed in ice (do not freeze) to the State Hygienic Laboratory, University of Iowa Research Park. Include complete history of the animal. Call 319-335-4500 for further consultation. See additional information: Rabies Test Request Information Form

Radio-Allergo Sorbent Test (RAST)

See:	 Allergen, (IgE) ImmunoCAP(R), Serum

Radiometric GFR Determination

Laboratory	Nuclear Medicine
Comments	Please refer to the Nuclear Medicine and PET Center Procedures section of the Hospital Formulary and Handbook.

Rapamycin

See:	 Sirolimus, Whole Blood

RB1 Gene Analysis Full Sequence, Bilateral

Laboratory	Commercial Mail-out Laboratory
Order Code	RB1B
CPT Code	81479
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	For adults, TWO 6 mL blood in EDTA pink top tube For infants or small children, 2-5 mL blood in EDTA pink top tube
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href="http://impactgenetics.com/ Testing Requisition and the <a href= "http://impactgenetics.com/wp-content/uploads/2012/11/RB Genetic Testing for Retinoblastoma (RB) from Impact Genetics to the lab, with the specimen and the A-1a Miscellaneous Request. <pre> <u>Diagnosis of Unknown Mutations in the RB1 gene</u> *DNA is isolated from blood or retinoblastoma tumor. *The size and copy number of each of the 27 exons and promoter region of the RB1 gene is determined by quantitative multiplex PCR. *The DNA sequence is analyzed. *In isolated cases of unilateral retinoblastoma, methylation-specific *PCR is used to identify promoter hypermethylation. *If other methods detect no mutation RT-PCR is used to search for intronic mutations likely to cause missplicing that leads to exon skipping. *Results are confirmed and reported. <u>Testing Relatives for a Known Mutation</u> *DNA is isolated from a blood sample. *One relatively simple test determines the presence or absence of the mutation found in the proband.</pre>
Analytic Time	Proband turn-around time is less than 3 months and may be as fast as 3 weeks. Family member turn-around time is less than 3 weeks. In urgent pre-natal cases, where the family mutation is known, turn-around time is 7 business days.
Testing Schedule	Suggest Monday - Thursday collection of samples due to shipment to Canada.

RB1 Gene Analysis Full Sequence, Unilateral, Blood

Laboratory	Commercial Mail-out Laboratory
Order Code	RB1UB
CPT Code	81479
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	For adults, TWO 6 mL blood in EDTA pink tube tube For infants or small children, 2-5 mL blood in EDTA pink tube tube
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href="http://impactgenetics.com/ Testing Requisition and the <a href= "http://impactgenetics.com/wp-content/uploads/2012/11/RB Genetic Testing for Retinoblastoma (RB) from Impact Genetics to the lab, with the specimen and the A-1a Miscellaneous Request. <pre> <u>Diagnosis of Unknown Mutations in the RB1 gene</u> *DNA is isolated from blood or retinoblastoma tumor. *The size and copy number of each of the 27 exons and promoter region of the RB1 gene is determined by quantitative multiplex PCR. *The DNA sequence is analyzed. *In isolated cases of unilateral retinoblastoma, methylation-specific *PCR is used to identify promoter hypermethylation. *If other methods detect no mutation RT-PCR is used to search for intronic mutations likely to cause missplicing that leads to exon skipping. *Results are confirmed and reported. <u>Testing Relatives for a Known Mutation</u> *DNA is isolated from a blood sample. *One relatively simple test determines the presence or absence of the mutation found in the proband.</pre>
Testing Schedule	Suggest Monday - Thursday collection of samples due to shipment to Canada.

RB1 Gene Analysis Full Sequence, Unilateral, Tumor

Laboratory	Commercial Mail-out Laboratory
Order Code	RB1TB
CPT Code	81479
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	For adults, TWO 6 mL blood in EDTA pink top tube For infants or small children, 2-5 mL blood in EDTA pink top tube
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href="http://impactgenetics.com/ Testing Requisition and the <a href= "http://impactgenetics.com/wp-content/uploads/2012/11/RB Genetic Testing for Retinoblastoma (RB) from Impact Genetics to the lab, with the specimen and the A-1a Miscellaneous Request. <pre> <u>Diagnosis of Unknown Mutations in the RB1 gene</u> *DNA is isolated from blood or retinoblastoma tumor. *The size and copy number of each of the 27 exons and promoter region of the RB1 gene is determined by quantitative multiplex PCR. *The DNA sequence is analyzed. *In isolated cases of unilateral retinoblastoma, methylation-specific *PCR is used to identify promoter hypermethylation. *If other methods detect no mutation RT-PCR is used to search for intronic mutations likely to cause missplicing that leads to exon skipping. *Results are confirmed and reported. <u>Testing Relatives for a Known Mutation</u> *DNA is isolated from a blood sample. *One relatively simple test determines the presence or absence of the mutation found in the proband.</pre>
Testing Schedule	Suggest Monday - Thursday collection of samples due to shipment to Canada.

RBC Antigen Testing Per Antigen

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	AGPT
CPT Code	86905
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	0.5 mL
Rejection Criteria:	Specimen must be labeled with patient’s first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Reference Range	Red cell antigens are tested with antisera to determine phenotype.
Order Form:	DeGowin Blood Center Requisition
Methodology	Tube test, direct or antiglobulin
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

RBC Enzyme Evaluation

Laboratory	Commercial Mail-out Laboratory
Order Code	RBCZYME
CPT Code	82657-RBC enzymes 82955-G-6-PD 84087-Glucose phosphate isomerase 84220-Pyruvate kinase 82978-Glutathione (if appropriate)
Collection Medium	<table> \<tr> \<td align=center></td><td \<td align=center><a href="javascript:larger_tube(’882.jpg’)"><img src="/p \<tr> \<td width="110" valign="top" align="center">Yellow top 6 mL (ACD solution \<td width="110" valign="top" align="center">Yellow top peds 2.7 mL (ACD s \</tr> \</table>
Minimum	ACD-B tube is the only acceptable tube type at reference lab; MUST CALL Mailouts at 356-8593 for tube. This tube is not available through Hospital Stores. Preferred Minimum: 10 mL whole blood (requires TWO 6 mL ACD-B tubes) Absolute Minimum: 5 mL whole blood (requires TWO peds 2.7 mL ACD-B tubes)
Rejection Criteria:	Specimens other than Whole blood Anticoagulants other than ACD
Reference Range	Definitive results and an interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	All enzyme defects, including erythrocyte enzyme errors, are inherited; some are sex-linked and located on the X chromosome. Some family members have no hematologic abnormalities, while others have a hemolytic anemia. For a number of red blood cell enzyme defects (e.g., deficiencies of hexokinase, glucose phosphate isomerase, pyruvate kinase), the sole clinical manifestation is hemolytic anemia. Glucose-6- phosphate dehydrogenase deficiency is the most common metabolic error of the red cell and presents with acute hemolytic anemia in response to oxidant stress (e.g., drugs, acute infections, fava bean ingestion). This is a consultative evaluation looking at red cell enzyme defects as the cause for early red cell destruction. Useful for: Identifying defects of red cell enzyme metabolism and evaluating patients with hemolytic anemia. Glutathione is reflexed (added by reference laboratory) if original enzyme information is normal. Testing Algorithm This is a consultative evaluation in which the case will be evaluated at the reference laboratory, the appropriate tests performed at an additional charge, and the results interpreted. Reflexed RBC Enzymes includes: adenosine deaminase, adenylate kinase, phosphofructokinase, phosphoglycerate kinase, triosephosphate isomerase, and pyrimidine 5’nucleotidase
Methodology	Kinetic Spectrophotometry (KS)
Analytic Time	2-10 days upon receipt at reference laboratory
Testing Schedule	Monday through Friday; Varies

RBC Folate

Laboratory	Commercial Mail-out Laboratory
Order Code	EFOL
CPT Code	82747
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adult/Pediatric minimum: 1 mL whole blood </pre>
Rejection Criteria:	Nonfrozen or clotted specimens.
Reference Range	280 - 903 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Hematocrit must be performed and indicated on the test request form. If the patient has not received a transfusion or experienced excessive bleeding between the RBC folate draw and the hematocrit draw, any hematocrit drawn within 24 hours of the RBC folate draw is acceptable. Protect from light during collection, storage, and shipment.</pre>
See:	 Folate, Serum
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Chemiluminescent Immunoassay
Analytic Time	4 days upon receipt at reference laboratory

RBC Total Lipid Fatty Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	RBCFA
CPT Code	82544
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult minimum: 0.5 mL serum Pediatric minimum: 0.15 mL serum</pre>
Reference Range	<pre> Includes C8 to C26 saturated, monounsaturated, polyunsaturated fatty acids and plasmalogens. Reference Ranges By Report</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient age is required on request form; also include information regarding treatment, family history and tentative diagnosis.
See:	 Fatty Acid Oxidation Probe, Fibroblasts or Skin Biopsy
Methodology	<pre> Gas Chromatography-Mass Spectrometry (GC-MS) Stable Isotope Dilution Analysis</pre>
Analytic Time	2 weeks upon receipt at reference laboratory

Red Blood Cell Transketolase

See:	 Vitamin B1, Whole Blood

Red Cell Fragility

See:	 Osmotic Fragility, Erythrocyte, Whole Blood

Redox

Laboratory	Commercial Mail-out Laboratory
Order Code	REDOX
CPT Code	82543(x4)
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> SUBMIT ONE SAMPLE TYPE Minimum: 0.4-1.0 mL serum, CSF or vitreous fluid. Urine minimum: 1-2 mL</pre>
Rejection Criteria:	Gel separator tubes, citrated tubes
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Testing includes the following for serum specimens: Lactic Acid: Pyruvic Acid OH Butyric Acid: Acetoacetic Acid MMA (Methylmalonic Acid) Homocystine Creatinine Glucose (also include 2 ratios)</pre>
Methodology	Column chromatography/mass spectrometry, stable isotope dilution, quantitative single stationary and mobile phase
Analytic Time	4 working days upon receipt at reference laboratory

Reducing Substances

Laboratory	Commercial Mail-out Laboratory
Order Code	REDUF
CPT Code	84376
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Feces specimen, stool contain </tr> </table>
Minimum	<pre> Adult recommended minimum: 5 g stool Adult absolute minimum: 1 g stool Pediatric minimum: 0.5 g stool</pre>
Rejection Criteria:	Specimens with preservatives or in diapers
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Colorimetry
Analytic Time	24 hours upon receipt at reference laboratory

Reducing Substances

Laboratory	Hematology
Order Code	REDU
CPT Code	81002
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	2 mL of urine
Order Form:	A-1a General Lab or Epic Req
Comments	Solid material can not be analyzed by this method. This test is for pediatric patients only.
Methodology	Clinitest Tablets
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Renal Biopsy

Laboratory	Surgical Pathology Laboratory
CPT Code	<pre> 88305(technical and professional) 88313 x4(technical and professional) 88348 (technical and professional) 88346 x9 (technical and professional)</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	<pre> Send biopsy on saline soaked gauze to Surgical Pathology Laboratory at 5804 JPP (6-1859). Lab personnel will triage the biopsy for light microscopy, EM, and Immunopathology. If ANCA and AGBM assay are also desired, please submit 5 ml red top tube and A1a Immunopathology requisition.</pre>
See:	 Glomerular Basement Membrane Antibodies, IgG, Serum
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Light Microscopy, Electron Microscopy and Immunofluorescence
Analytic Time	Light Microscopy and Immunofluorescence within 24 hours (upon receipt in laboratory). Electron microscopy within 24-48 hours (upon receipt in laboratory).
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Renin Activity

Laboratory	Commercial Mail-out Laboratory
Order Code	REN
CPT Code	84244
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2.0 mL Absolute Minimum: 1.2 mL
Rejection Criteria:	Serum. Specimens collected in citrate, heparin, or oxalate. Hemolyzed or refrigerated specimens. Do not collect in refrigerated tubes.
Reference Range	<pre> Adult, normal sodium diet: Supine: 0.2-1.6 ng/mL/hr Upright: 0.5-4.0 ng/mL/hr Children, normal sodium diet, supine: Newborn (1-7 days): 2.0-35.0 ng/mL/hr Cord blood: 4.0-32.0 ng/mL/hr 1-12 months: 2.4-37.0 ng/mL/hr 13 months-3 years: 1.7-11.2 ng/mL/hr 4-5 years: 1.0-6.5 ng/mL/hr 6-10 years: 0.5-5.9 ng/mL/hr 11-15 years: 0.5-3.3 ng/mL/hr Children, normal sodium diet, upright: 0-3 years: Not Available 4-5 years: Less than or equal to 15 ng/mL/hr 6-10 years: Less than or equal to 17 ng/mL/hr 11-15 years: Less than or equal to 16 ng/mL/hr</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Radioimmunoassay
Analytic Time	2 working days upon receipt at reference laboratory

Resin (T-3) Uptake Test (RT3U)

See:	 Free Thyroxine, Plasma

Respiratory Virus PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	RVPCR
CPT Code	87798(x3), 87501(x2)
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Swab Kit Flexible Nasopharyng </tr> </table>
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> This PCR assay tests for eight respiratory viruses: Influenza A (including H1N1), influenza B, parainfluenza viruses 1, 2, 3, adenovirus, respiratory syncytial virus (RSV), and human metapneumovirus. Human metapneumovirus is a recently identified (2001) respiratory virus related to RSV. Its clinical manifestations are also similar to that of RSV and ranges from mild upper respiratory infections to bronchiolitis and severe pneumonia.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Polymerase Chain Reaction
Analytic Time	1-3 days
Testing Schedule	Weekdays

Restrictive Dermopathy

See:
Lamin (LMNA) Full Gene Sequence with Interpretation, Whole Blood

RET Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	MEN2MUT
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Yellow top tube (ACD solution A)
Minimum	<pre> Preferred minimum: 2.0 mL lavender top tube (EDTA) Absolute minimum: 0.5 mL whole blood Contact Clinical Pathology/Core Laboratory for other specimen options (356-3527): Amniotic Fluid or Chorionic Villus</pre>
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful For</u>: Confirmation of diagnosis of multiple endocrine neoplasia type 2 (MEN 2), MEN 2B, and familial medullary thyroid carcinoma (FMTC) Documentation of germline mutation to distinguish FMTC from sporadic multifocal medullary thyroid carcinoma <u>Cautions</u>: A small percentage of individuals who are carriers or have a diagnosis of multiple endocrine neoplasia type 2 (MEN2) may have a mutation that is not identified by this method (eg, mutations in other exons, promoter mutations). The absence of a mutation(s), therefore, does not eliminate the possibility of positive carrier status or the diagnosis of MEN2. For carrier testing, it is important to first document the presence of a RET proto-oncogene mutation in an affected family member. In some cases, DNA alterations of undetermined significance may be identified. Rare polymorphisms exist that could lead to false-negative or false-positive results. If results obtained do not match the clinical findings, additional testing should be considered. A previous bone marrow transplant from an allogenic donor will interfere with testing. Test results should be interpreted in the context of clinical findings, family history, and other laboratory data. Errors in our interpretation of results may occur if information given is inaccurate or incomplete. Please print, complete and submit the following forms to the lab, with the specimen and the A-1a Miscellaneous Request: Molecular Genetics-Inherited Cancer Syndromes Patient Information Sheet and the Informed Consent Form for DNA Testing from the Mayo Medical Laboratories. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Polymerase Chain Reaction (PCR) Amplification/DNA Sequencing of Exons 10, 11, 13, 14, 15, and 16 of the RET Proto-onocogene
Analytic Time	8 working days upon receipt at reference laboratory

RET Gene Analysis Known Familial Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	MEN2KMUT
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Yellow top tube (ACD solution A)
Minimum	2 mL whole blood in a lavender top (EDTA) tube
Rejection Criteria:	No specimen should be rejected. If specimen is not received at the appropriate temperature or in the wrong anti-coagulant, please include a note to the reference laboratory. If questions, contact Mailouts at 356-8593.
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Useful for *Confirmation of diagnosis of MEN 2 *Predictive testing of potential carriers of MEN 2A, MEN 2B, or FMTC Please print, complete and submit the following forms to the lab, with the specimen and the A-1a Miscellaneous Request: Molecular Genetics-Inherited Cancer Syndromes Patient Information Sheet and the Informed Consent Form for DNA Testing from the Mayo Medical Laboratories. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Polymerase chain reaction (PCR) amplification/DNA sequencing is utilized to test for the presence of a specific mutation previously identified in an affected family member.
Testing Schedule	Test performed once per week on Monday.

Ret-Proto Oncogene

See:	 RET Gene Analysis Common Variants, Whole Blood

Reticulocyte Cellular Hemoglobin

Laboratory	Hematology
Order Code	RETHE
CPT Code	85046
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range	30-40 pg
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Other anticoagulants are not recommended.
See:	 Reticulocyte Count (Automated), Whole Blood
Methodology	Reticulocytes are stained with a polymethine dye, oxazine 750 and cells analyzed for cell size and hemoglobin. Light absorption is proportional to the DNA/RNA content.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Reticulocyte Count (Automated)

Laboratory	Hematology
Order Code	ARET
CPT Code	85045
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range	<pre> Age Absolute Reticulocyte Range 1 - 3 Days* 77 - 283 K/mm3 4 - 30 Days* 14 - 159 K/mm3 31 - 60 Days* 28 - 201 K/mm3 60 Days - Adult 12 - 130 K/mm3 *Full Term Infant</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	A reticulocyte count can usually be added to any CBC sample <24 hours old.
Methodology	<pre> Flow Cytometry Reticulocyte counts are performed using flow cytometry method. The RNA/DNA in the Reticulocytes is stained and the stained cells are then detected and enumerated on the basis of a two-dimensional distribution of the forward scattered light and lateral fluorescent light.</pre>
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Retinoids (Retinol or Retinyl Palmitate)

See:	 Vitamin A, Serum

Reverse T3

See:	 Triiodothyronine, Reverse, Plasma

Reverse Type only (ABO)

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	BT
CPT Code	86900, Rh 86901
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	0.5 mL
Rejection Criteria:	Specimen must be labeled with patient’s first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Order Form:	DeGowin Blood Center Requisition
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Rh Type

Laboratory	DeGowin Blood Center - Blood Bank
Order Code	RH
CPT Code	86901
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>or</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	0.5 mL
Rejection Criteria:	Specimen must be labeled with patient's first and last name and medical record number. Specimens will be rejected if information is not on the label when received.
Reference Range	not applicable
Order Form:	DeGowin Blood Center Requisition
Methodology	Tube or microplate
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Rheumatoid Antibodies

See:	 Rheumatoid Factor, Plasma

Rheumatoid Factor

Laboratory	Chemistry
Order Code	RF
CPT Code	86431
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL; whole blood in light green top tube or ONE microtainer.
Reference Range	<14 IU/mL
Order Form:	A-1a General Lab or Epic Req
See:	 Cryoglobulin Quantitation, Serum
Methodology	Immunoturbidimetric Assay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Ri

See:	 Paraneoplastic Autoantibody, CSF

Riboflavin

See:	 1 , Plasma

Ribosomal P Protein

Laboratory	Chemistry
Order Code	RIBOP
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers
Reference Range	1.0 AI (antibody index) or less
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 25, 2013.
See:	 Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum Double Stranded DNA Antibody, Plasma RNP Antibody, Plasma Smith Antibody, Plasma
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Rickettsia rickettsii Antibody, IgG & IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	RMSGM
CPT Code	86757 RMSF IgG; 86757 RMSF IgM
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum in a red top tube
Rejection Criteria:	Severely lipemic, contaminated, or hemolyzed specimens.
Reference Range	<pre> Rickettsia rickettsii Antibody, IgG Less than 1:64: Negative - No significant level of Rickettsia rickettsii Antibody, IgG detected. 1:64 - 1:128: Low Positive - Presence of Rickettsia rickettsii Antibody, IgG detected, suggestive of current or past infection. 1:256 or greater: Positive - Presence of Rickettsia rickettsii Antibody, IgG suggestive of recent or current infection. Rickettsia rickettsii Antibody, IgM Less than 1:64: Negative - No significant level of Rickettsia rickettsii Antibody, IgM detected. 1:64 or greater: Positive - Presence of Rickettsia rickettsii Antibody, IgM detected, which may indicate a current or recent infection; however, low levels of IgM antibodies may occasionally persist for more than 12 months post-infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Indirect Fluorescent Antibody
Analytic Time	5 days upon receipt at reference laboratory

Rickettsia rickettsii Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	RMSIGG
CPT Code	86757
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum in a red top tube
Rejection Criteria:	Severely lipemic, contaminated, or hemolyzed specimens.
Reference Range	Less than 1:64: Negative - No significant level of Rickettsia rickettsii Antibody, IgG detected. 1:64 - 1:128: Low Positive - Presence of Rickettsia rickettsii Antibody, IgG detected, suggestive of current or past infection. 1:256 or greater: Positive - Presence of Rickettsia rickettsii Antibody, IgG suggestive of recent or current infection.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Indirect Fluorescent Antibody
Analytic Time	5 days upon receipt at reference laboratory

Risperidone Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	RISP
CPT Code	82541
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum Absolute Minimum: 0.5 mL serum</pre>
Rejection Criteria:	Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	Therapeutic range Not well established Total (Resipedone and Metabolite) 20-60 ng/mL Toxic range Not well established
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-5 days upon receipt at reference laboratory

Ristocetin Cofactor

See:	 Von Willebrand Factor Assay (FVIIIR:RCF), Plasma

RNA Polymerase III Ab, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	RNAP
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	0.5 mL serum in a red top tube
Reference Range	<20.0 U (negative) 20.0-39.9 U (weak positive) 40.0-80.0 U (moderate positive) >80.0 U (strong positive)
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	A positive result indicates the presence of measurable IgG antibodies to RNA polymerase III, but does not unequivocally establish the diagnosis of systemic sclerosis or other autoimmune disease. The level of RNA polymerase III autoantibodies does not indicate the severity of disease in patients with systemic sclerosis. The presence of immune complexes or other immunoglobulin aggregates in the patient specimen may cause an increased level of nonspecific binding and produce false-positive results with this assay.
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	2 working days upon receipt at reference laboratory

RNP Antibody

Laboratory	Chemistry
Order Code	RNP
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers
Reference Range	1.0 AI (antibody index) or less
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 25, 2013.
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Rocky Mountain Spotted Fever, Antigen Detection

See:	 Skin Biopsy, Tissue

Rohypnol

See:	 Flunitrazepam + Metabolites, Drug Level, Serum

Rotavirus Antigen Detection

Laboratory	Microbiology
Order Code	ROTA
CPT Code	87425
Collection Medium	Sterile container
Minimum	<pre> Stool specimen in a nonmetal container. Hard, formed stools unsatisfactory.</pre>
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Test is run daily.
Methodology	EIA antigen detection
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0700-1630, 7 days a week, including holidays.

RTT

See:	 MECP2 Gene Analysis Dup/Delet Variant, Whole Blood

Rubella (German Measles) Antibody Immune Status (IgG)

See:	 Rubella Antibody, IgG, Plasma
See Appendix	See Additional Information: Microbiology Specimen Collection and Transport

Rubella Antibody, IgG

Laboratory	Chemistry
Order Code	RUBEIGG
CPT Code	86317
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers.
Reference Range	<pre> Less than 5 IU/mL: Negative - No significant level of detectable rubella IgG antibody. 5-9 IU/mL: Equivocal - Repeat testing in 10-14 days may be helpful. 10 IU/mL or greater: Positive - IgG antibody to rubella detected, which may indicate a current or previous exposure/immunization to rubella. Rubella IgG antibody can be formed following rubella infection or after rubella vaccination. A reactive result is consistent with immune status to rubella virus. Non-reactive and equivocal results flag as abnormal in Epic which indicates non-immune or equivocal immune status to rubella. A non-reactive result does NOT imply rubella infection. If ordered in workup of possible rubella infection, the IgG antibody results should be interpreted in conjunction with other laboratory tests, clinical history, and physical examination.</pre>
Order Form:	A-1a General Lab or Epic Req
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Rubella Antibody, IgM

Laboratory	Chemistry
Order Code	RUBEIGM
CPT Code	86762
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers.
Reference Range	Reference range and methodology changed effective 12/11/2012. 0.8 AI or less: Negative - No significant level of detectable rubella IgM antibody. 0.9-1.0 AI: Equivocal - Repeat testing in 10-14 days may be helpful. 1.1 AI or greater: Positive - IgM antibody to rubella detected, which may indicate a current or past rubella infection .
Order Form:	A-1a General Lab or Epic Req
Comments	For workup related to possible rubella infection, acute and convalescent specimens must be labeled as such; parallel testing is preferred and convalescent specimens must be received within 30 days from receipt of the acute specimens. Please mark specimen plainly as "ACUTE" or "CONVALESCENT." In children and adults, rubella infection usually results in a mild exanthematous disease. However, infection during pregnancy, particularly in the first trimester, can result in fetal death or the "rubella syndrome," a spectrum of congenital defects that includes cataracts, deafness, glaucoma, congenital heart disease, and mental retardation. About ten to 20 percent of newborns infected in utero fail to survive past the first year of life. Since complications of congenital rubella infection are so severe, diagnosis of infection during the first trimester of pregnancy may influence the decision to terminate or continue the pregnancy.
Methodology	Multiplex Flow Immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Rubeola (Measles Virus) IgG Antibody Detection

See:	 Measles (Rubeola) Antibody, IgG, Plasma

S

S-Sulfocysteine Assay

Laboratory	Commercial Mail-out Laboratory
Order Code	SULCYS
CPT Code	82127, 82570
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	<pre> Preferred Minimum: 1.0 mL urine Absolute Minimum: 0.3 mL urine</pre>
Reference Range	See report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Biochemical Genetics Laboratory: Test Request Form to the lab, with the specimen and the A-1a Miscellaneous Request.
Methodology	Tandem Mass Spectrometry
Analytic Time	2 weeks upon receipt at reference laboratory
Testing Schedule	Testing performed Monday-Thursday only.

Salicylate

Laboratory	Chemistry
Order Code	SAL
CPT Code	80196
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL; light green top tube or ONE microtainer.
Reference Range	<pre> Therapeutic <30 mg/dL Acute toxic >40 mg/dL Chronic toxicity may occur with levels <40 mg/dL.</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Colorimetric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Salivary Cortisol

See:	 Cortisol, Salivary

Sarcoglycan-Deficient Limb Girdle Muscular Dystrophy

Laboratory	Histopathology
CPT Code	<pre> 88305 Muscle Biopsy (technical and professional) 88346x Number of Immunofluorescent Stains (technical and professional) 88331 Frozen Section H&E (technical and professional)</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Methodology	Immunofluorescence
Analytic Time	1 week
Testing Schedule	0800-1700 Monday through Friday. For additional services, contact the Histopathology Laboratory at 356-2140 or contact Dr. Steve Moore at pager #5197.

Scabies Exam

Laboratory	Microbiology
Order Code	C SCAB
CPT Code	87210
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Sterile mineral oil is available from Pharmacy (item 991565, 10 mL container).
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	Weekdays

SCID

See:	 Immunodeficiency Evaluations; Adult and Pediatric, Peripheral Blood

Scl-70 Antibody

Laboratory	Immunopathology
Order Code	SCL70
CPT Code	86235
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Adult - 2 mL; red top tube Pediatric - 2 mL; red top tube
Reference Range	Absent
Order Form:	A-1a Immunopathology or Epic Req
Comments	Appears to be a 'Marker' antibody for scleroderma or PSS. Rarely present in patients with other systemic rheumatic diseases.
Methodology	Immunodiffusion
Analytic Time	1 week
Testing Schedule	Weekly

SCN1A Gene Analysis Full Gene Sequence and Reflexive

Laboratory	Commercial Mail-out Laboratory
Order Code	SCN1A
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Adults: 10 mL Whole Blood EDTA Pediatrics: 5-6 mL Whole Blood EDTA</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the following form to the lab, with the specimen and the A-1a Miscellaneous Request or Epic Req: <a href= "ht Requisition and Statement of Medical Necessity Due to the unique nature of genetic testing, pateints should receive pre-test and post-test counseling. Informed consent is recommended.
Methodology	Scanning and sequence analysis of the entire coding region.
Analytic Time	4 weeks

SCN4A Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	HOPPGENE
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Yellow top tube (ACD solution A)
Minimum	<pre> <u>Adult minimum</u>: 10-15 mL whole blood from THREE 6 mL pink top (EDTA) tubes. <u>Infant or small children preferred minimum</u>: THREE 4 mL whole blood from lavender top (EDTA) tube. <u>Infant or small children absolute minimum</u>: 3 mL whole blood from ONE pink top (EDTA) tube.</pre>
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Please print, complete and submit the following forms to the lab, with the specimen and the A-1a Miscellaneous Request from Massachusetts General Hospital/Neurogenetics DNA Diagnostic Laboratory. General Requisition Form and the Consent Form for DNA-based Analysis This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	2 weeks upon receipt at reference laboratory

SCN4A Gene Analysis Exon 12 Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	HYPPGENE
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Yellow top tube (ACD solution A)
Minimum	<pre> <u>Adult minimum</u>: 10-15 mL whole blood from THREE 6 mL pink top (EDTA) tubes. <u>Infant or small children preferred minimum</u>: 10 mL whole blood from TWO 6 mL lavender top (EDTA) tubes. <u>Infant or small children absolute minimum</u>: 3 mL whole blood from ONE pink top (EDTA) tube.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Please print, complete and submit the following forms to the lab, with the specimen and the A-1a Miscellaneous Request from Massachusetts General Hospital/Neurogenetics DNA Diagnostic Laboratory. General Requisition Form and the Consent Form for DNA-based Analysis This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.</pre>
Methodology	DNA sequencing utilizing PCR and restriction enzyme digestion.
Analytic Time	1 week upon receipt at reference laboratory

Sed Rate

See:	 Sedimentation Rate (ESR), Whole Blood

Sedimentation Rate (ESR)

Laboratory	Hematology
Order Code	ESR
CPT Code	85651
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	1.5 mL
Reference Range	Men: 0-15 mm/hr; women: 0-20 mm/hr (Westergren method)
Order Form:	A-1a General Lab or Epic Req
Comments	Must be received in the laboratory within 2 hours of drawing. Specimens received for a sedimentation rate within 48 hours of a previous measurement will be cancelled. Sedimentation rate varies slowly and daily measurements are clinically unnecessary.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Westergren
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Selenium

Laboratory	Commercial Mail-out Laboratory
Order Code	SES
CPT Code	84255
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	Preferred Minimum: 2.0 mL plasma from Royal Blue K2 EDTA tube
Rejection Criteria:	Separator tubes. Specimens that are not separated from the red cells or clot within 6 hours.
Reference Range	23 - 190 μg/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Note: Elevated results from noncertified trace element-free tubes may be due to contamination. Elevated concentrations of trace elements in serum should be confirmed with a second specimen collected in a trace element-free tube, such as royal blue sterile tube (no additive).
Methodology	Quantitative Inductively Coupled Plasma-Mass Spectrometry
Analytic Time	1-2 days upon receipt at reference laboratory.

Semen Analysis, Post-Vasectomy

Laboratory	Hematology
Order Code	SPX
CPT Code	89310
Collection Medium	Miscellaneous container; contact laboratory
Minimum	1.0 mL
Rejection Criteria:	Collection in condom is not acceptable. Place specimen in leakproof container.
Reference Range	No sperm present.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Qualitative test performed in the Core Lab.
Methodology	Microscopic review.
Analytic Time	15 minutes (upon receipt in laboratory)

Serologies (Titers)

See:	 CMV IgG Antibody Detection, Plasma CMV IgM Antibody Detection, Plasma Helicobacter pylori Antibody, IgG, Serum Measles (Rubeola) Antibody, IgG, Plasma Mumps IgG Antibody Detection, Plasma Rubella (German Measles) Antibody Immune Status (IgG) Toxoplasmosis Antibody, IgM, Serum Toxoplasmosis IgG Antibody, Serum Varicella Zoster IgG Detection, Plasma

Seroquel Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	SEROQ
CPT Code	83788
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA)</td></tr></table>
Minimum	Preferred Minimum: 1 mL plasma
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-5 days upon receipt at reference laboratory

Serotonin

Laboratory	Commercial Mail-out Laboratory
Order Code	SERO
CPT Code	84260
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Pink top tube</td></tr></table>
Minimum	Preferred Minimum: 3 mL whole blood Absolute Minimum: 1 mL whole blood
Rejection Criteria:	Non-frozen specimens or specimens other than whole blood.
Reference Range	50 - 200 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Mix specimen well, place on ICE and deliver to Specimen Control, 6240 RCP.
Methodology	Quantitative High Performance Liquid Chromatography (HPLC)
Analytic Time	1-5 days upon receipt at reference laboratory

Serotonin Release Assay

Laboratory	Commercial Mail-out Laboratory
Order Code	SRA
CPT Code	86022
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred minimum: 5 mL serum from TWO 5 mL red top tubes Absolute minimum: 1 mL serum from ONE 5 mL red top tube</pre>
Reference Range	By report. A positive result requires <u>></u> 20% release of serotonin with low dose heparin <u>and</u> < 20% release in the presence of a high concentration of heparin. Percent release with low dose and high dose heparin are reported. Results are interpreted as negative, borderline positive, positive, or strong positive.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete, and submit the <a href="http://www.bcw.edu/cs/gro Immunology Test Requisition from the Blood Center of Wisconsin with the sample and the A-1a Miscellaneous Request or Epic Req.
Methodology	Serotonin Release Assay (SRA)
Analytic Time	2-4 days upon receipt at reference laboratory

Sertraline (Zoloft) Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	SERT
CPT Code	80299
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	Therapeutic Range: Not well established.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-5 days upon receipt at reference laboratory.

Serum Acquisition for - On-Call Preliminary Crossmatch (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	99001, 99070
Minimum	One 10 mL red top (no additive) tube from recipient (patient).
Comments	<pre> Crossmatch includes serum acquisition, storage, and preliminary on-call crossmatch test. Laboratory arranges shipment of samples from patient. All HLA Testing is ordered through the University of Iowa Epic System.</pre>
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions

Serum Protein Electrophoresis

See:
Protein Electrophoresis, Serum

Severe Combined Immunodeficiency Syndrome (SCID)

See:
Immunodeficiency Evaluations; Adult and Pediatric, Peripheral Blood

Sezary Prep

Laboratory: Bone Marrow Lab
Order Code: BMBC
CPT Code: 85009
Minimum: <pre>
Minimum of 6 mL whole blood in one or two of the following container types.

Send two tubes with 3 mL whole blood in 3 mL lavender 15% EDTA container (Hosp Stores order #907688).

Send two tubes with 4 mL whole blood in 4 mL lavender 15% EDTA container (Hosp Stores order #907691).

Send one tube with 6 mL whole blood in 6 mL pink 15% EDTA container (Hosp Stores order #907692).</pre>
Order Form: Epic Consult Form
Comments: <pre>
Useful in patients with a low white blood cell count when suspecting Sezary Syndrome. Sezary cells are more easily seen in a buffy coat preparation displaying morphologic characteristics.

Specimen must be in laboratory before 3:30 p.m. on the day of collection.</pre>

See Appendix: See Additional Information:
Specimens Requiring Immediate Delivery
Methodology: Staining and microscopic examination.
Analytic Time: 24 hours (upon receipt in laboratory)
Testing Schedule: 0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Sezary Syndrome Immunophenotyping

See:
Chronic Lymphocytic Leukemia, Various

Sezary Syndrome

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                  Laboratory  Flow Cytometry Service
           Collection Medium  <table>
                              <tr>
                              <td align=center></td></tr>
                              <tr>
                              <td width="110" valign="top" align="center">Yellow top tube (ACD solution
                              </tr>
                              </table>

 Alternate Collection Media:  Green top tube 4 mL (Na Heparin), Lavender top tube 3 mL (EDTA)
                     Minimum  <pre>
                              Peripheral Blood: 10 mL

                              Bone Marrow:  2-4 mL yellow top tube (ACD solution A)

                              Fluids and Tissue: Dispense sample into vial of RPMI-1640 tissue
                              culture media.</pre>
             Reference Range  <pre>
                              Antibodies routinely included are: CD2, CD3, CD4, CD5, CD7, CD8,
                              CD19, CD25, and CD45.

                              The pathologist will provide an interpretative report.</pre>
                 Order Form:  A-1a Immunopathology or Epic Req
                    Comments  Please state the clinical question to be answered on the requisition.
                              Specimens accepted from Monday 0800 until Friday 1630.  Clinical
                              Pathology resident should be contacted if studies are needed emergently
                              at other times.

                 See Appendix  See Additional Information: <br />
                              Specimens Requiring Immediate Delivery
                  Methodology  Flow Cytometry-Whole Blood Lysis
               Analytic Time  2 days
            Testing Schedule  0800-1630 Monday through Friday.  For additional services,
                              contact Clinical Pathology Resident on-call at pager #3404.
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SGOT

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                         See:  <br />Aspartate Aminotransferase (AST), Plasma
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SGPT

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                         See:  <br />Alanine Aminotransferase (ALT), Plasma
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Sickle Cell Screen

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                  Laboratory  Hematology
                  Order Code  SS
                    CPT Code  85660
           Collection Medium  <table>
                              <tr>
                              <td align=center></td></tr>
                              <tr>
                              <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA)
                              </tr>
                              </table>

                     Minimum  Full draw; 3.0 mL lavender top; (or fingerstick)
             Reference Range  Negative (positive in SS, SA, SC and other rare genotypes)
                 Order Form:  A-1a General Lab or Epic Req
                    Comments  Ambiguous results may occur if patient has been transfused in the
                              preceding 3 months.

                  Methodology  Hemoglobin Solubility
               Analytic Time  3 hours (upon receipt in laboratory)
            Testing Schedule  24 hrs/day, 7 days a week, including holidays.
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Silicone Clotting Time

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                    Comments  Test not available; see linked test below "Activated Partial
                              Thromboplastin Time, Plasma".

                         See:  <br />Activated Partial Thromboplastin Time (aPTT), Plasma
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Sirolimus

Laboratory	Chemistry
Order Code	SIR
CPT Code	80195
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	2/3 full in lavender top (EDTA) tube or ONE lavender top (EDTA) microtube for pediatric patients.
Reference Range	5-20 ng/mL
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	Everolimus (Zortress®, Afinitor®) cross-reacts significantly with the sirolimus immunoassay. Sirolimus blood concentrations cannot be determined reliably in patients whose blood has both sirolimus and everolimus. This can occur when patients are being transitioned from sirolimus to everolimus or everolimus to sirolimus.
Methodology	Chemiluminescent Microparticle Immunoassay
Testing Schedule	Batch analysis performed on Tuesdays and Fridays. Sample must be received by 0900 for same day service. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Sjogren‘s Antibodies

See:	 SS-A Antibody, Plasma SS-B Antibody, Plasma

Skin Biopsy, Immunofluorescence

Laboratory	Immunopathology
CPT Code	<pre> 88305 (technical and professional) 88346 x 5 (technical and professional)</pre>
Minimum	4 mm skin punch biopsy is required.
Reference Range	The pathologist will provide an interpretative report.
Comments	<pre> Deliver the specimen to the Surgical Pathology laboratory at 5804 JPP. A completed requisition must accompany all requests. It should contain: patient name, medical record number, date of biopsy, tissue source, biopsy site, clinical history, question(s) to be answered, and differential diagnosis. Include other pertinent history and findings.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Light Microscopy and Direct Immunofluorescence
Analytic Time	2 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Skin Biopsy

Laboratory	Histopathology
CPT Code	<pre> 88305 (technical and professional) 88346 x5 (technical and professional)</pre>
Minimum	Skin biopsy is required.
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	<pre> Deliver the specimen to the Surgical Pathology laboratory at 5804 JPP. A completed requisition must accompany all requests. It should contain: patient name, medical record number, date of biopsy, tissue source, biopsy site, clinical history, question(s) to be answered, and differential diagnosis. Include other pertinent history and findings. Label the container with the patient name, medical record number and tissue source.</pre>
See:	 Skin Biopsy, Immunofluorescence, Tissue
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Light Microscopy
Analytic Time	2 days
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

SLC26A4 (Deafness Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	SLC26A4
CPT Code	83891, 83894, 83898 (x20), 83903 (x20), 83904 (x5)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Screening for SLC26A4 is performed by DHPLC and sequencing. Oligonucleotide primers have been designed to amplify each exon. Abnormal elution profiles are sequenced to determine the specific mutation.
Analytic Time	8 weeks

SLOS

See:	 7-Dehydrocholesterol, Plasma

Sm/RNP (Common Motif) Antibodies

Laboratory	Chemistry
Order Code	RNPSM
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers
Reference Range	1.0 AI (antibody index) or less
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 25, 2013.
See:	 Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum Double Stranded DNA Antibody, Plasma Jo-1 Antibody, Plasma RNP Antibody, Plasma SS-A Antibody, Plasma SS-B Antibody, Plasma Scl-70 Antibody, Serum Smith Antibody, Plasma
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Smear Review

See:	 Blood Smear, Path Morphologic Exam, (Wright Stain) Blood Smear, Technologist Review, (Wright Stain)

Smith Antibody

Laboratory	Chemistry
Order Code	SM
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers
Reference Range	1.0 AI (antibody index) or less
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 25, 2013.
See:	 Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum Double Stranded DNA Antibody, Plasma Jo-1 Antibody, Plasma RNP Antibody, Plasma SS-A Antibody, Plasma SS-B Antibody, Plasma Scl-70 Antibody, Serum Sm/RNP (Common Motif) Antibodies, Plasma
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Smith-Lemli-Opitz Screen

See:	 7-Dehydrocholesterol, Plasma

SMN1 Gene Analhysis Full Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	SMASEQ
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Adult Minimum: 6 mL whole blood Pediatric Minimum: 2-3 mL whole blood
Rejection Criteria:	Unlabeled specimens are unacceptable. Specimens received in green top (Heparin) tubes are unacceptable. Broken or severely damages specimen tubes are unacceptable.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the DNA Analysis Requisition and Consent Form to the lab, with the specimen and the A-1a Miscellaneous Request.
Analytic Time	60 days upon receipt at reference laboratory
Testing Schedule	Test available Monday through Thursday as lab does not accept sample on Saturday. Consent form should be completed.

SMN1 Gene Analysis Exon 7 Deletion

Laboratory	Commercial Mail-out Laboratory
Order Code	SMAD
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Adult Minimum: 6 mL whole blood Pediatric Minimum: 2-3 mL whole blood
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the DNA Analysis Requisition and Consent Form to the lab, with the specimen and the A-1a Miscellaneous Request.
Analytic Time	14 days upon receipt at reference laboratory
Testing Schedule	Test available Monday through Thursday as lab does not accept sample on Saturday. Consent form should be completed.

SMN1 Gene Analysis Known Familial Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	SMACT
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Adult Minimum: 6 mL whole blood Pediatric Minimum: 2-3 mL whole blood
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the DNA Analysis Requisition and Consent Form to the lab, with the specimen and the A-1a Miscellaneous Request. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Analytic Time	21 days upon receipt at reference laboratory
Testing Schedule	Test available Monday through Thursday as lab does not accept sample on Saturday. Consent form should be completed.

SNRPN/UBE3A Methylation Analysis Angelman Syndrome with Interpretation

Laboratory	Molecular Pathology
Order Code	AS
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults - 3 mL whole blood in lavender top tube (EDTA) Children - 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Reference Range	Angelman syndrome - absent maternal 15q12
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
See:	 Chromosomal Analysis, Peripheral Blood, Cord Blood Fluorescence In-Situ Hybridization (FISH-Microdeletion), Peripheral Blood, Bone Marrow, Fibroblasts, Other Tissue SNRPN/UBE3A Methylation Analysis Prader-Willi with Interpretation, Whole Blood
Methodology	Southern Blot (Methylation detection)
Analytic Time	21 days
Testing Schedule	Weekly

SNRPN/UBE3A Methylation Analysis Prader-Willi with Interpretation

Laboratory	Molecular Pathology
Order Code	PW
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults - 3 mL whole blood in lavender top tube (EDTA) Children - 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Reference Range	Prader-Willi syndrome - absent paternal 15q12
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
See:	 SNRPN/UBE3A Methylation Analysis Angelman Syndrome with Interpretation, Whole Blood
Methodology	Southern Blot (Methylation detection)
Analytic Time	21 days
Testing Schedule	Weekly

Sodium-Urine, Random

Laboratory	Chemistry
Order Code	URNA
CPT Code	84300
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL random urine; no preservative
Reference Range	Units are mEq/L. No established reference range for random urine sodium.
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Ion Selective Electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Sodium

Laboratory	Chemistry
Order Code	UNA
CPT Code	84300
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> 24 hr collection; no preservative (or random specimen). Collections other than 24 hr will not be calculated for mEq/24 hr.</pre>
Reference Range	130-315 mEq/24 hr
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Collection and Preservation of 24-Hour Urine Specimens Urine Tests Requiring no Preservatives
Methodology	Ion Selective Electrode
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Sodium

Laboratory	Critical Care Laboratory
Order Code	NAC
CPT Code	84295
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Heparinized syringe or Green </tr> </table>
Minimum	0.5 ml in Lithium/Sodium Heparin syringes
Reference Range	<pre> 135-145 mEq/l Critical Care Critical Value Adults: <120mEq/l and >160mEq/l Peds: <120mEq/l and >155mEq/l Special Care Nurseries Critical Value: <130mEq/l and >155mEq/l</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	Can be ordered with blood gases (0.5 mL blood required); all needles must be removed from the syringe before delivery.
See Appendix	See Additional Information: Critical Care Critical Lab Values Special Care Nurseries Critical Lab Values
Methodology	Ion Selective Electrode
Analytic Time	10 minutes (upon receipt in laboratory)

Sodium

Laboratory	Chemistry
Order Code	NA
CPT Code	84295
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients.
Rejection Criteria:	Sodium heparin is not acceptable (elevates Na)
Reference Range	<pre> 135-145 mEq/L. Pediatric Reference Ranges: Age Range Units Premature 130-140 mEq/l Critical value: <120 mEq/l and >160 mEq/l</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Sodium-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Critical Lab Values Chemistry Pediatric Reference Ranges
Methodology	Ion Selective Electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Sodium-Other

Laboratory	Chemistry
Order Code	NAO
CPT Code	84302
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Sodium, Plasma
Methodology	Ion selective electrode
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Soluble IL-2Ra

Laboratory	Commercial Mail-out Laboratory
Order Code	IL2R
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Preferred minimum: 3 mL lavender top tube (EDTA) Absolute minimum: 1 mL lavender top tube (EDTA)</pre>
Reference Range	< 2126 U/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Note: Specimen may be obtained Monday through Thursday only, no weekends, or holidays. Sample must be received at the reference laboratory within 24 hours of collection.
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	2 weeks upon receipt at reference laboratory

Soluble Liver Antigen Ab, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	SLA
CPT Code	83516
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum Absolute Minimum: 0.3 mL serum
Rejection Criteria:	Hemolyzed, lipemic, contaminated, or heat-inactivated specimens.
Reference Range	<pre> 0.0-20.0 U: Negative 20.1-24.9 U: Equivocal Greater than or equal to 25.0 U: Positive</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-4 days upon receipt at reference laboratory

Soluble Transferrin Receptor

Laboratory	Chemistry
Order Code	STFR
CPT Code	84238
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL from light green top tube or ONE microtainer.
Reference Range	<pre> Adult male: 2.2 - 5.0 mg/L Adult female: 1.9 - 4.4 mg/L</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	The uptake of iron by the body's cells is controlled by expression of the transferrin receptor (TfR). If the intracellular iron stores are exhausted - corresponding to a ferritin concentration of less than 12 g/L - then more TfR is expressed. The affinity of the transferrin receptor to transferrin depends on the latter's loading state. As 80-95% of the transferrin receptor molecules are localized on erythropoietic cells, the TfR concentration (and hence also the sTfR concentration) reflects the iron requirement of these cells. When iron deficiency exits, the sTfR concentration in serum rises even before the hemoglobin concentration is significantly depressed. The sTfR concentration status can be obtained by determining the sTfR index (=sTfR concentration/log ferritin concentration).
Methodology	Immunoturbidimetric Assay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Somatomedin C

See:	 Insulin-Like Growth Factor I, Serum

Somatostatin

Laboratory	Commercial Mail-out Laboratory
Order Code	SOMS
CPT Code	84307
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1.8 mL plasma Absolute Minimum: 0.6 mL plasma Prechill two 4 mL lavender EDTA tubes or two full 6 mL pink-K2EDTA 30 minutes prior to collection.</pre>
Rejection Criteria:	Thawed specimens. Grossly hemolyzed or lipemic specimens.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Extraction/Radioimmunoassay
Analytic Time	6-20 days upon receipt at reference laboratory.

Specific Compound S

See:	 11-Deoxycortisol Quantitative, Serum

Specific Gravity

Laboratory	Hematology
Order Code	SGO
CPT Code	84315
Collection Medium	Miscellaneous container; contact laboratory
Minimum	1.0 ml
Order Form:	A-1a General Lab or Epic Req
Methodology	Refractometry
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Specific Gravity

Laboratory	Hematology
Order Code	USGI
CPT Code	81002
Collection Medium	Miscellaneous container; contact laboratory
Minimum	0.5 mL urine
Reference Range	1.015-1.026
Order Form:	A-1a General Lab or Epic Req
Methodology	Refractometry
Analytic Time	30 minutes.
Testing Schedule	24 hrs/day, 7 days a week, including holidays. Testing is performed in the main Core laboratory.

SPEP

See:	 Protein Electrophoresis, Serum

Spontaneous Sputum for Cancer Evaluation

Laboratory	Cytopathology
Minimum	<pre> Early morning deep cough specimen deposited into a sputum cup containing mucolexx fixative,(obtained from Cytology). Sputum x 3 (one each morning for three consecutive days).</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-2 Cytopathology or Epic Req
Comments	The requisition with complete patient history must accompany the specimen. Label specimen container with patient name. After 1700 daily, weekends and holidays deliver to Specimen Control (6240 RCP).
Analytic Time	2 days

Sporothrix Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	SPORABS
CPT Code	86671
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1.0 mL of serum from 3.0 mL whole blood in a red top tube Absolute Minimum: 0.15 mL of serum from 0.5 mL whole blood in a red top tube</pre>
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Latex Agglutination
Analytic Time	3 working days upon receipt in reference laboratory

Sporothrix Antibody, CSF

Laboratory	Commercial Mail-out Laboratory
Order Code	SPORABCSF
CPT Code	86671
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 0.5 mL of spinal fluid Absolute Minimum: 0.2 mL of spinal fluid</pre>
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Latex Agglutination
Analytic Time	2 working days upon receipt at reference laboratory

SS

See:	 Sickle Cell Screen, Blood

SS-A Antibody

Laboratory	Chemistry
Order Code	SSA
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers
Reference Range	1.0 AI (antibody index) or less
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 25, 2013.
See:	 Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum SS-B Antibody, Plasma
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

SS-B Antibody

Laboratory	Chemistry
Order Code	SSB
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers
Reference Range	1.0 AI (antibody index) or less
Order Form:	A-1a General Lab or Epic Req
Comments	Assay methodology and reference ranges changed February 25, 2013.
See:	 Anti-Nuclear Antibody Screen and Reflex Titer by IFA, Serum SS-A Antibody, Plasma
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Standard Chromosome Analysis

See:	 Chromosomal Analysis, Amniotic Fluid Chromosomal Analysis, Bone Marrow (for acquired and constitutional abnormalities) Chromosomal Analysis, Chorionic Villi (CV) Chromosomal Analysis, Fetal Blood (Prenatal Diagnosis) Chromosomal Analysis, Peripheral Blood for Hematological Disorders Chromosomal Analysis, Peripheral Blood, Cord Blood Chromosomal Analysis, Product of Conception (POC) Chromosomal Analysis, Skin or Internal Tissue or Blood from Autopsy Chromosomal Analysis, Skin, Other Tissue

Staphylococcus aureus (MRSA/MSSA) by PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	SAPCR
CPT Code	87640
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Copan Dual Swab</td></tr></table>
Rejection Criteria:	Specimen collected using different swab (not Copan dual swab) or from site other than nares will be rejected.
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Used to detect colonization with SA and methicillin-resistant Staphylococcus aureus (MRSA). A positive result does not necessarily indicate viable organism. The primers and probes in the Xpert SA Nasal Complete assay detects a proprietary sequence for the staphylococcal protein A (spa) gene, the gene for methicillin resistance (mecA), and the staphylococcal cassette chromosome mec (SCCmec) inserted into the SA chromosomal attB site. Inhibition of the SA Nasal Complete assay resulting in Invalid or false Negative test results has been observed in the presence of inhaled nasal steroids Flonase and Nasonex. Reliable results are dependent on proper specimen collection, handling, and storage.
Methodology	Real-time polymerase chain reaction
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Stem Cell Quantitation

Laboratory	Flow Cytometry Service
Order Code	CD34PRE
CPT Code	Technical: 88184, 88185; Professional: 88187
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Yellow top tube (ACD solution</td></tr></table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	10 mL yellow top (ACD solution A) tube is required.
Reference Range	The laboratory will provide a quantitative report.
Order Form:	A-1a Immunopathology or Epic Req
Comments	Specimens are accepted Monday 0800 through Friday 1500. The clinical pathology resident should be contacted at pager #3404 for other arrangements.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow Cytometry
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Sterility Check-Bacterial

Laboratory	Microbiology
Order Code	C STER
CPT Code	87081
Collection Medium	Sterile container
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	<pre> Used to insure sterility of pharmacologic preparations, Blood Bank preparations, or sterilized objects.</pre>
Methodology	Standard culture media
Analytic Time	3-5 days
Testing Schedule	0700-2200, 7 days a week, including holidays.

Sterols

Laboratory	Commercial Mail-out Laboratory
Order Code	STERL
CPT Code	82542
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Minimum	1 mL plasma Fasting (12 hours or more, infants just before next feeding). Note: Patient’s age and sex are required.
Rejection Criteria:	Specimens other than plasma.
Reference Range	DESMOSTEROL 0.0-5.0 mg/L LATHOSTEROL 0.0-7.0 mg/L CAMPESTEROL 0.0-7.0 mg/L SITOSTEROL 0.0-5.0 mg/L <u>Cautions</u>: Reference ranges were derived using fasting specimens from healthy individuals. Sitosterol and campesterol values may be mildly elevated in individuals whose diets include foods with high concentrations of plant sterols, such as some vegetable oils and infant formulas.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Informed Consent for Genetic Testing to the lab, with the specimen and the A-1a Miscellaneous Request or Epic Req. Testing includes desmosterol, lathosterol, campesterol, and sitosterol for the investigation of desmosterolosis and sitosterolemia. <u>Clinical Information</u>: Cholesterol plays an essential role in many cellular and developmental processes. In addition to its role as a membrane lipid, it is the precursor to numerous molecules that play an important role in cell growth and differentiation, protein glycosylation, and signaling pathways. The biosynthesis of cholesterol and its subsequent conversion to other essential compounds is complex, involving a number of intermediates and enzymes. Disorders that result from a deficiency of these enzymes lead to an accumulation of specific intermediates and inhibit the formation of important biomolecules. Clinical findings common to cholesterol biosynthesis disorders include congenital skeletal malformations, dysmorphic facial features, psychomotor retardation, and failure to thrive. One example is desmosterolosis (desmosterol reductase deficiency), which has a similar phenotype to Smith-Lemli-Opitz (SLO) syndrome (7-dehydrocholesterol reductase deficiency). Its biochemical marker is the elevation of desmosterol in plasma, tissue, and cultured cells. Sitosterolemia is a rare autosomal recessive disorder caused by mutations in 2 ATP-binding cassette (ABC) transporter genes, ABCG5 and ABCG8, which abnormally enhance the absorption of plant sterols and cholesterol from the intestines. Patients often present with tendon and tuberous xanthomas as well as premature coronary artery disease. A biochemical diagnosis of sitosterolemia is made by documenting elevations of the plant sterols sitosterol and campesterol in plasma or serum.
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Gas Chromatography-Mass Spectrometry (GC-MS)/Gas Chromatography-Flame

	Ionization Detection (GC-FID)
Analytic Time	10 days

Stone Analysis

See:	 Calculi Analysis, Calculi specimen (air dried)

Stone Analysis at Litholink Laboratory

Laboratory	Commercial Mail-out Laboratory
Order Code	STONEORD
CPT Code	<pre> 81050, 82140, 82340, 82436, 82507, 82570, 82615, 83735, 83945, 83986, 84105, 84133, 84300, 84392, 84540, 84560</pre>
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed dark pl </tr> </table>
Minimum	24 hour urine collection with special preservative; collected by patient at home and submitted to reference laboratory via FedEx from patient's home.
Rejection Criteria:	Collections must be at least 22 hours but no longer than 26 hours. No vitamins five days prior to collection. Refrigerated urine. Determined by reference laboratory.
Comments	STONEORD is an order placement tool for provider orders. Provider determines one day collection versus two day collection. Orders received in Mailouts via Epic In Basket will be sent to Litholink on a daily basis Monday-Friday. Litholink Laboratory then sends kit to patient's home. Once 24 hour sample is collected; patient contacts FedEx for home pick-up and submission to Litholink Laboratory. Results are faxed to Mailouts when completed and entered into patient's electronic medical record. Please refer to Litholink Stone Collection Instructions at Litholink.
Testing Schedule	Varies dependent upon patient's collection.

Stool Culture, Surveillance

Laboratory	Microbiology
Order Code	C SURV
CPT Code	87081
Collection Medium	Sterile container
Minimum	Submit 10-20 g stoool in sterile container. Transport time is less than or equal to 1 hr. Refrigerate if transport is delayed.
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	Surveillance cultures may be ordered on Bone Marrow Transplant and other immunocompromised patients to detect overgrowth of normal flora by Staph aureaus, yeast, or a gram negative bacillus.
See Appendix	See Additional Information: Microbiology Specimen Collection and Transport Normal (Indigenous) Flora of Human Body
Testing Schedule	0700-2200, 7 days a week, including holidays.

Streptococcus pneumoniae Antibodies, IgG

See:	 Pneumococcal Antibodies, IgG, Serum

Streptomycin

Laboratory	Commercial Mail-out Laboratory
Order Code	STREP
CPT Code	80299
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	CSF container
Minimum	2 mL serum or CSF from 4-6 mL whole blood in a red-top tube
Rejection Criteria:	SST or gel tube
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Peak sample is drawn 2 hours after dose. Trough sample is drawn 6 hours after dose. Please print, complete, and submit the <a href=http://www.nationaljewish. Pharmacokinetics Laboratory Requisition from the National Jewish Health Laboratory with the specimen and A-1a Miscellaneous Request. NOTE: Reference Laboratory must know if the patient is receiving ampicillin.</pre>
Analytic Time	1 week upon receipt at reference laboratory

Streptozyme, Reflex to Titer

Laboratory	Commercial Mail-out Laboratory
Order Code	SZYME
CPT Code	<pre> 86403 Streptococcus screen; 86406 Streptococcus titer (if reflexed from positive screening test); all positive results for screening will be titered at an additional charge.</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA)
Minimum	<pre> Preferred Minimum: 1 mL serum or plasma Absolute minimum: 0.1 mL serum or plasma</pre>
Reference Range	<pre> Streptococcus pyogenes, Group A Antibody (Streptozyme Screen) Less than 100 STZ units: Negative Streptococcus pyogenes, Group A Antibody (Streptozyme Titer) Less than 100 STZ units: Negative</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Detection of multiple antibodies to extracellular antigens of streptococcus with streptozyme is of some diagnostic value but should never replace more standard tests such as streptolysin O antibody (ASO) or DNase-B antibody. These antibodies may be detected in patients after streptococcal pharyngitis, rheumatic fever, pyoderma, glomerulonephritis, and other related conditions. In evaluating a patient with suspected acute rheumatic fever or nephritis, determination of ASO, DNAse-B antibody, and streptozyme will likely yield a positive result in 92-98 percent of cases.
See:	 Antistreptolysin O, Serum Dnase B Antibody, Serum
Methodology	Semi-Quantitative Hemagglutination
Analytic Time	1-3 days upon receipt at reference laboratory

Striated Muscle Antibody, IgG with Reflex to Titer

Laboratory	Commercial Mail-out Laboratory
Order Code	STMR
CPT Code	86255 Striated muscle; if reflexed, add 86256 Striated muscle titer: additional charges will occur
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 1 mL serum Adult Absolute Minimum: 0.5 mL serum Pediatric Minimum: 0.15 mL serum</pre>
Rejection Criteria:	Plasma. Severely lipemic, contaminated, or hemolyzed specimens.
Reference Range	<pre> Screen: < 1:40 No antibody detected. Titer: < 1:40 No antibody detected.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Titers greater than or equal to 1:80 are suggestive of myasthenia; however, striated muscle antibody can be found in rheumatic fever, myocardial infarction, and a variety of post-cardiotomy states. All positives will be titered to endpoint. If Striated Muscle Ab is >1:40, then a titer will be added.</pre>
Methodology	Indirect Fluorescent Antibody
Analytic Time	5 days upon receipt at reference laboratory

Strongyloides Antibody, IgG by ELISA

Laboratory	Commercial Mail-out Laboratory
Order Code	STRONGY
CPT Code	86682
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum in red top tube Absolute Minimum: 0.2 mL serum in red top tube
Rejection Criteria:	Lipemic, hemolyzed, icteric, bacterially contaminated, or heat-inactivated specimens
Reference Range	<pre> 1.49 IV or less: Negative No significant level of Strongyloides IgG antibody detected. 1.50 - 2.10 IV: Equivocal Questionable presence of Strongyloides IgG antibody detected. Repeat testing in 10 - 14 days may be helpful. 2.11 IV or greater: Positive IgG antibodies to Strongyloides detected, which may suggest current or past infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-8 days upon receipt at reference laboratory

Stypven Time

See:	 Factor II Assay, Plasma

Substance Identification

Laboratory	Commercial Mail-out Laboratory
Order Code	SUBID
CPT Code	80100, 80101(x15)
Collection Medium	Miscellaneous container; contact laboratory
Minimum	Minimum specimen volume: 50 mg
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Acceptable Specimens: Powder or residue, tablet or residue, vial contents or empty vial, unknown substance or residue. The list of drugs screened for in this unknown specimen include: acetaminophen, acetone, acetylmorphine, alprazolam, amantadine, amitriptyline, amobarbital, amoxapine, amphetamine, antidepressants, antipsychotics, barbital, barbiturates, benzodiazepines, benztropine, brompheniramine, bupropion, butabarbital, butalbital, caffeine, carbamazepine, carisoprodol, chlordiazepoxide, chlorpheniramine, chlorpromazine, chlorzoxazone, clomipramine, clonazepam, clozapine, cocaine, codeine, cyclobenzaprine, desalkylflurazepam, desipramine, desmethyldiazepam, dextromethorphan (as methorphan),diazepam, dihydrocodeine, diltiazem, diphenhydramine, doxepin, doxylamine, ephedrine, ethosuximide, ethyl alcohol, fentanyl, fluoxetine, fluphenazine, flurazepam and metabolite, fluvoxamine, glutethimide, guaifenesin, halazepam, haloperidol, heroin, hydrocodone, hydromorphone, hydroxyzine, ibuprofen, imipramine, isopropyl alcohol, ketoprofen, lidocaine, lorazepam, loxapine, maprotiline, marijuana (THC), mefenamic acid, meperidine, mephobarbital, mepivacaine, MDA, MDMA, meprobamate, mesoridazine, methadone, methamphetamine, methapyrilene, methaqualone, methocarbamol, methorphan, methyl alcohol, methylphenidate, methyprylon, metoprolol, midazolam, morphine, naproxen, nifedipine, nortriptyline, opiates, orphenadrine, oxaprozin, oxazepam, oxycodone, paroxetine, pentazocine, pentobarbital, perphenazine, phenacetin, phencyclidine, phenmetrazine, phenobarbital, phentermine, phenylpropanolamine, phenytoin, primidone, procainamide, procaine, prochlorperazine, promazine, promethazine, propoxphene, propranolol, protriptyline, pseudoephedrine, pyrilamine, salicylate, secobarbital, sertraline, temazepam, THC (marijuana), theophylline, thiopental, thioridazine, tolmetin, tramadol, trazodone, triazolam, trifluoperazine, trihexyphenidyl, trimipramine, tripelennamine, valproic acid, venlafaxine, and verapamil. This list is not necessarily inclusive of all possible drugs that could be identified.</pre>
Methodology	<pre> Immunoassay (IA) Gas Chromatography/Mass Spectrometry(GC/MS) Confirmation: Various</pre>
Analytic Time	2 weeks upon receipt at reference laboratory

Substance P

Laboratory	Commercial Mail-out Laboratory
Order Code	SUBP
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">GI preservative collection tu </tr> </table>
Minimum	1 mL plasma from a Special Z-GI preservative collection tube obtained from reference laboratory. Mailouts has these tubes, call 356-8593.
Reference Range	40 - 270 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Contact Commercial Mailouts at 356-8593 to obtain collection tubes for this testing. No other specimen collection container is acceptable by the reference laboratory. Patients should be fasting for 10-12 hours prior to specimen collection. Antacid medications or medications that affect intestinal motility should be discontinued, if possible, for at least 48 hours prior to collection.</pre>
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Direct Radioimmunoassay
Analytic Time	1 week upon receipt at reference laboratory

Succinyladenosine

Laboratory	Commercial Mail-out Laboratory
Order Code	CSFSUCC
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">CSF Collection Tubes</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1.0 mL CSF Absolute Minimum: 0.5 mL CSF</pre>
Reference Range	0.74 - 4.92 umol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit to the lab, the <a href= "http://www.me Metabolic Test Order Form from Medical Neurogenetics, with the specimen and the A-1a Miscellaneous Request.
Analytic Time	2 weeks upon receipt at reference laboratory

Sucrose Lysis

See:	 Paroxysmal Nocturnal Hemoglobinuria (PNH) Screen, Peripheral Blood

Sulfonamides (Sulfas) Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	SULFA
CPT Code	84311
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 1.0 mL serum Adult Absolute Minimum: 0.5 mL serum Pediatric Minimum: 0.5 mL serum</pre>
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Therapeutic: 5.0-15.0 mg/dL Toxic: >20.0 mg/dL This test is designed to mesure sulfamethoxazole and sulfisoxazole. Peak sulfonamide (total) blood levels of 5-15 mg/dL may be effective for most infections, with concentrations of 12-15 mg/dL being optimal for serious infections. Sulfonamide levels should not exceed 20 mg/dL.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Indicate which sulfa drug is being administered.
Methodology	Quantitative Colorimetric
Analytic Time	5 days upon receipt at reference laboratory

Sulfonylurea Hypoglycemics Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	SUREAS
CPT Code	83788
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum Absolute <inimum: 0.4 mL serum</pre>
Rejection Criteria:	Separator tubes.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	3-9 days upon receipt at reference laboratory

Sulfur-Containing Amino Acids

See:	 Amino Acids, Quantitative, Random Urine

Sulkowitch (Calcium-Semiquantitative)

See:	 Calcium, Urine Quantitative Calcium, Urine, Random

SUREPATH

See:	 Pap Test-Liquid Based Collection, Cervical/Endocervical/Vaginal Cells in Fluid Collection Media

Surgical Pathology Consultation

Laboratory	Surgical Pathology Laboratory
CPT Code	<pre> CPT code is dependent on: tissue source, extent of surgery, and diagnosis.</pre>
Minimum	<pre> Pathology Consultation. The attending physician must sign the requisition indicating if s/he would like the consulting pathologist to order additional stains and/or procedures necessary to render a diagnosis. The requisiton must contain: patient name, medical record number, biopsy date, tissue source, complete patient history. Tissue for frozen section evaluation or other special studies should be delivered fresh (wrapped in saline soaked gauze) to the Surgical Pathology Laboratory, 5804 JPP. Place all other tissue in 10% neutral buffered formalin and deliver to the Surgical Pathology Laboratory.</pre>
Reference Range	The pathologist will provide an interpretative report.
Order Form:	H-1 Surgical Pathology or Epic Req
Comments	The Surgical Pathology window at 5804 JPP is open Mon.-Fri 0730-1700. After hours deliver the formalin fixed tissue to the Critical Care Laboratory in 5802 JPP. If submitting fresh tissue after hours, contact the Surgical Pathology resident on call by paging 131-3265. The resident will provide delivery instructions.
Methodology	Light microscopy
Analytic Time	2 days

Susceptibility Profiles, Antimicrobial

See:	 Antimicrobial Susceptibility Profile MIC, (Per Organism)

Sweat Chloride

Laboratory	Chemistry
Order Code	SWCL
CPT Code	82438
Collection Medium	Miscellaneous container; contact laboratory
Minimum	20 mg of sweat
Reference Range	<pre> Sweat testing should not be performed within 48 hours of birth. For infants up to and including 6 months of age: Less than or equal to 29 mmol/L = cystic fibrosis is unlikely 30 - 59 mmol/L = intermediate Greater than or equal to 60 mmol/L = indicative of cystic fibrosis For individuals older than 6 months of age: Less than or equal to 39 mmol/L = cystic fibrosis is unlikely 40 - 59 mmol/L = intermediate Greater than or equal to 60 mmol/L = indicative of cystic fibrosis NOTE: Sweat chloride values less than 30 mmol/L have been documented in genetically proven CF patients. Clinical correlation is necessary.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> This procedure is performed by specialized nursing staff of the Pediatric Specialty Clinic. Notify laboratory of sample arrival by calling 356-3527.</pre>
Methodology	Chloridometer
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	0700-2000 Monday through Friday, excluding holidays. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Synthetic Cannabinoid Metabolites Screen, Urine

Laboratory	Commercial Mail-out Laboratory
Order Code	SYNCAN
CPT Code	80101x2
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine</td> </tr> </table>
Minimum	3 mL urine in a plastic container (preservative-free)
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Purpose of this test is for Forensic Analysis; Exposure Monitoring/Abuse Monitoring
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)

Synthetic Glucocorticoid Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	SGSU
CPT Code	82544
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Urine (Random)-BD Vacutainer, </tr> </table>
Minimum	5 mL random urine, no preservative
Reference Range	Negative Cutoff concentrations Beclomethasone dipropionate: 0.10 mcg/dL Betamethasone: 0.10 mcg/dL Budesonide: 0.10 mcg/dL Dexamethasone: 0.10 mcg/dL Fludrocortisone: 0.10 mcg/dL Flunisolide: 0.10 mcg/dL Fluorometholone: 0.10 mcg/dL Megestrol acetate: 0.10 mcg/dL Methylprednisolone: 0.10 mcg/dL Prednisolone: 0.10 mcg/dL Prednisone: 0.10 mcg/dL Triamcinolone: 0.30 mcg/dL Triamcinolone acetonide: 0.10 mcg/dL Values for normal patients not taking these synthetic glucocorticoids should be less than the cutoff concentration (detection limit).
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Clinical Information</u>: Synthetic glucocorticoids are widely used and have important clinical utility both as anti-inflammatory and immunosuppressive agents. The medical use of these agents, as well as their surreptitious use, can sometimes lead to a confusing clinical presentation. Patients exposed to these steroids may present with clinical features of Cushing syndrome, but with suppressed cortisol levels and evidence of hypothalamus-pituitary-adrenal axis suppression. <u>Useful For</u>: Confirming the presence of the listed synthetic glucocorticoids (see Interpretive Data) Confirming the cause of secondary adrenal insufficiency. This assay does not detect fluticasone propionate. <u>Cautions</u>: This method cannot detect all of the available synthetic steroids either available as pharmaceutical compounds or chemicals present in food. The assay confirms only the listed synthetic glucocorticoids (see Interpretive Data). Lack of detection does not preclude use of synthetic glucocorticoid because adrenal suppression may persist for some time after the exogenous steroid is discontinued.
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS) Stable Isotope Dilution Analysis
Analytic Time	4 days upon receipt at reference laboratory

Synthetic Glucocorticoid Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	SGSS
CPT Code	82544
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	2 mL serum in red top tube
Reference Range	Negative Cutoff concentrations Betamethasone: 0.10 mcg/dL Budesonide: 0.10 mcg/dL Dexamethasone: 0.10 mcg/dL Fludrocortisone: 0.10 mcg/dL Flunisolide: 0.10 mcg/dL Fluorometholone: 0.10 mcg/dL Megestrol acetate: 0.10 mcg/dL Methylprednisolone: 0.10 mcg/dL Prednisolone: 0.10 mcg/dL Prednisone: 0.10 mcg/dL Triamcinolone: 0.30 mcg/dL Triamcinolone acetonide: 0.10 mcg/dL Values for normal patients not taking these synthetic glucocorticoids should be less than the cutoff concentration (detection limit).
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Clinical Information</u>: Synthetic glucocorticoids are widely used and have important clinical utility both as anti-inflammatory and immunosuppressive agents. The medical use of these agents, as well as their surreptitious use, can sometimes lead to a confusing clinical presentation. Patients exposed to these steroids may present with clinical features of Cushing syndrome, but with suppressed cortisol levels and evidence of hypothalamus-pituitary-adrenal axis suppression. <u>Useful For</u>: Confirming the presence of the listed synthetic glucocorticoids (see Interpretive Data) Confirming the cause of secondary adrenal insufficiency. This assay does not detect fluticasone propionate. <u>Cautions</u>: This method cannot detect the presence of fluticasone propionate in serum. This method cannot detect all of the available synthetic steroids either available as pharmaceutical compounds or chemicals present in food. The assay confirms only the listed synthetic glucocorticoids. (See Interpretative Data) Lack of detection does not preclude use of synthetic glucocorticoids because adrenal suppression may persist for some time after the exogenous steroid is discontinued.
Methodology	Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS) Stable Isotope Dilution Analysis
Analytic Time	5 days upon receipt at reference laboratory

Syphilis IgG

Laboratory	Chemistry
Order Code	SYPHG
CPT Code	86780 (Syphilis IgG) 86592 (RPR - if performed as reflex) 86593 (RPR titer - if performed as reflex) 86780 (TPPA - if performed as reflex)
Collection Medium	<table> \<tr\> \<td align=center\>\</td\>\</tr\> \<tr\> \<td width="110" valign="top" align="center"\>Red top tube\</td\> \</tr\> \</table\>
Reference Range	Non-reactive: 0.8 AI (antibody index) or less Equivocal: 0.9-1.0 AI Reactive: 1.1 AI or greater Syphilis IgG results with low reactivity (1.1-2.0 AI) are more likely to be false positives.
Order Form:	A-1a General Lab or Epic Req
Comments	New assay and syphilis testing algorithm introduced February 25, 2013. Positive syphilis IgG results are reflex automatically to RPR. If syphilis IgG and RPR results are discrepant, TPPA is additionally performed.
See:	 Syphilis Treatment Follow-up (RPR with Titer), Serum
Methodology	Multiplex flow immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Syphilis Treatment Follow-up (RPR with Titer)

Laboratory	Commercial Mail-out Laboratory
Order Code	STF
CPT Code	86592 RPR; if reflexed, add 86593 RPR titer
Collection Medium	<table> \<tr\> \<td align=center\>\</td\>\</tr\> \<tr\> \<td width="110" valign="top" align="center"\>Red top tube\</td\> \</tr\> \</table\>
Minimum	Preferred Minimum: 1 mL serum Absolute Minimum: .25 mL serum
Rejection Criteria:	CSF and other body fluids.
Reference Range	Non-reactive (< 1:1)
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	If RPR is weakly reactive or reactive, then a titer to endpoint will be added. This test is intended for assessing treatment efficacy in patients who have been treated for syphilis. Successful treatment is generally indicated by a 4-fold reduction in RPR titer (e.g., 1:32 to 1:8). For routine syphilis testing, "Syphilis IgG" should be ordered.
See:	 Syphilis IgG, Serum
Methodology	Semi-Quantitative Charcoal Agglutination
Analytic Time	3-5 days upon receipt at reference laboratory

T

T & B Cell Markers

See:
Acute Leukemia, Peripheral Blood, Bone Marrow, or CSF

CD4 Lymphocytes, Peripheral blood

Chronic Lymphocytic Leukemia, Various

Immunodeficiency Evaluations; Adult and Pediatric, Peripheral Blood

Lymphocyte Subsets, Peripheral Blood

Post Bone Marrow Transplant Monitoring, Peripheral Blood or Bone Marrow

Stem Cell Quantitation, Peripheral Blood

T Cell Antigen Response

See:
Lymphocyte Transformation, Antigen, Whole Blood

Lymphocyte Transformation, Mitogen, Whole Blood

T Cell Mitogen Response

See:
Lymphocyte Transformation, Antigen, Whole Blood

Lymphocyte Transformation, Mitogen, Whole Blood

T-3

See:
Triiodothyronine (T-3), Plasma

T-3 RIA

See:
Triiodothyronine (T-3), Plasma

T-4

See:
Thyroxine (T-4), Plasma

T-cell Clonality

See:
TRG Gene Clonality by PCR with Interpretation

Tacrolimus

Laboratory	Chemistry
Order Code	TACRO
CPT Code	80197
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	Preferred Minimum: 3 mL whole blood in lavender top tube (EDTA) or ONE lavender top (EDTA) microtube for pediatric patients, mix well.
Reference Range	Therapeutic range 5.0 - 20.0 ng/mL
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Methodology	Chemiluminescent Microparticle Immunoassay
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	Availability: one batch per day. Cutoff time for same day service is 0900. Results available 1200 daily.

Tartrate Resistant Acid Phosphatase (TRAP) for Gaucher clinical drug monitoring

Laboratory	Commercial Mail-out Laboratory
Order Code	GENTRAP
CPT Code	84060
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Pediatric Minimum: 2 mL serum in red top tube.
Rejection Criteria:	<pre> Hemolyzed specimens. Specimens not received at reference laboratory within 4 days of specimen collection; do not collect on Fridays, holidays, day before a holiday, or weekends.</pre>
Reference Range	3 - 10 IU/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> The Tartrate Resistant Acid Phosphatase (TRAP) colorimetric enzyme assay uses p-nitrophenyl phosphate as subtrate. Testing used for patients on Cerezyme (part of Gaucher Disease clinical drug monitoring including ACE, TRAP and CHITO. Time and temperature sensitive. Specimens must be received by reference laboratory within 4 days of blood draw.</pre>
See:	 Angiotensin Converting Enzyme (ACE) for Gaucher Clinical Drug Monitoring, Serum Chitotriosidase (CHITO) for Gaucher clinical drug monitoring, Serum
Methodology	Colorimetric Enzyme Assay
Analytic Time	1-2 weeks

Tay-Sachs Enzyme Carrier

Laboratory	Commercial Mail-out Laboratory
Order Code	TSECT
CPT Code	83080
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	Adult minimum: 10 mL whole blood
Rejection Criteria:	Samples must reach reference laboratory within two days of collection.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Submit requisition with patient’s clinical symptoms and ethnicity. A completed questionnaire should accompany all specimens.
Methodology	Enzyme Analysis
Analytic Time	2 weeks upon receipt at reference laboratory

TB Culture

See:	 Mycobacterial Culture

TB/AFB

See:	 Acid Fast Stain (Auramine-Rhodamine) Mycobacterial Culture

Teased Fiber Preparation, Nerve Biopsy

See:	 Nerve Biopsy, Fresh Tissue

TECTA (Deafness Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	TECTA
CPT Code	83891, 83894, 83898 (x23), 83903 (x13), 83904 (x10)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Screening for TECTA is performed via DHPLC and sequencing. Oligonucleotide primers have been designed to amplify each exon. Amplified samples are run on the DHPLC; abnormal elution profiles are sequenced to determine the specific mutation.
Analytic Time	3 months

Tegretol

See:	 Carbamazepine Epoxide & Total Drug Level, Serum Carbamazepine, Plasma

Testosterone, Free &Total - Female/Children

Laboratory: Commercial Mail-out Laboratory
Order Code: FTSTFC
CPT Code: 84403 Testosterone, 84270 Sex Hormone Binding Globulin
Collection Medium:

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<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>

Minimum:

<pre>
Preferred Minimum: 1 mL serum
Absolute Minimum: 0.4 mL serum</pre>

Rejection Criteria: EDTA plasma

Reference Range:

<pre>
Serum Total Testosterone, Determine by LC-MS/MS

Age	Female	Male
Premature (26-28 weeks)	5-16 ng/dL	59-125 ng/dL
Premature (31-35 weeks)	5-22 ng/dL	37-198 ng/dL
Newborn	20-64 ng/dL	75-400 ng/dL
1-5 months	< 20 ng/dL	14-363 ng/dL
6-24 months	< 9 ng/dL	< 37 ng/dL
2-3 years	< 20 ng/dL	< 15 ng/dL
4-5 years	< 30 ng/dL	< 19 ng/dL
6-7 years	< 7 ng/dL	< 13 ng/dL
8-9 years	1-11 ng/dL	2-8 ng/dL
10-11 years	3-32 ng/dL	2-165 ng/dL
12-13 years	6-50 ng/dL	3-619 ng/dL
14-15 years	6-52 ng/dL	31-733 ng/dL
16-17 years	9-58 ng/dL	158-826 ng/dL
18-39 years	9-55 ng/dL	300-1080 ng/dL
40-59 years	9-55 ng/dL	300-890 ng/dL
60 years and older	5-32 ng/dL	300-720 ng/dL
Premenopausal (> 18 years)	9-55 ng/dL	
Postmenopausal	5-32 ng/dL	
Tanner Stage I	2-17 ng/dL	2-15 ng/dL
Tanner Stage II	5-40 ng/dL	3-303 ng/dL
Tanner Stage III	10-63 ng/dL	10-851 ng/dL
Tanner Stage IV-V	11-62 ng/dL	162-847 ng/dL </pre>

Order Form: A-1a Miscellaneous Request or Epic Req

Comments: This test is suggested for women and children due to an improved sensitivity of testosterone by LC-MS/MS.

See:

Testosterone, Free and Total, Adult, Plasma

Testosterone, Total, Pediatric, Serum

Testosterone, Total, Plasma

Methodology:

<pre>
High Performance Liquid Chromatography/Tandem Mass Spectrometry/Electrochemiluminescent Immunoassay
The concentration of free testosterone is derived from a mathematical expression based on the constant for the binding of testosterone to sex hormone binding globulin.</pre>

Analytic Time: 5 days upon receipt at reference laboratory

Testosterone, Free and Total, Adult

Laboratory: Chemistry
Order Code: FTSTM
CPT Code: 84403 Testosterone, 84270 Sex Hormone Binding Globulin
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Plasma Separator Tube</td>
</tr>
</table>

Minimum: 3 mL whole blood in light green top or TWO microtainers
Rejection Criteria: EDTA plasma
Reference Range:

<pre>
Testosterone, total
Adult Males:
  19-49 years old   249-836 ng/dL
  50 years and older   193-740 ng/dL

Adult Females:
  19-49 years old   8-48 ng/dL
  50 years and older   2-41 ng/dL

Boys
  <1 month   75-400 ng/dL
  1-5 months   14-363 ng/dL
  6-24 months   Less than 37 ng/dL
  2-5 years   Less than 19 ng/dL
  6-9 years   Less than 13 ng/dL
  10-11 years   3-327 ng/dL
  12-13 years   29-432 ng/dL
  14-15 years   40-778 ng/dL
  16-18 years   238-1048 ng/dL

  Tanner stage 1   Less than 15 ng/dL
  Tanner stage 2   3-432 ng/dL
  Tanner stage 3   65-778 ng/dL
  Tanner stage 4   180-763 ng/dL
  Tanner stage 5   188-882 ng/dL

Girls
  Up to 30 days   20-64 ng/dL
  1-5 months   Less than 20 ng/dL
  6-24 months   Less than 9 ng/dL
  2-3 years   Less than 20 ng/dL
  4-5 years   Less than 30 ng/dL
  6-7 years   Less than 13 ng/dL
  8-9 years   1-8 ng/dL
  10-11 years   3-32 ng/dL
  12-13 years   3-50 ng/dL
  14-15 years   6-52 ng/dL
  16-18 years   9-58 ng/dL

  Tanner stage I   Less than 17 ng/dL
  Tanner stage II   Less than 40 ng/dL
  Tanner stage III   5-63 ng/dL
  Tanner stage IV-V   6-58 ng/dL

Sex hormone binding globulin
  Males 10-80 nmol/L
  Females, non-pregnant 20-130 nmol/L
Reference ranges not well established during pregnancy.

Free testosterone
Males
  0-9 years   Less than 1 pg/mL
  10-11 years   Less than 4 pg/mL
  12-13 years   Less than 68 pg/mL
  14-15 years   2-95 pg/mL
  16-17 years   26-119 pg/mL
  18 years and older   32-168 pg/mL

  Tanner stage I   Less than 3 pg/mL

Tanner stage II	Less than 15 pg/mL
Tanner stage III	Less than 68 pg/mL
Tanner stage IV	24-117 pg/mL
Tanner stage V	28-165 pg/mL
Females	
0-9 years	Less than 1 pg/mL
10-11 years	Less than 3 pg/mL
12-13 years	Less than 5 pg/mL
14-15 years	Less than 6 pg/mL
16-17 years	Less than 7 pg/mL
18-30 years	1-5 pg/mL
31-40 years	1-6 pg/mL
41-50 years	1-4 pg/mL
51 years and older	Less than 3 pg/mL
Tanner stage I	1-12 pg/mL
Tanner stage II	4-28 pg/mL
Tanner stage III	7-44 pg/mL
Tanner stage IV-V	8-43 pg/mL

% free testosterone 1.1-2.5%</pre>

Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	New immunoassay method for testosterone instituted 3/ reference ranges updated 12/29/2011.
See:	 Testosterone, Free &Total - Female/Children, S Testosterone, Total, Pediatric, Serum Testosterone, Total, Plasma
Methodology	Electrochemiluminescent Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Testosterone, Total

Laboratory	Chemistry
Order Code	TST
CPT Code	84403
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top or TWO microtainers.
Reference Range	<pre> Adult Males: 19-49 years old 249-836 ng/dL 50 years and older 193-740 ng/dL Adult Females: 19-49 years old 8-48 ng/dL 50 years and older 2-41 ng/dL Boys <1 month 75-400 ng/dL 1-5 months 14-363 ng/dL 6-24 months Less than 37 ng/dL 2-5 years Less than 19 ng/dL 6-9 years Less than 13 ng/dL 10-11 years 3-327 ng/dL 12-13 years 29-432 ng/dL 14-15 years 40-778 ng/dL 16-18 years 238-1048 ng/dL Tanner stage 1 Less than 15 ng/dL Tanner stage 2 3-432 ng/dL Tanner stage 3 65-778 ng/dL Tanner stage 4 180-763 ng/dL Tanner stage 5 188-882 ng/dL Girls Up to 30 days 20-64 ng/dL 1-5 months Less than 20 ng/dL 6-24 months Less than 9 ng/dL 2-3 years Less than 20 ng/dL 4-5 years Less than 30 ng/dL 6-7 years Less than 13 ng/dL 8-9 years 1-8 ng/dL 10-11 years 3-32 ng/dL 12-13 years 3-50 ng/dL 14-15 years 6-52 ng/dL 16-18 years 9-58 ng/dL Tanner stage I Less than 17 ng/dL Tanner stage II Less than 40 ng/dL Tanner stage III 5-63 ng/dL Tanner stage IV-V 6-58 ng/dL</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	New immunoassay method instituted 3/3/2011. Pediatric reference ranges updated 12/28/2011. Assay is not recommended for girls less than 8 years old due to the low concentrations of testosterone in this population.
See:	 Testosterone, Free &Total - Female/Children, Serum Testosterone, Free and Total, Adult, Plasma Testosterone, Total, Pediatric, Serum
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Testosterone, Total, Pediatric

Laboratory	Commercial Mail-out Laboratory
Order Code	TEST1
CPT Code	84403
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum in a red top tube Absolute Minimum: 0.2 mL serum in a red top tube - This volume does not permit repeat analysis
Rejection Criteria:	EDTA plasma
Reference Range	Serum Total Testosterone, Determined by LC-MS/MS <u>Female</u> Premature (26-28 weeks): 5-16 ng/dL Premature (31-35 weeks): 5-22 ng/dL Newborn: 20-64 ng/dL 1-7 months: Levels decrease during the first month to less than 10 ng/dL and remain at this level until puberty. 7-9 years: Less than 15 ng/dL 10-11 years: 2-42 ng/dL 12-13 years: 6-64 ng/dL 14-15 years: 9-49 ng/dL 16-17 years: 8-63 ng/dL 18-30 years: 11-59 ng/dL 31-40 years: 11-56 ng/dL 41-51 years: 9-55 ng/dL Postmenopausal: 6-25 ng/dL Tanner Stage I: Less than 17 ng/dL Tanner Stage II: 4-39 ng/dL Tanner Stage III: 10-60 ng/dL Tanner Stage IV: 8-63 ng/dL Tanner Stage V: 10-60 ng/dL <u>Male</u> Premature (26-28 weeks): 59-125 ng/dL Premature (31-35 weeks): 37-198 ng/dL Newborn: 75-400 ng/dL 1-7 months: Levels decrease rapidly the first week to 20-50 ng/dL, and then increase to 60-400 ng/dL between 20-60 days. Levels then decline to pre-pubertal range levels of 3-10 ng/dL by seven months. 7-9 years: Less than 9 ng/dL 10-11 years: 2-57 ng/dL 12-13 years: 7-747 ng/dL 14-15 years: 33-585 ng/dL 16-17 years: 185-886 ng/dL 18-39 years: 300-1080 ng/dL 40-59 years: 300-890 ng/dL 60 years and older: 300-720 ng/dL Tanner Stage I: Less than 20 ng/dL Tanner Stage II: 2-149 ng/dL Tanner Stage III: 7-762 ng/dL Tanner Stage IV: 165-854 ng/dL Tanner Stage V: 194-783 ng/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test is suggested for women and children due to an improved sensitivity of testosterone by LC-MS/MS.
See:	 Testosterone, Free and Total, Adult, Plasma Testosterone, Total, Plasma
Methodology	High Performance Liquid Chromatography (HPLC)/Tandem Mass Spectrometry
Analytic Time	5 days upon receipt at reference laboratory

Tetanus Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	TETNUS
CPT Code	86317
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Adult/Pediatric Minimum: 1.0 mL serum in a red top tube
Rejection Criteria:	Plasma and other body fluids. Severely lipemic, contaminated and hemolyzed specimens.
Reference Range	Antibody concentration of > 0.1 IU/mL is usually considered protective.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Include patient immunization status (pre or post immunization) on requisition. Analysis includes both the Pre and Post status if paired specimens were submitted. "Pre" and "post" vaccination samples will be submitted together for testing. "Post" sample should be drawn 30 days after immunization and, if shipped separately, must be received within 60 days of "pre" sample. Please clearly mark samples "Pre-Vaccine" or "Post-Vaccine" so that samples will be saved and tested simultaneously. Serum must be removed from cells as soon as possible after blood draw.</pre>
Methodology	Multi-Analyte Fluorescent Detection
Analytic Time	2 days upon receipt at reference laboratory

Tetrahydrobiopterin & Neopterin

Laboratory	Commercial Mail-out Laboratory
Order Code	PTERIN
CPT Code	82492
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">CSF Collection Tubes</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 3.5 mL CSF Absolute Minimum: 1.5 mL CSF</pre>
Reference Range	<pre> Age (years) BH4 (nmol/L) Neop (nmol/L) 0-0.2 40-105 7-65 0.2-0.5 23-98 7-65 0.5-2.0 18-58 7-65 2.0-5.0 18-50 7-65 5.0-10 9-40 7-40 10-15 9-32 8-33 Adults 10-30 8-28</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit to the lab, the <a href= "http://www.me Metabolic Test Order Form from Medical Neurogenetics, with the specimen and the A-1a Miscellaneous Request.
Analytic Time	2 weeks upon receipt at reference laboratory

Tetrahydrocannabinoid

See:	 THC (Marijuana) Confirmation, Random Urine

TGFBR1&2 Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	TGFBR1/2
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> 4 mL whole blood Alternate sample types: CVS, fibroblasts, amniocytes, or extracted DNA.</pre>
Reference Range	See report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Laboratory Test Requisition Form from Connective Tissue Gene Tests with the specimen and the A-1a Miscellaneous Request. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	See report

Thalassemia Screen

Comments	<pre> Pertinent clinical information should accompany the request and there should be a recent hematology profile. Peripheral smear morphology, RBC indicies and results of these tests are correlated by the pathologist and a written narrative is reported by computer. Analysis is only performed on Wednesday mornings. Analysis cannot be done on patients transfused in the preceding 3 months since the presence of transfused cells may render the interpretation ambiguous.</pre>
See:	 Hemoglobin Evaluation, Quantitation with Interpretation, Blood

Thalassemia, Alpha

See:	 HBA1/HBA2 Gene Analysis Common Variants, Whole Blood

THBD Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	THBD
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the <a href= "http://www.healthcare.uic from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition. <u>The reference laboratory offers a known familial variant test. If you want to order the known familial variant version of the test, please order LAB7840</u>.
Methodology	Overlapping oligonucleotide primer sets have been designed to amplify the exon of THBD which are used for bi-directional sequencing.
Analytic Time	3 months

THC (Marijuana) Confirmation

Laboratory	Commercial Mail-out Laboratory
Order Code	THCC
CPT Code	82542
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 4 mL random urine Absolute Minimum: 0.5 mL random urine
Rejection Criteria:	Specimens exposed to repeated freeze/thaw cycles.
Reference Range	Drugs covered: 9-carboxy-THC Positive cutoff: 5 ng/mL The drug analyte detected in this assay, 9-carboxy THC, is a metabolite of delta-9-tetrahydrocannabinol (THC). Detection of 9-carboxy THC suggests use of, or exposure to, a product containing THC. This test cannot distinguish between prescribed or non-prescribed forms of THC, nor can it distinguish between active or passive use. The 9-carboxy THC metabolite can be detected in urine for several weeks. Normalization of results to creatinine concentration can help document elimination or suggest recent use, when specimens are collected at least one week apart. For medical purposes only; not valid for forensic use.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	5 days upon receipt at reference laboratory

THC, Urine Screen + Reflexed Confirmation

Laboratory	Chemistry
Order Code	THCR
CPT Code	80101
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Urine (Random)-BD Vacutainer, no additive yellow top
Minimum	5 mL random urine
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Screen includes THC with a cutoff of 50 ng/mL for the main metabolite of THC (9-carboxy-THC). Effective April 12, 2010, THC was no longer included in the routine drugs of abuse-urine panel "Drugs of Abuse Screen". All positive screening tests are automatically reflexed to a mail-out confirmation assay that uses liquid chromatography-tandem mass spectrometry (LC/MS/MS) to provide definitive identification and quantitation of 9-carboxy-THC. It is highly unlikely that passive (second-hand) inhalation of marijuana smoke will result in a positive screening test. Research studies have shown that maximum urinary concentrations of 9-carboxy-THC levels only reach 15-20 ng/mL following passive inhalation of heavy marijuana smoke. References: Cone EJ, Johnson RE, Darwin WD, Yousefnejad D, Mell LD, Paul BD, Mitchell J. Passive inhalation of marijuana smoke: urinarlysis and room air levels of delta-9-tetrahydrocannabinol. J Anal Toxicol 1987;11:89-96. Hammett-Stabler CA, Pesce AJ, Cannon DJ. Urine Drug Screening in the Medical Setting. Clinica Chimica Acta 2002;315:125-135.<pre>
See:	 Drugs of Abuse-Urine + Confirm, Urine Drugs of Abuse-Urine, Urine THC-Urine Screen, Urine, Random
See Appendix	See Additional Information: Cross Reacting Drugs
Methodology	Assay is based on the kinetic interaction of microparticles in a solution (KIMS) as measured by changes in light transmission.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

THC-Urine Screen

Laboratory	Chemistry
Order Code	THCU
CPT Code	80101
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Urine (Random)-BD Vacutainer, no additive yellow top
Minimum	5 mL random urine
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<pre> Screen includes THC with a cutoff of 50 ng/mL for the main metabolite of THC (9-carboxy-THC). Effective April 12, 2010, THC was no longer included on the routine drugs of abuse-urine panel "Drugs of Abuse Screen". If confirmation is needed for THC, call the Laboratory at 356-3527. Allow up to seven days for confirmatory results. Confirmation is at an additional charge. It is highly unlikely that passive (second-hand) inhalation of marijuana smoke will result in a positive screening test. Research studies have shown that maximum urinary concentrations of 9-carboxy-THC levels only reach 15-20 ng/mL following passive inhalation of heavy marijuana smoke. References: Cone EJ, Johnson RE, Darwin WD, Yousefnejad D, Mell LD, Paul BD, Mitchell J. Passive inhalation of marijuana smoke: urinarlysis and room air levels of delta-9-tetrahydrocannabinol. J Anal Toxicol 1987;11:89-96. Hammett-Stabler CA, Pesce AJ, Cannon DJ. Urine Drug Screening in the Medical Setting. Clinica Chimica Acta 2002;315:125-135.<pre>
See:	 Drugs of Abuse-Urine + Confirm, Urine Drugs of Abuse-Urine, Urine THC, Urine Screen + Reflexed Confirmation, Urine, Random
See Appendix	See Additional Information: Cross Reacting Drugs
Methodology	Assay is based on the kinetic interaction of microparticles in a solution (KIMS) as measured by changes in light transmission.
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Theophylline

Laboratory	Chemistry
Order Code	THEO
CPT Code	80198
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer.
Reference Range	<pre> 10-20 mcg/mL Critical value: >20.0 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	Kinetic Interaction of Microparticles in Solution (KIMS)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Thiamine

See:	 Vitamin B1, Whole Blood

Thiocyanate

Laboratory	Commercial Mail-out Laboratory
Order Code	THIOCY
CPT Code	84430
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL plasma Absolute Minimum: 0.5 mL plasma</pre>
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Nonsmoker: 1-4 μg/mL Smoker: 3-12 μg/mL Toxic: > 50 μg/mL Values seen with nitroprusside therapy: 6-29 μg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Seperate plasma from cells within 2 hours of collection.
Methodology	Quantitative Colorimetric
Analytic Time	1-4 days upon receipt at reference laboratory.

Thiopurine Methyltransferase

Laboratory	Commercial Mail-out Laboratory
Order Code	TPMT
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Minimum	5.0 mL whole blood
Rejection Criteria:	Samples not refrigerated. Samples greater than 6 days.
Reference Range	<pre> >17.0 U/mL RBC (normal) 15.4-17.0 U/mL RBC (probable low normal) 11.9-15.3 U/mL RBC (possible carrier) 6.0-11.8 U/mL RBC (carrier range) 0.0-5.9 U/mL RBC (homozygous deficient range) Reference values apply to all ages.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Useful for</u>: Detection of individuals with low thiopurine methyltransferase activity who are at risk for excessive myelosuppression or severe hematopoietic toxicity when taking azathioprine (Imuran) or 6-MP (Purinethol).
Methodology	Enzymatic End-Point/Liquid Chromatography - Tandem Mass Spectrometry (LC-MS/MS)
Analytic Time	3-5 days upon receipt at reference laboratory.

Thiopurine Methyltransferase

Laboratory	Commercial Mail-out Laboratory
Order Code	TPMTRBC
CPT Code	82657
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Minimum	Preferred Minimum: 5 mL whole blood Absolute Minimum: 3 mL whole blood
Rejection Criteria:	Specimens collected in sodium fluoride/potassium oxalate (gray). Hemolyzed, frozen, or room temperature specimens.
Reference Range	Normal TPMT activity: 25-65 U/mL - Individuals are predicted to be at low risk of bone marrow toxicity as a consequence of standard thiopurine therapy; no dose adjustment is recommended. Abnormal TPMT activity: < 25 U/mL - Individuals are predicted to be at high risk of bone marrow toxicity as a consequence of standard thiopurine dosing; a dose reduction and therapeutic monitoring is recommended. High TPMT activity: > 65 U/mL - Individuals are not predicted to be at low risk for bone marrow toxicity as a consequence of standard thiopurine dosing, but may be at risk for therapeutic failure due to excessive inactivation of thiopurine drugs. Individuals may require higher than the standard dose; therapeutic monitoring is recommended.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzymatic/High Performance Liquid Chromatography
Analytic Time	3-4 days upon receipt at reference laboratory.

Thrombin Time

Laboratory	Hemostasis/Thrombosis
Order Code	TT
CPT Code	85670
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 1.8 mL (N </tr> </table>
Minimum	Full draw; 1.8 mL light blue top (mix well). Tube must be at least 90% full.
Reference Range	15-21 seconds
Order Form:	A-1a General Lab or Epic Req
Comments	Deliver to laboratory promptly.
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw Specimens Requiring Immediate Delivery
Methodology	Optical clot detection.
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Thromboelastograph

Laboratory	Hemostasis/Thrombosis
Order Code	TEG
CPT Code	85396
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw of 2.7 mL Light Blue Sodium Citrate tube
Reference Range	<pre> R: 5 - 10 minutes K: 1 - 3 minutes Angle: 53 - 72 degrees MA: 50 - 70 mm LY30: 0 - 8 % CI: -3 - 3</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test needs a separate tube! It CANNOT be performed with any other coagulation tests.
See:	 Thromboelastograph - Heparinase, Whole Blood
Methodology	A stationary pin attached to a torsion wire is immersed into whole blood. When the first fibrin forms, it begins to bind the cup and pin, causing the pin to oscillate in phase with the clot. A mechanical-electrical transducer converts the rotation movement of the pin to an electrical signal which is monitored by a computer.
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Thromboelastograph - Heparinase

Laboratory	Hemostasis/Thrombosis
Order Code	TEGH
CPT Code	85396
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw of 2.7 mL Light Blue Sodium Citrate tube
Reference Range	<pre> R: 5 - 10 minutes K: 1 - 3 minutes Angle: 53 - 72 degrees MA: 50 - 70 mm LY30: 0 - 8 % CI: -3 - 3</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test needs a separate tube! It CANNOT be performed with any other coagulation tests except the TEG.
See:	 Thromboelastograph, Whole Blood
Methodology	A stationary pin attached to a torsion wire is immersed into whole blood. When the first fibrin forms, it begins to bind the cup and pin, causing the pin to oscillate in phase with the clot. A mechanical-electrical transducer converts the rotation movement of the pin to an electrical signal which is monitored by a computer.
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Thyrocellular Antibody (Microsomal)

See:	 Thyroid Peroxidase Antibody, Plasma

Thyroglobulin Antibodies (Autoimmune Thyroiditis)

Laboratory	Chemistry
Order Code	TGAB
CPT Code	86800
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Red top tube
Minimum	3 mL whole blood in pink top tube or TWO microtainers.
Reference Range	<116 IU/mL Reference values apply to all ages.
Order Form:	A-1a General Lab or Epic Req
Comments	Useful for an adjunct to anti-thyroid peroxidase (anti-TPO) autoantibody, antithyrotropin-receptor autoantibody, and thyroid-stimulating immunoglobulin measurements in the diagnosis of autoimmune thyroid diseases: Hashimoto disease, postpartum thyroiditis, neonatal hypothyroidism, and Graves disease. <u>Cautions</u>: Low titers of thyroid autoantibodies may be observed in the absence of autoimmune or other thyroid diseases and are considered a nonspecific finding. The population prevalence of such nonspecific low-level anti-thyroglobulin (anti-Tg) positivity is higher in females than in males and increases with age in both genders. Anti-Tg values determined by different methodologies might vary significantly and cannot be directly compared with one another. Some patients might show to be antibody-positive by some methods and antibody-negative by others. Comparing anti-Tg antibodies values from different methods might lead to erroneous clinical interpretation. In patients receiving therapy with high biotin doses (ie, >5 mg/day), no specimen should be drawn until at least 8 hours after the last biotin administration. Tg concentrations >2,000 ng/mL may lead to falsely elevated anti-Tg concentrations.
See:	 Thyroglobulin, Tumor Marker (Includes Anti-TG), Serum
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Thyroglobulin, Fine Needle Aspiration

Laboratory	Commercial Mail-out Laboratory
Order Code	TGFNA
CPT Code	84432
Collection Medium	Miscellaneous container; contact laboratory
Minimum	0.5 mL saline needle rinse.
Rejection Criteria:	Breast milk and salivary fluid. Specimens containing EDTA. Viscous specimens.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Use with FNA biopsy of thyroid nodules to diagnose benign or malignant non-medullary thyroid nodules.
Methodology	Quantitative Chemiluminescent Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Thyroglobulin, Tumor Marker (Includes Anti-TG)

Laboratory	Commercial Mail-out Laboratory
Order Code	TG
CPT Code	84432-Thyroglobulin, tumor marker 86800-Thyroglobulin antibody screen
Collection Medium	<table> \<tr> \<td align=center></td></tr> \<tr> \<td width="110" valign="top" align="center">Red top tube</td> \</tr> \</table>
Minimum	Preferred Minimum: 1.5 mL serum
Reference Range	THYROGLOBULIN ANTIBODY SCREEN <22 IU/mL Reference values apply to all ages. THYROGLOBULIN, TUMOR MARKER > or =16 years: < or =33 ng/mL Athyrotic individuals normally have human thyroglobulin values < or =2 ng/mL.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Useful for follow-up of patients with differentiated thyroid cancers after thyroidectomy and ablation. An aid in determining the presence of thyroid metastasis to lymph nodes. <u>Cautions</u>:The test is most sensitive for detection of thyroid cancer recurrence when patients are off thyroid replacement long enough to have an elevated thyroid-stimulating hormone (TSH) prior to drawing the specimen. This test also can be used to follow patients with normal TSH; however, thyroglobulin (Tg) values from specimens with high TSH should not be compared with values with normal TSH, because TSH stimulation changes the baseline determinations. Thyroid autoantibodies may interfere with the measurement of Tg. All specimens are prescreened for antibodies and a comment appended to the report if they are present. Undetectable levels of Tg should be interpreted with caution if anti-Tg is present. A Tg antibody result of <22 IU/mL is unlikely to cause clinically significant Tg assay interference. It is recommended that the Tg result be reviewed for concordance with clinical presentation. Specimens with Tg concentrations >250,000 ng/mL may "hook" and appear to have markedly lower levels. Anti-Tg values determined by different methodologies might vary significantly and cannot be directly compared with one another. Some patients might show to be antibody-positive by some methods and antibody-negative by others. Comparing anti-Tg antibodies values from different methods might lead to erroneous clinical interpretation. In patients receiving therapy with high biotin doses (ie, >5 mg/day), no specimen should be drawn until at least 8 hours after the last biotin administration. Tg concentrations >2,000 ng/mL may lead to falsely elevated anti-Tg concentrations.
See:	 Thyroglobulin Antibodies (Autoimmune Thyroiditis), Plasma
Methodology	Electrochemiluminescence Immunoassay Immunoenzymatic Assay All specimens are screened for the presence of autoantibody to thyroglobulin.
Analytic Time	24 hours upon receipt at reference laboratory

Thyroid Function Tests

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                        See:  <br />Free Thyroxine, Plasma
                              <br />Thyroid Stimulating Hormone (TSH), Plasma
                              <br />Thyroid Stimulating Hormone (TSH), Reflexive, Plasma
                              <br />Thyroxine (T-4), Plasma
                              <br />Triiodothyronine (T-3), Plasma
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Thyroid Peroxidase Antibody

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                  Laboratory  Chemistry
                  Order Code  TPOAB
                    CPT Code  86376
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Plasma Separator Tube</td>
                               </tr>
                               </table>

 Alternate Collection Media:  Call laboratory for additional acceptable specimen collection containers.
                    Minimum  3 mL; plasma separator tube top or TWO microtainers.
              Reference Range  0.0 - 9.0 IU/mL
                  Order Form:  A-1a Miscellaneous Request or Epic Req
                  Methodology  Electrochemiluminescence Immunoassay
                Analytic Time  1 hour (upon receipt in laboratory)
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Thyroid Stimulating Hormone (TSH), Reflexive

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                  Laboratory  Chemistry
                  Order Code  TSHR
                    CPT Code  84443
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Plasma Separator Tube</td>
                               </tr>
                               </table>

 Alternate Collection Media:  Call laboratory for additional acceptable specimen collection containers.
                    Minimum  3 mL whole blood in light green top or THREE microtainers.
              Reference Range  <pre>
                                     AGE       MALES AND FEMALES
                               1 - 11 months   0.8-6.3 &#956;IU/mL
                               1 - 5 years     0.7-5.9 &#956;IU/mL
                                 > 5 years     Same as adult values
                                 Adults        0.27-4.20 &#956;IU/mL</pre>
                  Order Form:  A-1a General Lab or Epic Req
                     Comments  <pre>
                               If TSH is outside the adult reference range, a Free T4 is automatically
                               analyzed, at an additional charge to the patient.

                               New analytical immunoassay with different reference range instituted
                               4/24/00 at 1000.</pre>

                  Methodology  Electrochemiluminescence Immunoassay
                Analytic Time  1 hour (upon receipt in laboratory)
             Testing Schedule  24 hrs/day, 7 days a week, including holidays.
```

Thyroid Stimulating Hormone (TSH)

Laboratory	Chemistry
Order Code	TSH
CPT Code	84443
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	4 mL whole blood in light green top or TWO microtainers.
Reference Range	<pre> AGE MALES AND FEMALES 1 - 11 months 0.8-6.3 μIU/mL 1 - 5 years 0.7-5.9 μIU/mL > 5 years Same as adult values Adults 0.27-4.20 μIU/mL</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Samples which are part of a TRH stimulation test should be clearly identified as such. New analytical immunoassay with different reference range instituted 4/24/00 at 1000.
See:	 Thyroid Stimulating Hormone (TSH), Reflexive, Plasma
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	2 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Thyroid Stimulating Hormone Receptor Antibody

See:	 TSH Receptor Antibody, Serum

Thyroid Stimulating Immunoglobulin

Laboratory	Commercial Mail-out Laboratory
Order Code	TSI
CPT Code	84445
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.7 mL serum
Rejection Criteria:	Plasma
Reference Range	Effective August 20, 2012 Negative - 122% basal activity or less Positive - 123% basal activity or greater
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Bioassay/Quantitative Chemiluminescence
Analytic Time	2-5 days upon receipt at reference laboratory

Thyroxine (T-4)

Laboratory	Chemistry
Order Code	T4
CPT Code	84436
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top or TWO microtainers.
Reference Range	<pre> AGE MALES/FEMALES 0 - 3 days 8.0-20.0 mcg/dL 3 - 30 days 5.0-15.0 mcg/dL 31 days - 1 years 6.0-14.0 mcg/dL 1 - 5 years 4.5-11.0 mcg/dL 6 - 18 years 4.5-10.0 mcg/dL Normal adults 4.6 12.0 mcg/dL</pre>
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Thyroxine - Age Variation in Serum
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Thyroxine Binding Globulin

Laboratory	Commercial Mail-out Laboratory
Order Code	TBG
CPT Code	84442
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum
Rejection Criteria:	Plasma. Grossly hemolyzed or lipemic specimens.
Reference Range	13.0 - 30.0 μg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative Chemiluminescent Immunoassay
Analytic Time	4 working days upon receipt at reference laboratory

Thyroxine, Free by Equilibrium Dialysis

Laboratory: Commercial Mail-out Laboratory
Order Code: FT4D
CPT Code: 84439
Collection Medium:

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<td width="110" valign="top" align="center">Red top tube</td>
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</table>

Minimum: Preferred Minimum: 2 mL serum
Absolute Minimum: 0.3 mL serum
Rejection Criteria: Serum separator tubes and gels.
Reference Range:

<pre>
Free Thyroxine ng/dL

Age	Female	Male
25-30 weeks gestation:	0.5-3.3 ng/dL	0.5-3.3 ng/dL
31-36 weeks gestation:	1.3-4.7 ng/dL	1.3-4.7 ng/dL
Birth to 1 week:	2.2-5.3 ng/dL	2.2-5.3 ng/dL
2-3 weeks:	0.9-4.0 ng/dL	0.9-4.0 ng/dL
1-5 months:	1.1-2.2 ng/dL	1.1-2.2 ng/dL
6 months- 6 years:	1.4-2.7 ng/dL	1.4-2.7 ng/dL
7 years- 17 years:	1.1-2.0 ng/dL	1.1-2.0 ng/dL
18 years and older:	1.1-2.4 ng/dL	1.1-2.4 ng/dL
Pregnancy, 1st Trimester	0.7-2.0 ng/dL	
Pregnancy, 2nd Trimester	0.7-2.1 ng/dL	
Pregnancy, 3rd Trimester	0.5-1.6 ng/dL	

</pre>

Methodology: Equilibrium Dialysis/High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time: 1 week upon receipt at reference laboratory

Thyroxine-Free Index

See:
Free Thyroxine, Plasma

Tiagabine (Gabitril(R)) Drug Level

Laboratory: Commercial Mail-out Laboratory
Order Code: TIAG
CPT Code: 82541
Collection Medium:

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<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>

Minimum:

<pre>
Preferred Minimum: 3 mL serum from red top tube
Absolute Minimum: 1 mL serum from red top tube</pre>

Rejection Criteria: Separator tubes
Reference Range: By report
Order Form: A-1a Miscellaneous Request or Epic Req
Comments: Draw specimen prior to dosing.

Methodology: High Performance Liquid Chromatography/Tandem Mass Spectrometry
Analytic Time: 5 working days

TIBC

See:
Iron Panel (IRON, UIBC, TIBC), Plasma

Tissue Examination

See:
Surgical Pathology Consultation, Tissue

Tissue Reports

Comments: For more information on surgical pathology reports, please contact Anatomic Pathology Records office, at 356-2476.

Tissue Staining Procedures

Comments: Contact Histopathology lab, 356-2140.

Tissue Transglutaminase

Laboratory	Immunopathology
Order Code	TTG
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL red top tube Pediatric - 2 mL; red top tube</pre>
Reference Range	<pre> <20 units Negative 20-30 units Weak Positive >30 units Moderate to Strong Positive</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	The results will be obtained with the INOVA QUANTA Lite™ ELISA. Assay values obtained with different manufacturers' methods may not be used interchangeably. The magnitude of the reported antibody levels can not be correlated to an endpoint titer.
Methodology	Enzyme-Linked Immunosorbent Assay (ELISA)
Analytic Time	1 week
Testing Schedule	Bi-weekly - Batch analysis performed twice weekly excluding university ho

Tissue Typing

See:	 HLA B27, Whole Blood

Tobramycin

Laboratory	Chemistry
Order Code	TOB
CPT Code	80200
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top or ONE microtainer.
Reference Range	<pre> Peak 6-10 mcg/mL; (45-75 min. after I.M. dose, 15-30 min. after I.V. dose) Trough <2 mcg/mL; (Not more than 30 min. before next dose) Critical value: Peak >10 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
Comments	Phlebotomy team does not draw timed tobramycin specimens. Clinical staff must draw accurately timed peak and trough specimens.
See Appendix	See Additional Information: Chemistry Critical Lab Values Specimens Requiring Immediate Delivery
Methodology	EIA (Enzymatic Immunoassay)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Toll-Like Receptor Function

Laboratory	Commercial Mail-out Laboratory
Order Code	TLR
CPT Code	86353(x6), 83520(x3)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Yellow top tube (ACD solution <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	<pre> Preferred Minimum: One 10 mL whole blood and one 10 mL normal control from a healthy non-related individual. Absolute Minimum: 7 mL whole blood and 7 mL normal control from a healthy non-related individual. Infant Minimum: 3 mL whole blood and 7 mL normal control from a healthy non-related individual.</pre>
Rejection Criteria:	Yellow (ACD Solution B). Refrigerated or frozen specimens. Specimens in transport longer than 48 hours.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Results for TNF alpha, IL-1 beta, and IL-6 are reported as pg/mL. Interpretation comparing the patient results to the simultaneously collected client normal control and the laboratory normal control will be provided by the reference laboratory. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Cell Culture/Quantitative Multiplex Bead Assay
Analytic Time	9-10 days upon receipt at reference laboratory

Toluene

Laboratory	Commercial Mail-out Laboratory
Order Code	TOL
CPT Code	84600
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Preferred Minimum: 2 mL whole blood Absolute Minimum: 0.7 mL whole blood</pre>
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Gas Chromatography
Analytic Time	3-10 days upons receipt at reference laboratory

Topamax

See:	 Topiramate (Topir) Drug Level, Serum

Topiramate (Topir) Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	TOPR
CPT Code	80201
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.3 mL serum
Rejection Criteria:	Gel seperator tubes
Reference Range	Therapeutic range not well established.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Enzyme Immunoassay
Analytic Time	Within 24 hours upon receipt at reference laboratory.

Total Protein-Other

Laboratory	Chemistry
Order Code	TPO
CPT Code	84155
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Total Protein, Plasma
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Total Protein

Laboratory	Chemistry
Order Code	TP
CPT Code	84155
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients.
Reference Range	<pre> Adult 6.0 - 8.0 g/dL Pediatric Reference Ranges Males Females Birth-31 days 4.1-6.3 g/dL 4.2-6.2 g/dL 1-6 months 4.7-6.7 4.4-6.6 6 months-1 year 5.5-7.0 5.6-7.9 1-18 years 5.7-8.0 5.7-8.0</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Total Protein-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Pediatric Reference Ranges
Methodology	Spectrophotometric
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Toxicology Consultation

Comments	Dial 1-800-272-6477 and ask for ’Poison Control’

Toxocara Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	TOXCAB
CPT Code	86682
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum from red top tube Absolute Minimum: 0.15 mL serum from red top tube
Rejection Criteria:	Heat-inactivated or contaminated specimens.
Reference Range	<pre> 0.299 OD or less: Negative - No significant level of Toxocara IgG antibody detected. 0.300-0.500 OD: Equivocal - Questionable presence of Toxocara IgG antibody detected. Repeat testing in 10-14 days may be helpful. 0.501 OD or greater: Positive - Presence of IgG antibody to Toxocara detected, suggestive of a current or past infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-5 days upon receipt at reference laboratory

Toxoplasma gondii by PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	TOXOPCR
CPT Code	87798
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA), Pink top tube
Minimum	<pre> Pediatric Collection: 0.25 mL serum, plasma, or CSF in a sterile container. (Less volume may decrease the sensitivity of the assay.) Fresh tissue, snap frozen on dry ice. Adult Collection: 1 mL serum, plasma, amniotic fluid, or CSF in a sterile container. Fresh tissue, snap frozen on dry ice.</pre>
Rejection Criteria:	Nonsterile or leaking containers, heparinized, hemolyzed or clotted whole blood.
Reference Range	<pre> Negative: Toxoplasma gondii DNA not detected by PCR Positive: Toxoplasma gondii DNA detected by PCR</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Write specimen source on requisition.
See:	 Toxoplasmosis Antibody, IgM, Serum
Methodology	Polymerase Chain Reaction
Analytic Time	5 working days upon receipt at reference laboratory

Toxoplasma gondii PCR, Vitreous

Laboratory	Commercial Mail-out Laboratory
Order Code	TOXG
CPT Code	87798
Collection Medium	Sterile container
Minimum	0.2-0.3 mL (This amount of sample will perform from 1 up to 4 viral tests).
Reference Range	Negative for the presence of Toxoplasma gondii DNA.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Toxoplasma gondii is an intracellular protozoan parasite that chronically infects about 10% of the adult population in the United States. Results should be interpreted with consideration of clinical and laboratory findings. A negative result does not indicate absence of disease. Reliable results depend on adequate specimen collection and the absence of inhibiting substances.
See:	 Cytomegalovirus by PCR, Vitreous, Vitreous Herpes Simplex Virus PCR, Vitreous, Vitreous Varicella-Zoster Virus PCR, Vitreous, Vitreous
Methodology	Polymerase Chain Reaction (PCR)/DNA Probe Hybridization
Analytic Time	24 hours upon receipt at reference laboratory

Toxoplasmosis Antibody, IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	TOXOM
CPT Code	86778
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Red top tube</td></tr></table>
Minimum	Preferred Minimum: 1 mL serum Absolute Minimum: 0.5 mL serum
Rejection Criteria:	Grossly hemolyzed, contaminated or heat-inactivated specimens.
Reference Range	<pre>Effective January 16, 2013 7.9 AU/mL or less: Not Detected 8.0 - 9.9 AU/mL: Indeterminate - Repeat testing in 10-14 days may be helpful. 10.0 AU/mL or greater: Detected - Significant level of Toxoplasma gondii IgM antibody detected and may indicate a current or recent infection. However, low levels of IgM antibodies may occasionally persist for more than 12 months post-infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Acute and convalescent specimens must be labeled as such; parallel testing is preferred and convalescent specimens must be received within 30 days from receipt of the acute specimens. Please mark specimen plainly as "acute" or "convalescent."
See:	 Toxoplasmosis IgG Antibody, Serum
Methodology	Chemiluminescent Immunoassay
Analytic Time	24 hours upon receipt at reference laboratory

Toxoplasmosis IgG Antibody

Laboratory	Chemistry
Order Code	TOXOG
CPT Code	86777
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from red top tube or TWO microtainers.
Reference Range	Reference range and methodology changed effective 12/11/2012. 9 IU/mL or less: Negative - No significant level of detectable Toxoplasma gondii IgG antibody. 10-11 IU/mL: Equivocal - Repeat testing in 10-14 days may be helpful. 12 IU/mL or greater: Positive - IgG antibody to Toxoplasma detected, which may indicate a current or past Toxoplasma infection.
Order Form:	A-1a General Lab or Epic Req
Comments	Acute and convalescent specimens must be labeled as such; parallel testing is preferred and convalescent specimens must be received within 30 days from receipt of the acute specimens. Please mark specimen plainly as "ACUTE" or "CONVALESCENT." Toxoplasmosis is an infection caused by the parasite Toxoplasma gondii. The infection is mainly acquired by ingestion of food or water that is contaminated by mature oocysts shed by cats or by undercooked meat containing tissue cysts. Primary acute infection occurs in many individuals and usually produces mild symptoms followed by a latent period that may persist for life. However, reactivation of a latent Toxoplasma infection as a result of immunosuppression can lead to meningoencephalitis. Primary maternal Toxoplasma infection occurring during pregnancy can lead to severe damage of the fetus as the parasite can be transmitted across the placenta. Infants with congenital infection often do not present with clinical symptoms at birth but may develop severe sequelae later in life such as mental and psychomotor retardation, chorioretinitis and hearing loss. The fetal infection rate increases with gestational age at which the mother acquires Toxoplasma infection. However, the risk of severe clinical manifestations is higher in case of early maternal infection. Early drug therapy in acute infection during pregnancy can prevent congenital damage or ameliorate the severity of clinical manifestations. The diagnosis of Toxoplasma infection is most commonly made by the detection of IgG and IgM antibodies directed against Toxoplasma. The determination of IgG antibodies to Toxoplasma gondii is used to assess the serological status to T. gondii and is indicative of an acute or latent infection. The detection of IgM antibodies to T. gondii indicates an acute, recent or reactivated Toxoplasma infection. The diagnosis of the acute acquired infection during pregnancy is established by a seroconversion or a significant rise in antibody titers (IgG and/or IgM) in serial samples.
See:	 Toxoplasmosis Antibody, IgM, Serum
Methodology	Multiplex Flow Immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Transferrin

Laboratory	Commercial Mail-out Laboratory
Order Code	TRFN
CPT Code	84466
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Adult/Pediatric Preferred Minimum: 0.5 mL serum
Rejection Criteria:	Specimens collected in EDTA or hemolyzed specimens.
Reference Range	200-400 mg/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Fasting Sample preferred.
Methodology	Immunoturbidimetric
Analytic Time	Within 24 hours upon receipt at reference laboratory.

Transferrin Receptor, Soluble

See:	 Soluble Transferrin Receptor, Plasma

Transforming Growth Factor Receptor 2 Exon 5, R460C with Interpretation

Laboratory	Molecular Pathology
Order Code	TGFBR2
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Adults - 3 mL whole blood in lavender top tube (EDTA) Children - 2 mL whole blood in lavender top tube (EDTA) Testing on smaller volumes than those requested will be attempted. However, in some cases, small blood volumes may compromise the ability to perform testing. Testing requires a dedicated collection tube.</pre>
Reference Range	Normal
Order Form:	A-1a Molecular Pathology/Diagnostics or Epic Req
Comments	<pre> Testing requires a dedicated collection tube. Only the exon 5, R460C variant is detected.</pre>
Methodology	Sequencing
Analytic Time	21 days
Testing Schedule	Weekly

Trazodone Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	TRAZ
CPT Code	82486
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum<
Rejection Criteria:	Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range	<pre> Therapeutic range: 0.8 - 1.6 μg/mL Toxic: > 3.2 μg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-5 days upon receipt at reference laboratory.

TRG Gene Clonality by PCR with Interpretation

Laboratory	Molecular Pathology
Order Code	TCELLPCR
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/lavender_3ml.png" cl <td align=center><img src="/path_handbook/gifs/tubes/yellow.png" class="a <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	5 mL blood in a lavender top or yellow top, 1 mL bone marrow aspirate in a lavender top or yellow top, 3 cu mm of fresh frozen tissue or Formalin-fixed, paraffin embedded tissue, body fluids in a lavender top or yellow top or lymph node aspirates in RPMI.
Reference Range	None
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	DNA extracted from bone marrow mononuclear cells or tissue is examined for rearrangement of T-cell receptor gamma (TCRG) genes.
Methodology	Multiplex Polymerase Chain Reaction (PCR) followed by Fluorescence Capillary Electrophoresis
Analytic Time	7 working days
Testing Schedule	Weekly

TRH Stimulation Test

See:	 Thyroid Stimulating Hormone (TSH), Plasma

Trichinella Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	TRICHAB
CPT Code	86784
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult Preferred Minimum: 0.5 mL serum Adult Absolute Minimum: 0.2 mL serum Pediatric Minimum: 0.1 mL serum</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Qualitative Enzyme-Linked Immunosorbent Assay
Analytic Time	7 working days upon receipt at reference laboratory

Trichomonas - Males Only

Laboratory	Commercial Mail-out Laboratory
Order Code	TVAG
CPT Code	87798
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">APTIMA® Unisex Swab Kit </tr> </table>
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test is for male patients ONLY. Specimens from Females should use LAB7263 Wet Prep for Trichomonas, Candida and Gardnerella. Call Microbiology at 356-2591 for the APTIMA Unisex Swab for males. This kit contains the Male Urethral swab and has instructions for male collection. Alternatively, other swabs that are sized for the male urethra may be used and sent immediately to Microbiology for processing for mailout testing.
See:	 Wet Prep for Trichomonas, Candida and Gardnerella, Vaginal Swab
Methodology	Transcription-mediated Amplification
Analytic Time	1-4 days upon receipt at the reference laboratory

Tricyclic Multi-Drug Screen

Laboratory: Commercial Mail-out Laboratory
Order Code: TADID
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Pink top tube</td>
</tr>
</table>

Minimum: Preferred Minimum: 1 mL plasma
Rejection Criteria: Whole blood. Gel separator tubes, light blue (citrate), or yellow (SPS or ACD solution).
Reference Range:

<pre>

Drug	Sensitivity	Therapeutic Range	Toxic
Amitriptyline (Elavil, Vanatrip)	<10 ng/mL		
Nortriptyline (Aventyl, Pamelor)	<10 ng/mL	50-150 ng/mL	>500 ng/mL
Total Amitriptyline + Nortriptyline		95-250 ng/mL	>500 ng/mL
Imipramine (Tofranil)	<10 ng/mL		
Desipramine (Norpramin)	<10 ng/mL	100-300 ng/mL	>500 ng/mL
Total Imipramine + Desipramine		150-300 ng/mL	>500
Doxepin (Sinequan, Zonalon)	<10 ng/mL		
Nordoxepin	<10 ng/mL		
Total Doxepin + Nordoxepin		100-300 ng/mL	>500 ng/mL
Protriptyline (Vivactil)	<10 ng/mL	70-240 ng/mL	>400 ng/mL
Clomipramine (Anafranil)	<20 ng/mL		
Norclomipramine	<20 ng/mL		
Total Clomipramine + Metabolite		220-500 ng/mL	>900 ng/mL

</pre>

Order Form: A-1a Miscellaneous Request or Epic Req
Comments: Note: This test is used to quantitate the following tricyclic antidepressants: amitriptyline, clomipramine, desipramine, doxepin, imipramine, norclomipramine, nordoxepin, nortriptyline, and protriptyline.

Methodology: Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time: 1-3 days upon receipt at reference laboratory.

Triglycerides-Other

Laboratory: Chemistry
Order Code: TRIGO
CPT Code: 84478
Collection Medium:

<table>
<tr>
<td align=center></td></tr>
<tr>
<td width="110" valign="top" align="center">Red top tube</td>
</tr>
</table>

Minimum: 1 mL fluid in red top tube
Rejection Criteria: Plasma, serum, urine, or cerebrospinal fluid.
Reference Range: No established reference range (see Test Limitations)
Order Form: A-1a Miscellaneous Request or Epic Req
See:
Triglycerides, Plasma
Methodology: Enzymatic
Analytic Time: 1 hour (upon receipt in laboratory)
Testing Schedule: 24 hrs/day, 7 days a week, including holidays.

Triglycerides

Laboratory	Chemistry
Order Code	TRIG
CPT Code	84478
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients.
Reference Range	<pre> Normal: < 150 mg/dL Borderline High: 150-199 mg/dL High: 200-499 mg/dL Very High: > or = 500 mg/dL To convert triglyceride values to mm/L, divide by 88.6.</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Fasting for at least 12 hours prior to collection is recommended.
See:	 Triglycerides-Other, Body Fluid
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Triiodothyronine (T-3)

Laboratory	Chemistry
Order Code	TT3
CPT Code	84480
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top or TWO microtainers.
Reference Range	<pre> AGE MALES/FEMALES 0 - 3 days .6-3.0 ng/mL 4 days - 1 year .9-2.6 ng/mL 1 day - 6 years .9-2.4 ng/mL 7 - 11 years .9-2.3 ng/mL 12 - 18 years 1.0-2.1 ng/mL Adults .8-2.0 ng/mL</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	New analytical immunoassay with different reference range instituted 4/24/00 at 1000.
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Triiodothyronine - Free (T-3)

Laboratory	Chemistry
Order Code	FT3
CPT Code	84481
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top or TWO microtainers
Reference Range	<pre> Less than 1 month: 1.4-5.5 pg/mL Less than 1 year: 2-6.9 pg/mL 1 - 5 years: 2.4-6.7 pg/mL 5 - 18 years: 2.3-5.5 pg/mL Adults: 2.57-4.43 pg/mL To convert results to ng/dL, multiply result x.1 To convert results to pmol/L, multiply result x 1.54</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	New analytical immunoassay with different reference range instituted 4/24/00.
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Triiodothyronine, Reverse

Laboratory	Commercial Mail-out Laboratory
Order Code	RT3
CPT Code	84482
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL plasma Absolute Minimum: 1 mL plasma
Rejection Criteria:	Grossly hemolyzed specimens.
Reference Range	0-17 years: Not established 18 years and older: 9.0-27.0 ng/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Requires Pathology Resident approval. Contact Clinical Chemistry resident on pager 131-3724 for approval.
Methodology	Quantitative Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	1-3 days upon receipt at reference laboratory.

Trileptal

See:	 Oxcarbazepine (10-Hydroxy Met) Drug Level, Serum

Trofile Co-Receptor Tropism

Laboratory	Commercial Mail-out Laboratory
Order Code	TROFILE
CPT Code	87999
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Absolute Minimum: 3 mL plasma
Rejection Criteria:	Samples which have been thawed.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires Infectious Disease attending approval. Mailouts staff will not process order without approval. If approval is given, the name of the Infectious Disease attending can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Recombinant virus, single replication
Analytic Time	Reported within 20 days

Troponin T

Laboratory	Chemistry
Order Code	TROPT
CPT Code	84484
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL; plasma separator tube top or TWO microtainers.
Rejection Criteria:	Red top tube is not acceptable.
Reference Range	Is less than or equal to 0.10 ng/mL
Order Form:	A-1a General Lab or Epic Req
Comments	Troponin T method instituted 3/13/00 at 0700.
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Trypanosoma cruzi Antibody, IgG

Laboratory	Commercial Mail-out Laboratory
Order Code	CHAGASG
CPT Code	86753
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 0.5 mL serum
Rejection Criteria:	Plasma. Lipemic, hemolyzed, icteric, turbid, bacterially contaminated, or heat-inactivated specimens.
Reference Range	0 Units: Negative - No significant level of Trypanosoma cruzi IgG antibody detected. 1-5 Units: Equivocal - Questionable presence of Trypanosoma cruzi IgG antibody detected. Repeat testing in 10-14 days may be helpful. 6-15 Units: Positive - IgG antibodies to Trypanosoma cruzi detected, which may suggest current or past infection.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Rapid Strip Assay

Trypsin-Like Immunoreactivity

Laboratory	Commercial Mail-out Laboratory
Order Code	TRLIMR
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Heparinized specimens. Hemolyzed or lipemic specimens.
Reference Range	<pre> Effective August 15, 2011 Expected Cathodic Trypsinogen Concentration Values for the Varied Disease States Healthy Individuals 10.0-57.0 ng/mL Chronic Pancreatitis 46.0 ng/mL or less Acute Pancreatitis 92.0-850.0 ng/mL Total Pancreatectomy 1.4 ng/mL or less</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Radioimmunoassay
Analytic Time	1-5 days upon receipt at reference laboratory.

Tryptase (alpha & beta)

Laboratory	Commercial Mail-out Laboratory
Order Code	TRYPAB
CPT Code	83516
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL serum
Rejection Criteria:	Whole blood or urine.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	For anaphylaxis, serum must be obtained 15 minutes to 4 hours after onset of acute clinical symptoms. For mastocytosis, serum should be obtained during a non-acute time period.
Methodology	<pre> Mature Tryptase: Immunoassay utilizing a monoclonal capture antibody that preferentially recognizes mature alpha and beta tryptases. Total Tryptase: UNICAP assay uses a capture monoclonal antibody that recognizes pro, pro', and mature forms of alpha and beta tryptases.</pre>
Analytic Time	1 week upon receipt at reference laboratory

Tryptase, Total

Laboratory	Commercial Mail-out Laboratory
Order Code	TRYP
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum Absolute Minimum: 0.5 mL serum
Reference Range	0.4-10.9 μg/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This assay measures total tryptase and does not distinguish between the alpha and beta protein types. Samples should preferably be collected between 15 minutes and three hours after the suspected event causing mast cell activation.
Methodology	Quantitative Fluorescent Enzyme Immunoassay
Analytic Time	1-4 days upon receipt at reference laboratory. Run at reference laboratory on Monday, Wednesday and Fridays.

Tryptophan

See:	 Amino Acids, Quantitative, Plasma Amino Acids, Quantitative, Random Urine

TSH

See:	 Thyroid Stimulating Hormone (TSH), Plasma Thyroid Stimulating Hormone (TSH), Reflexive, Plasma

TSH Receptor Antibody

Laboratory	Commercial Mail-out Laboratory
Order Code	TSHRAB
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL serum Adult and Pediatric Absolute Minimum: 0.3 mL serum</pre>
Rejection Criteria:	Plasma. Grossly hemolyzed or lipemic specimens.
Reference Range	Less than or equal to 1.75 IU/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Electrochemiluminescent Immunoassay
Analytic Time	2 working days upon receipt at reference laboratory

TTG

See:	 Tissue Transglutaminase, Serum

Tumor Necrosis Factor-Alpha

```
                  Laboratory  Commercial Mail-out Laboratory
                  Order Code  TNF
                    CPT Code  83520
            Collection Medium  <table>
                               <tr>
                               <td align=center></td></tr>
                               <tr>
                               <td width="110" valign="top" align="center">Red top tube</td>
                               </tr>
                               </table>

 Alternate Collection Media:  Light Green top tube (Lithium Heparin)
                     Minimum  <pre>
                               Adult preferred minimum:  1 mL serum or plasma
                               Adult absolute minimum:   0.3 mL serum or plasma
                               Pediatric minimum:        0.3 mL serum or plasma</pre>
          Rejection Criteria:  Heat-inactivated, refrigerated or contaminated specimens.
              Reference Range  0-22 pg/mL
                  Order Form:  A-1a Miscellaneous Request or Epic Req
                 See Appendix  See Additional Information: <br />
                               Specimens Requiring Immediate Delivery
                  Methodology  Quantitative Multiplex Bead Assay
                Analytic Time  5 days upon receipt at reference laboratory
                               1-4 days upon receipt at reference laboratory
```

Tylenol

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                         See:  <br />Acetaminophen, Plasma
```

Type and Screen

```
                         See:  <br />Type and Screen (T&S), Epic Order Code LAB7602
```

Type and Screen (T&S)

```
                    Comments  <pre>
                              A Type and Screen order includes Blood Type (ABO and Rh) and Antibody
                              Screen.  A Type and Screen must be requested every three days for Red
                              Blood Cell transfusion.  This request is also appropriate for patients
                              for whom blood is not likely to be required, but for whom blood must be
                              available quickly to treat potential blood loss.

                              Average Turnaround time: 1 hour

                              Specimen labeling procedure must be followed.

                              Minimum information on the IPR bar code specimen label of the primary
                              tube:
                                Patient’s last name and first name
                                Patient’s medical record number
                                Phlebotomist and witness initials (Computer Downtime)
                                Perform IPR scan prior to sending specimen to lab

                              Multiple concurrent specimens:
                              All specimens labeled as above requirement.</pre>

                         See:  <br />Antibody Screen, Plasma
                               <br />Blood Type (ABO and Rh), Blood
                               <br />Rh Type, Blood
                See Appendix  See Additional Information: <br />
                              Blood Center Services
```

Type, Screen and Crossmatch

```
                         See:  <br />Cross-Match, Per Unit, Blood
                               <br />Type and Screen (T&S), Epic Order Code LAB7602
```

Tyrosine

```
                         See:  <br />Amino Acids, Quantitative, Plasma
                               <br />Amino Acids, Quantitative, Random Urine
```

Tyrosine-Quantitation

```
                    Comments  Performed at University Hygienic lab.  Need 4 ml; red top.  Useful for
                              diagnosis and monitoring of patients with PKU.

                         See:  <br />Amino Acids, Quantitative, Plasma
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U

UBE3A Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	UBE3A
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Alternate Collection Media:	Yellow top tube (ACD solution A)
Minimum	<pre> Preferred Minimum: 5-10 mL whole blood collected in an EDTA (pink top) tube. Pediatric Minimum: 3 mL whole blood collected in an EDTA (pink top) tube.</pre>
Reference Range	See report
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Molecular Diagnostic Request Form from Greenwood Genetic Center, with the specimen and the A-1a Miscellaneous Request. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. <u>The reference laboratory offers a known familial variant test. If you want to order the known familial variant version of the test, please order LAB7857</u>.
Analytic Time	6 weeks

UC-ANCA Screen and Interpretation

Laboratory	Immunopathology
Order Code	UCANCAS
CPT Code	<pre> 86255 UC-ANCA Screen (Technical) 86255-26 UC-ANCA Screen (Professional Interpretation)</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult - 5 mL red top tube Pediatric - 2 mL red top tube</pre>
Reference Range	<1:40 titer, includes interpretative report.
Order Form:	A-1a Immunopathology or Epic Req
Comments	<pre> "UC-ANCA" (also called "atypical P-ANCA" or "X-ANCA") is the type of ANCA most commonly found in some patients with certain inflammatory bowel and liver disease, namely, ulcerative colitis (72-80%), primary sclerosing cholangitis (72-80%), and autoimmune hepatitis type 1 (50-80%). A subset of patients with Crohn's Disease limited to the colon, may also be positive. Some patients with autoimmune connective tissues diseases (including systemic lupus erythematosus, rheumatoid arthritis and Felty's syndrome) may also have an autoantibody which produces the "atypical P-ANCA" pattern. Since the specificity of this autoantibody has not yet been conclusively identified (and there may be more than one specificity), there is no confirmatory test. It is important to order this test only in the clinical setting of inflammatory bowel or liver disease. Note: Very rare patients with ulcerative colitis or primary sclerosing cholangitis may have one of the vasculitis-related ANCA specificities (anti-MPO or PR3). Titration of "UC-ANCA" is not performed as studies have found no correlation between titer and disease activity.</pre>
Methodology	Immunofluorescence
Analytic Time	3 days
Testing Schedule	Daily - Batch analysis performed daily excluding weekends and university holidays.

UGT1A1 Gene Analysis Common Variants

Laboratory	Commercial Mail-out Laboratory
Order Code	UGT1A1
CPT Code	81350
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube, Yellow top tube (ACD solution A)
Minimum	<pre> Preferred Minimum: 3 mL whole blood from lavender top(EDTA) tube Absolute Minimum: 1 mL whole blood from lavender top(EDTA) tube</pre>
Rejection Criteria:	Frozen specimens
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Polymerase chain reaction followed by size analysis using capillary electrophoresis.
Analytic Time	1 week upon receipt at reference laboratory

Ullvich CMD

See:	 Congenital Muscular Dystrophy, Muscle or Skin Biopsy

Unfractionated Heparin

See:	 Serotonin Release Assay, Serum

Unknown Substance Identification

See:	 Substance Identification, Various (see comments)

UNOS PRA, Class I & Class II /MICA (VAMC)

Laboratory	Iowa Regional Histocompatibility and Immunogenetics
CPT Code	86828, 81479
Minimum	One 10 mL red top (no additive) tube.
Comments	<pre> Percent reactive antigen (PRA), class I & class II. The percentage of HLA antigens within a pool of donors bound by antibody in the blood sample. Results updated in UNOS. All HLA Testing is ordered through the University of Iowa Epic System.</pre>
See Appendix	See Additional Information: Iowa Regional Histocompatibility and Immunogenetics Laboratory Required Content on Requisitions
Methodology	Luminex, Solid Phase
Analytic Time	Testing performed weekly. Resulted in Epic in 7 working days. Available STAT. Verbal reported in 5 hours. Resulted in Epic by 24 h.

UP/UC

See:	 Creatinine-Urine, Random, Urine, Random Protein-Urine, Random, Urine, Random

Urea Nitrogen, Quantitation

Laboratory	Chemistry
Order Code	UUN
CPT Code	84520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	24 hr collection; no preservative
Reference Range	6-17 g/24 hr
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Collection and Preservation of 24-Hour Urine Specimens Urine Tests Requiring no Preservatives
Methodology	Enzymatic
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Urea Nitrogen-Other

Laboratory	Chemistry
Order Code	BUNO
CPT Code	84520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Urea Nitrogen, Plasma
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Urea Nitrogen

Laboratory	Chemistry
Order Code	BUN
CPT Code	84520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients.
Reference Range	10-20 mg/dL
Order Form:	A-1a General Lab or Epic Req
See:	 Urea Nitrogen-Other, Body Fluid
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Urea Nitrogen-Urine, Random

Laboratory	Chemistry
Order Code	URUN
CPT Code	84540
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL urine, random sample
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Uric Acid

Laboratory	Chemistry
Order Code	URUR
CPT Code	84560
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	10 mL; random sample; no preservative (must have at least 10 mL to titrate).
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Uric Acid

Laboratory	Chemistry
Order Code	UURI
CPT Code	84560
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	<pre> 24 hr collection; no preservative. Collection other than 24 hr will not be calculated for mg/24 hr. Must have at least 10 mL to titrate.</pre>
Reference Range	200-1,000 mg/24 hr
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Collection and Preservation of 24-Hour Urine Specimens Urine Tests Requiring no Preservatives
Methodology	Enzymatic
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Uric Acid (on ice-Elitek)

Laboratory	Chemistry
Order Code	URICICE
CPT Code	84550
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	2 mL whole blood in PRECHILLED light green top tube or one PRECHILLED microtainer for pediatric patients.
Reference Range	Confirm 3.4-7.0 mg/dL (males) and 2.4-5.7 mg/dL (females)
Order Form:	A-1a General Lab or Epic Req
Comments	This test is specifically for patients who are taking the drug rasburicase (Elitek). Collection in pre-chilled tubes and rapid transport limits breakdown of uric acid by the uricase enzyme in the blood tube.
See:	 Uric Acid, Plasma
See Appendix	See Additional Information: Chemistry Pediatric Reference Ranges Specimens Requiring Immediate Delivery
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Uric Acid-Other

Laboratory	Chemistry
Order Code	URICO
CPT Code	84560
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	1 mL fluid in red top tube
Rejection Criteria:	Plasma, serum, urine, or cerebrospinal fluid.
Reference Range	No established reference range (see Test Limitations)
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Uric Acid, Plasma
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Uric Acid

Laboratory	Chemistry
Order Code	URIC
CPT Code	84550
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer for pediatric patients.
Reference Range	<pre> Confirm 3.4-7.0 mg/dL (males) and 2.4-5.7 mg/dL (females) Pediatric Reference Ranges: Age Range Units 0-2 years 2.0-7.0 mg/dL 2-12 years 2.0-6.5 mg/dL 12-14 years 2.0-7.0 mg/dL</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	For patients who have received rasburicase (Elitek) within 48 hours of anticipated blood draw, "Uric Acid (on ice-Elitek)" (Epic #LAB870) should be ordered instead to avoid falsely low uric acid levels due to breakdown of uric acid by the uricase enzyme in the blood tube. See additional information listed in the links below.
See:	 Uric Acid (on ice-Elitek), Plasma Uric Acid-Other, Body Fluid
See Appendix	See Additional Information: Chemistry Pediatric Reference Ranges
Methodology	Enzymatic
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Urinalysis

Laboratory	Hematology
Order Code	UASI
CPT Code	81003
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	3 mL urine
Reference Range	Specific gravity: 1.005-1.030; pH: 5.0-9.0, Dipstick negative for protein, hemoglobin, bilirubin, urobilinogen, ketones, glucose, leukocyte esterase and nitrite.
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Collection: Midstream Clean Catch Urine Urine Tests Requiring no Preservatives
Methodology	Reflectance Spectrophotometry
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Urinalysis Microscopy

Laboratory	Hematology
Order Code	UAMI
CPT Code	81001
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	3 mL urine
Reference Range	<pre> WBC 0-5/hpf RBC 0-2/hpf Bacteria None seen Squamous Epithelial Cells <5/hpf Transitional Epithelial Cells <2/hpf Hyaline Casts 0-2/Lpf</pre>
Order Form:	A-1a General Lab or Epic Req
See:	 Urinalysis, Urine
See Appendix	See Additional Information: Collection: Midstream Clean Catch Urine Urine Tests Requiring no Preservatives
Methodology	Flow through microscopy
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Urinary Free Cortisol

See:	 Cortisol, Urinary Free (HPLC), Urine

Urine Charcoal Analysis

Laboratory	Hematology
Order Code	UCHAR
CPT Code	81015
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	5 mL urine
Reference Range	Negative for the presence of charcoal
Order Form:	A-1a General Lab or Epic Req
Comments	Collection of THREE consecutive first morning voided urines are recommended. Labeled with dates of collection. They may be saved and refrigerated and submitted on the same day for individual testing.
See Appendix	See Additional Information: Collection: Midstream Clean Catch Urine Urine Tests Requiring no Preservatives
Methodology	Wright stained cytospin prep
Analytic Time	4 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Urine Cytology

Laboratory	Cytopathology
Minimum	20 mL; (20+ mL, if possible) fresh catheterized specimen preferred (no preservative).
Reference Range	The pathologist will provide an interpretive report.
Order Form:	H-2 Cytopathology or Epic Req
Comments	The requisition with complete patient history must accompany specimen and must include modality of previous therapy. Place specimen in a clean, secure container. Label with patient name. Deliver fresh to the lab. After 1700 daily, weekends and holidays deliver to Specimen Control(6240 RCP). No 24 hour collection accepted.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery Urine Tests Requiring no Preservatives
Analytic Time	2 days

Urine Immunofixation Electrophoresis

Laboratory	Chemistry
Order Code	UIFE
CPT Code	86335 and 86335 -26
Collection Medium	<table> <tr> <td align=center></td></</br><tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Minimum	6 mL; random urine
Reference Range	No Bence Jones proteins detected. The urine IFE report includes an interpretive pathologist report.
Order Form:	A-1a General Lab or Epic Req
Comments	Urine immunofixation electrophoresis methodology switched from traditional gel electrophoresis to capillary electrophoresis on November 1, 2012. Technically, the method used in capillary electrophoresis to identify monoclonal proteins is known as immunotyping. Immunotyping can resolve both heavy and light immunoglobulin chains.
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Capillary Electrophoresis with Immunotyping
Testing Schedule	Weekly

Urine Kappa & Lambda Light Chains

See:	 Urine Protein Electrophoresis, Urine

Urine Protein Electrophoresis

See:	 Urine Protein Electrophoresis, Urine

Urine Protein Electrophoresis

Laboratory	Chemistry
Order Code	UPE
CPT Code	84166
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Clear top tube</td> </tr> </table>
Minimum	6 mL random urine; no preservatives are acceptable.
Reference Range	No monoclonal proteins detected.
Order Form:	A-1a General Lab or Epic Req
Comments	Electrophoresis and professional interpretation is cancelled if total urine protein is less than 20 mg/dL or if ordered within 7 days of a previous order. The UPEP report will include quantitation of the concentration of the monoclonal protein (if present) and an interpretative pathologist report. Urine protein electrophoresis methodology switched from traditional gel electrophoresis to capillary electrophoresis on November 1, 2012.
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	Capillary Electrophoresis
Testing Schedule	Weekly

Urine Reducing Substances

See:	 Reducing Substances, Urine

Urine, Bladder Wash, Bladder Brush

See:	 Urine Cytology, Urine

UroVysion

See:	 Fluorescence In-Situ Hybridization (FISH-Bladder Carcinoma), Voided Urine, Bladder Wash

V

Valine

See:	 Amino Acids, Quantitative, Plasma Amino Acids, Quantitative, Random Urine

Valium

See:	 Diazepam Drug Level, Serum

Valproic Acid

Laboratory	Chemistry
Order Code	VALP
CPT Code	80164
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer.
Reference Range	<pre> 50-100 mcg/mL Critical value: >150 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	EIA (Enzymatic Immunoassay)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Valproic Acid, Free & Total Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	VPAFT
CPT Code	80164 X2
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2 mL serum Absolute Minimum: 1 mL serum
Rejection Criteria:	Citrated plasma. Tubes that contain liquid anticoagulant.
Reference Range	<pre> Valproic Acid, Total Therapeutic Range: 50-125 μg/mL Toxic: Greater than 150 μg/mL Valproic Acid, Free Therapeutic Range: 5-15 μg/mL Toxic: Greater than 15 μg/mL VPA- % Free 5-18%</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Valproic Acid, Plasma
Methodology	Immunoassay
Analytic Time	4 working days upon receipt at reference laboratory

VanA/VanB Detection by PCR (rule out VRE)

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	C VREPCR
CPT Code	87500
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">ESwab Collection & Transport </tr> </table>
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	ESwab available from Hospital Stores (74541).
Methodology	Real Time PCR detection of the vanA and vanB resistance genes of vancomycin resistant enterococci.
Testing Schedule	Batch analysis performed once each day, Monday through Friday. Sample must be received by 0930 for same day service; specimens received on weekends and holidays will be held until next scheduled run.

Vancomycin

Laboratory	Chemistry
Order Code	VANC
CPT Code	80202
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or ONE microtainer.
Reference Range	<pre> peak 30-40 mcg/mL; (30-60 minutes after I.V. infusion) trough 5-10 mcg/mL; (not more than 30 minutes before next dose) Critical value: >50 mcg/mL</pre>
Order Form:	A-1a Therapeutic Drug Analysis or Epic Req
See Appendix	See Additional Information: Chemistry Critical Lab Values
Methodology	EIA (Enzymatic)
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Vancomycin Resistant Enterococci (VRE) Screen

See:	 VanA/VanB Detection by PCR (rule out VRE), Perirectal Swab

Vanillylmandelic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	VMAUR
CPT Code	84585
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	Preferred Minimum: 4 mL random urine Absolute Minimum: 1 mL random urine <hr> Abstain from medications for 72 hours prior to collection.
Reference Range	<pre> <u>Components</u> <u>Age</u> <u>Ref. Interval</u> VMA, Urine 18 years and older 0.0-7.0 mg/d The VMA-to-creatinine ratio will be reported when the patients is under 18 years, the urine collection is random or other than 24 hours, or the urine volume is less than 400 mL/24 hours. VMA 0-2 years 0-27 mg/g crt 3-5 years 0-13 mg/g crt 6-17 years 0-9 mg/g crt 18 years and older 0-6 mg/g crt</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	Moderately elevated VMA (vanillylmandelic acid) can be caused by a variety of factors such as essential hypertension, intense anxiety, intense physical exercise, and numerous drug interactions (including some over-the-counter medications and herbal products). Medications that may interfere with catecholamines and their metabolites include amphetamines and amphetamine-like compounds, appetite suppressants, bromocriptine, buspirone, caffeine, chlorpromazine, clonidine, disulfiram, diuretics (in doses sufficient to deplete sodium), epinephrine, glucagon, guanethidine, histamine, hydrazine derivatives, imipramine, levodopa (L-dopa, Sinemet®), lithium, MAO inhibitors, melatonin, methyldopa (Aldomet®), morphine, nitroglycerin, nose drops, propafenone (Rythmol), radiographic agents, rauwolfia alkaloids (Reserpine), tricyclic antidepressants, and vasodilators. The effects of some drugs on catecholamine metabolite results may not be predictable.
See:	 Catecholamines, Fractionated, Random Urine Homovanillic Acid, Random Urine Metanephrines Total, Random Urine
See Appendix	See Additional Information: Urine Tests Requiring no Preservatives
Methodology	High Performance Liquid Chromatography
Analytic Time	4 working days upon receipt at reference laboratory

Vanillylmandelic Acid

Laboratory	Commercial Mail-out Laboratory
Order Code	VMA24
CPT Code	84585
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">Urine - 24 hour/timed plastic </tr> </table>
Minimum	Preferred Minimum: 4 mL from a well-mixed 24 hr urine collection. Random urine is also accepted at reference lab. Refrigerate during collection and submission. Absolute Minimum: 1 mL from a well-mixed 24 hr urine collection. Random urine is also accepted at reference lab. Refrigerate during collection and submission.
Reference Range	<pre>

<u>Components</u> <u>Age</u> <u>Ref. Interval</u>

VMA, Urine	18 years and older	0.0-7.0 mg/d
	The VMA-to-creatinine ratio will be reported when the patient is under 18 years or the urine volume is less than 400 mL/24 hours.	
VMA	0-2 years	0-27 mg/g crt
	3-5 years	0-13 mg/g crt
	6-17 years	0-9 mg/g crt
	18 years and older	0-6 mg/g crt
Creatinine-24 hr		
	Male	
	3-8 years	140-700 mg/d
	9-12 years	300-1300 mg/d
	13-17 years	500-2300 mg/d
	18-50 years	1000-2500 mg/d
	51-80 years	800-2100 mg/d
	81 years and older	600-2000 mg/d
	Female	
	3-8 years	140-700 mg/d
	9-12 years	300-1300 mg/d
	13-17 years	400-1600 mg/d
	18-50 years	700-1600 mg/d
	51-80 years	500-1400 mg/d
	81 years and older	400-1300 mg/d</pre>

Order Form:	A-1a General Lab or Epic Req
Comments	<pre>

If screening for Neuroblastoma, the following tests are suggested: CAT24 (Catecholamines, Fractionated; Dopamine is included), HVA24 (Homovanillic Acid), MET24 (Metanephrines), VMA24 (Vanillylmandelic Acid).

VMA, Catecholamines, HVA, and Metanephrines may be done on same collection. All five tests may be done on same collection.

Moderately elevated VMA (vanillylmandelic acid) can be caused by a variety of factors such as essential hypertension, intense anxiety, intense physical exercise, and numerous drug interactions (including some over-the-counter medications and herbal products).

Medications that may interfere with catecholamines and their metabolites include amphetamines and amphetamine-like compounds, appetite suppressants, bromocriptine, buspirone, caffeine, chlorpromazine, clonidine, disulfiram, diuretics (in doses sufficient to deplete sodium), epinephrine, glucagon, guanethidine, histamine, hydrazine derivatives, imipramine, levodopa (L-dopa, Sinemet®), lithium, MAO inhibitors, melatonin, methyldopa (Aldomet®), morphine, nitroglycerin, nose drops, propafenone (Rythmol), radiographic agents, rauwolfia alkaloids (Reserpine), tricyclic antidepressants, and vasodilators. The effects of some drugs on

	catecholamine metabolite results may not be predicta
See:	 Catecholamines, Fractionated, 24 hr Urine Homovanillic Acid, 24 hr Urine Metanephrines Total, 24 hr Urine
See Appendix	See Additional Information: Urine Tests Requiring Preservatives, Refrigeration o Containers
Methodology	Quantitative High Performance Liquid Chromatography
Analytic Time	3 working days upon receipt at reference laboratory

Varicella Zoster IgG Detection

Laboratory	Chemistry
Order Code	VZSC
CPT Code	86787
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3.0 mL whole blood from light green top tube or TWO microtainers.
Reference Range	Reference range and methodology changed effective 12/11/2012. 0.8 AI or less: Negative - No significant level of detectable varicella- zoster IgG antibody. 0.9-1.0 AI: Equivocal - Repeat testing in 10-14 days may be helpful. 1.1 AI or greater: Positive - IgG antibody to varicella-zoster detected, which may indicate a current or past exposure/immunization to varicella-zoster.
Order Form:	A-1a General Lab or Epic Req
Methodology	Multiplex Flow Immunoassay
Analytic Time	3 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Varicella-Zoster Ab, IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	VZMCSF
CPT Code	86787
Collection Medium	<table> <tr> <td align=center></td></tr <tr> <td width="110" valign="top" align="center">CSF container</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 0.5 mL Absolute Minimum: 0.3 mL</pre>
Rejection Criteria:	Heat-inactivated or contaminated specimens; specimens other than CSF
Reference Range	<pre> 0.90 ISR or less: Negative - No significant level of IgM antibody to varicella-zoster virus detected. 0.91-1.09 ISR: Equivocal - Repeat testing in 10-14 days may be helpful. 1.10 ISR or greater: Positive - Significant level of IgM antibody to varicella-zoster virus detected, which may indicate current or recent infection. However, low levels of IgM antibodies may occasionally persist for more than 12 months post-infection.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	1-5 days upon receipt at reference laboratory

Varicella-Zoster Virus PCR, Vitreous

Laboratory	Commercial Mail-out Laboratory
Order Code	VZVPR
CPT Code	87798
Collection Medium	Sterile container
Minimum	0.2-0.3 mL (This amount of sample will perform from 1 up to 4 viral tests).
Reference Range	Negative
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Useful for rapid (qualitative) detection of varicella-zoster virus DNA in clinical specimens for laboratory diagnosis of disease due to this virus. <u>Cautions</u>: A negative result does not exclude the possibility of varicella-zoster virus (VZV) infection. The reference range is typically "negative" for this assay. This assay is only to be used for patients with a clinical history and symptoms consistent with VZV infection, and must be interpreted in the context of the clinical picture. This test is not used to screen asymptomatic patients.
See:	 Cytomegalovirus by PCR, Vitreous, Vitreous Herpes Simplex Virus PCR, Vitreous, Vitreous Toxoplasma gondii PCR, Vitreous, Vitreous
Methodology	Real-Time Polymerase Chain Reaction (PCR)/DNA Probe Hybridization
Analytic Time	24 hours upon receipt at reference laboratory

Vascular Endothelial Growth Factor

Laboratory	Commercial Mail-out Laboratory
Order Code	VEGFACTOR
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL plasma Absolute Minimum: 0.3 mL plasma
Rejection Criteria:	Refrigerated or room temperature specimens. Hemolyzed specimens.
Reference Range	9-86 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Quantitative Chemiluminescent Immunoassay
Analytic Time	1-8 days upon receipt at reference laboratory.

Vasoactive Intestinal Polypeptide

Laboratory	Commercial Mail-out Laboratory
Order Code	VIP
CPT Code	84586
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Preferred Minimum: 1 mL plasma Absolute Minimum: 0.6 mL plasma
Reference Range	<75 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Useful for detection of vasoactive intestinal polypeptide producing tumors in patients with chronic diarrheal diseases. <u>Cautions</u>: This test should not be requested in patients who have recently received radioisotopes, therapeutically or diagnostically, because of potential assay interference. A recommended time period before collection cannot be made because it will depend on the isotope administered, the dose given and the clearance rate in the individual patient. Specimens will be screened for radioactivity prior to analysis. Radioactive samples received in the laboratory will be held and assayed after the radioactivity has sufficiently decayed. This will result in a test delay.
Methodology	Radioimmunoassay (RIA)
Analytic Time	4 working days upon receipt at reference laboratory

Vasopressin

See:	 Arginine Vasopressin (ADH), Plasma

Venlafaxine Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	VENLA
CPT Code	82541
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum Absolute Minimum: 0.4 mL serum
Rejection Criteria:	Specimens that are obtained from gel tubes.
Reference Range	Venlafaxine + O-desmethylvenlafaxine: 195-400 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Venlafaxine is a serotonin and norepinephrine reuptake inhibitor (SNRI) approved for treatment of major depression, anxiety and panic disorders, and social phobias. It is also used for bipolar disorder, bulimia, post-traumatic stress, obsessive behavior, and attention-deficit disorder. Venlafaxine is converted by CYP2D6 to the active metabolite, O-desmethylvenlafaxine. The therapeutic range for venlafaxine includes measurement if O-desmethylvenlafaxine; optimal response is seen when combined concentrations of parent and metabolite are between 195 ng/mL to 400 ng/mL. Venlafaxine is significantly affected by reduced hepatic function, but only slightly by reduced renal function. Average elimination half-lives are 5 hours for venlafaxine and 10 hours for O-desmethylvenlafaxine, which are much shorter than many other antidepressants. For this reason, extended release formulations are available. Time to peak serum concentration is 2 hours for the regular product and 8 hours for the extended release product. Common toxicities are mild, including drowsiness, dizziness, nausea, and headache.
Methodology	Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)
Analytic Time	3 days upon receipt at reference laboratory

Venous Blood Gas, ECMO, Pre-Oxygenator

Laboratory	Critical Care Laboratory
Order Code	BGPRE
CPT Code	82803
Collection Medium	<table> <tr> <td align=center></td></t <tr> <td width="110" valign="top" align="center">Lithium/Sodium Heparin syring </tr> </table>
Minimum	0.5 mL in Lithium/sodium Heparin syringe ONLY. No air bubbles in syringe.
Reference Range	<pre> adults pediatrics pH 7.33-7.43 7.30-7.40 PCO2 37-50 30-40 torr pO2 37-47 50-65 torr Critical Care Critical Values: pH <7.20 and >7.60 pCO2 Adults <20 and >70 Peds <20 and >55 pO2 <20 Special Care Nurseries Critical Values: pH <7.25 and >7.65 pCO2 <30 and >70</pre>
Order Form:	A-1a Critical Care/Special Care Nurseries Laboratory or Epic Lab Order
Comments	If patient temperature is noted on requisition, blood gas will be corrected for temperature, otherwise 37°C will be assumed. Any air drawn in with the sample must be expelled immediately. Samples that contain greater than 25% air to sample volume ratio will not be analyzed. All needles must be removed from the syringe before delivery.
See Appendix	See Additional Information: Critical Care Critical Lab Values Specimens Requiring Immediate Delivery
Methodology	Traditional Electrodes
Analytic Time	10 minutes (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Ventricular Fluid Cells

See:	 Cell Count and Differential, CSF

Very Long Chain Fatty Acids + Phytanic Acids

Laboratory	Commercial Mail-out Laboratory
Order Code	VLCFA
CPT Code	82726
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	EDTA plasma or 1-3 mL whole blood EDTA following an overnight (12-14 hour) fast. Patient must not consume any alcohol for 24 hours before the specimen is drawn.
Reference Range	<pre> C22:0 < or = 96.3 umol/L C24:0 < or = 91.4 umol/L C26:0 < or = 1.30 umol/L C24:0/C22:0 ratio < or = 1.39 C26:0/C22:0 ratio < or = 0.023 Pristanic Acid 0-4 mo: < or = 0.60 umol/L 5-8 mo: < or = 0.84 umol/L 9-12 mo: < or = 0.77 umol/L 13-23 mo: < or = 1.47 umol/L > or = 24 mo: < or = 2.98 umol/L Phytatanic Acid 0-4 mo: < or = 5.28 umol/L 5-8 mo: < or = 5.70 umol/L 9-12 mo: < or = 4.40 umol/L 13-23 mo: < or = 8.62 umol/L > or = 24 mo: < or = 9.88 umol/L Pristanic/Phytanic Acid Ratio 0-4 mo: < or = 0.35 5-8 mo: < or = 0.28 9-12 mo: < or = 0.23 13-23 mo: < or = 0.24 > or = 24 mo: < or = 0.39</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Note: Patient’s age is required on request form for processing. Include information regarding treatment, family history, and tentative diagnosis.
See Appendix	See Additional Information: Fasting Specimen Requirements
Methodology	Capillary gas chromatography/mass spectroscopy of pentafluorobenzyl bromide fatty acid esters.
Analytic Time	2 weeks upon receipt at reference laboratory

VHL Gene Analysis Full Gene Sequence

Laboratory	Commercial Mail-out Laboratory
Order Code	VHLDNA
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	<pre> Preferred Minimum: 3.0 mL whole blood in lavender (EDTA) tube Absolute Minimum: 0.2 mL whole blood in lavender (EDTA) tube</pre>
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the <a href= http://www.mayomedicallabo Informed Consent Form for DNA Testing from the Mayo Medical Laboratories with the specimen and the A-1a Miscellaneous Request. Useful For: •Diagnosis of suspected VHL disease •Screening presymptomatic members of VHL families •Tailoring optimal tumor-surveillance strategies for patients, when used in conjunction with phenotyping When this test is ordered, both VHL full gene analysis (amplification) and VHL gene sequencing will be performed. DNA extraction will always be performed at an additional charge. If VHL gene sequencing does not identify a mutation, then VHL deletion detection will be performed at an additional charge. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Polymerase Chain Reaction (PCR) Amplification/DNA Sequencing and Deletion Detection by Multiplex Ligation-Dependent Probe Amplification (MLPA).
Analytic Time	14 days upon receipt at reference laboratory

VIP

See:	 Vasoactive Intestinal Polypeptide, Plasma

Viral & CMV Culture

Laboratory	Commercial Mail-out Laboratory
Order Code	VCMV
CPT Code	87252 Tissue Culture; 87254 Shell vial. If definitive identification required, add 87253.
Collection Medium	<table> <tr> <td align=center></td><td <td align=center><a href="javascript:larger_tube('65.jpg')"><img src="/pa <tr> <td width="110" valign="top" align="center">Swab Kit Straight HSV--VZV/Vi <td width="110" valign="top" align="center">Chlamydia/Viral Transport Kit </tr> </table>
Minimum	Nasopharyngeal washing/aspirate, or tracheal aspirate in sterile, leak-proof container. Eye swab, nasopharyngeal swab, throat swab, or tissue in viral transport media. Place each specimen in a separate, individually sealed bag.
Rejection Criteria:	Stool, rectal swab and CSF samples. Dry swabs, wood swabs, and calcium alginate swabs.
Reference Range	Negative - No virus isolated.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The following tests are standard of care for diagnosing viral infection in CSF specimens: Cytomegalovirus by PCR Enterovirus Detection by RT-PCR Herpes Simplex Virus by PCR Varicella-Zoster Virus by PCR. The viruses that can be isolated include: enteroviruses, herpes simplex virus, influenza A & B, parainfluenza types 1, 2, 3, adenovirus, varicella-zoster virus, cytomegalovirus, and RSV. However, virus specific tests are recommended for varicella-zoster virus, order Varicella-Zoster Virus DFA with Reflex to Varicella-Zoster Virus Culture; and RSV order Respiratory Syncytial Virus DFA Stain. Antigen detection is available for respiratory viruses, order Respiratory Viruses DFA Stain; and may be requested in conjunction with culture. An ELISA test (Rotavirus & Adenovirus 40-41 Antigens) is available for enteric adenoviruses 40 & 41 and rotavirus in stool specimens. For measles virus culture, order Measles (Rubeola) Virus Culture. For mumps virus culture, order Mumps Virus Culture.
Methodology	Cell Culture/Immunofluorescence
Analytic Time	Viral Cutlure: 3-16 days upon receipt at reference laboratory Cytomegalovirus Rapid Culture: 1-5 days upon receipt at reference laboratory

Viral & CMV Culture

Laboratory	Commercial Mail-out Laboratory
Order Code	VCMVU
CPT Code	87252 Tissue Culture; 87254 Shell vial. If definitive identification required, add 87253.
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Urine</td> </tr> </table>
Minimum	2 mL urine in sterile container. Other accepted samples are eye swab, lesion, tissue (brain, colon, kidney, liver, etc.).
Rejection Criteria:	Stool, rectal swab and CSF samples. Dry swabs, wood swabs, and calcium alginate swabs.
Reference Range	Negative - No virus isolated.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	The following tests are standard of care for diagnosing viral infection in CSF specimens: Cytomegalovirus by PCR Enterovirus Detection by RT-PCR Herpes Simplex Virus by PCR Varicella-Zoster Virus by PCR. The viruses that can be isolated include: enteroviruses, herpes simplex virus, influenza A & B, parainfluenza types 1, 2, 3, adenovirus, varicella-zoster virus, cytomegalovirus, and RSV. However, virus specific tests are recommended for varicella-zoster virus, order Varicella-Zoster Virus DFA with Reflex to Varicella-Zoster Virus Culture; and RSV order Respiratory Syncytial Virus DFA Stain. Antigen detection is available for respiratory viruses, order Respiratory Viruses DFA Stain; and may be requested in conjunction with culture. An ELISA test (Rotavirus & Adenovirus 40-41 Antigens) is available for enteric adenoviruses 40 & 41 and rotavirus in stool specimens. For measles virus culture, order Measles (Rubeola) Virus Culture. For mumps virus culture, order Mumps Virus Culture.
Methodology	Cell Culture/Immunofluorescence
Analytic Time	Viral Culture: 3-16 days upon receipt at reference laboratory Cytomegalovirus Rapid Culture: 1-5 days upon receipt at reference laboratory

Viral Culture

Laboratory	Commercial Mail-out Laboratory
Order Code	VIRAL
CPT Code	87252 Tissue culture. If definitive identification required, add 87253.
Collection Medium	<table> <tr> <td align=center></td><td <td align=center><a href="javascript:larger_tube('994.jpg')"><img src="/p <tr> <td width="110" valign="top" align="center">Chlamydia/Viral Transport Kit <td width="110" valign="top" align="center">Swab Kit Straight HSV--VZV/Vi </tr> </table>
Rejection Criteria:	Calcium alginate, dry, or wood swabs.
Reference Range	Negative - No virus isolated.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	An ELISA test (Rotavirus & Adenovirus 40-41 Antigens) is available for enteric adenoviruses 40 & 41 and rotavirus in stool specimens. For measles virus culture, order Measles (Rubeola) Virus Culture. For mumps virus culture, order Mumps Virus Culture.
Methodology	Cell Culture
Analytic Time	Viral Culture: 3-14 days upon receipt at reference laboratory Cytomegalovirus Rapid Culture: 1-5 days upon receipt at reference laboratory

Viscosity

Laboratory	Commercial Mail-out Laboratory
Order Code	VISC
CPT Code	85810
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm <tr> <td width="110" valign="top" align="center">Red top tube</td> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Rejection Criteria:	Clotted or hemolyzed specimens.
Reference Range	1.10-1.80 cP
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	To convert dynamic viscosity (cp) to relative viscosity, divide by 0.68.
Methodology	Quantitative Viscometry
Analytic Time	1-4 days upon receipt at reference laboratory.

Vitamin A

Laboratory	Commercial Mail-out Laboratory
Order Code	VTA
CPT Code	84590
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Adult preferred minimum: 1 mL serum Adult absolute minimum: 0.3 mL serum Pediatric Minimum: 0.2 mL serum</pre>
Reference Range	<pre> 0-1 month 0.18 - 0.50 mg/L 2 months-12 years 0.20 - 0.50 mg/L 13-17 years 0.26 - 0.70 mg/L 18+ years 0.30 - 1.2 mg/L Retinyl Palmitate 0 - 0.10 mg/L</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Draw sample following an overnight (12 hour fast). Patient should not consume alcohol for one day prior to blood draw. Serum retinol is typically maintained until hepatic stores are almost depleted. Values greater than 0.30 mg/L represent adequate liver stores, whereas values less than 0.10 mg/L indicate deficiency. Samples that come in contact with plastic tubing or have been exposed to excessive light may show low results. Vitamin A toxicity occurs when retinol concentration exceeds the capacity of retinol binding protein (RBP). Individuals with compromised renal function can retain RBP and may, therefore, have moderate retinol elevations. Drugs which interfere with vitamin A analysis include probucol (Lorelco). This assay does not measure other vitamin A metabolites such as retinaldehyde and retinoic acid.
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Quantitative High Performance Liquid Chromatography
Analytic Time	1-4 days upon receipt at reference laboratory

Vitamin B12 Deficiency Panel

Laboratory	Commercial Mail-out Laboratory
Order Code	VB12DEF
CPT Code	82607-Vitamin B12 assay 82941-Gastrin (if appropriate) 83921-MMA (if appropriate) 86340-IFBA (if appropriate)
Collection Medium	<table> \<tr> \<td align=center></td><td rowspan=2 width=20 align=center>and</td> \<td align=center><img src="/path_handbook/gifs/tubes/red.png" class="altm \<tr> \<td width="110" valign="top" align="center">Red top tube</td> \<td width="110" valign="top" align="center">Red top tube</td> \</tr> \</table>
Minimum	3 aliquots of serum are required at reference lab. One with 1.0 mL, one with 1.5 mL, one with 2.0 mL; these samples are processed in Specimen Control.
Reference Range	180-914 ng/L
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. <u>Useful for</u> Diagnosis of pernicious anemia Diagnosis of vitamin B12 deficiency-associated neuropathy <u>Testing Algorithm</u> Delineates situation(s) when tests are added to the initial order. This includes reflex and additional tests.If vitamin B12 is <150 ng/L, then intrinsic factor blocking antibody (IFBA) is performed. If IFBA is negative or indeterminate, then gastrin is performed. If vitamin B12 is 150 to 400 ng/L, then methylmalonic acid (MMA) is performed. If methylmalonic acid is >0.40 umol/L, then IFBA is performed.
Methodology	<pre> Vitamin B12 assay - Immunoenzymatic Assay Gastrin - Automated Chemiluminescent Immunometric Assay MMA - Liquid Chromatography-Tandem Mass Spectometry (LC-MS/MS) Stable Isotope Dilution Analysis IFBA - Competitive-Binding Immunoenzymatic Assay</pre>
Analytic Time	1 day upon receipt at reference laboratory
Testing Schedule	Test performed Monday-Friday only at reference laboratory.

Vitamin B12, Binding Capacity

Laboratory	Commercial Mail-out Laboratory
Order Code	B12BC
CPT Code	82608
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Recommended Minimum: 1 mL serum
Rejection Criteria:	Plasma
Reference Range	800-2600 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patient should fast for 12-15 hours prior to collection. Vitamin B12 supplements should not be administered within 72 hours of drawing blood for this test.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative Radioimmunoassay
Analytic Time	1-5 days upon receipt at reference laboratory

Vitamin B1

Laboratory	Commercial Mail-out Laboratory
Order Code	VTB1B
CPT Code	84425
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 4 mL (Na Hepar </tr> </table>
Alternate Collection Media:	Lavender top tube 3 mL (EDTA), Light Green top tube (Lithium Heparin), Pi
Minimum	<pre> Adult preferred minimum: 3 mL whole blood from green top (NA Heparin) tube. Absolute minimum: 1 mL whole blood from green top (NA Heparin) tube.</pre>
Rejection Criteria:	Any specimen other than whole blood. Glass tubes. Clotted or non-frozen specimens.
Reference Range	70-180 nmol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	High Performance Liquid Chromatography
Analytic Time	6 days upon receipt at reference laboratory

Vitamin B12, Reflexive

Laboratory	Chemistry
Order Code	B12R
CPT Code	82607
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in red top tube or THREE microtainers.
Reference Range	<pre> Normal: 243-894 pg/mL Indeterminate: 175-242 pg/mL Deficient: < 174 pg/mL</pre>
Order Form:	A-1a General Lab or Epic Req
Comments	<pre> If plasma is sent and Intrinsic Factor Blocking Antibodies (IFBA) is reflexively ordered, the laboratory will call for an additional red top tube if IFBA is required. Intrinsic factor antibody automatically analyzed if B12 result is <243 pg/ml. Patient is charged for IFBA result. New analytical immunoassay with different reference ranges instituted 4/24/00 at 10:00.</pre>
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Electrochemiluminescence immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Vitamin B12

Laboratory	Chemistry
Order Code	B12
CPT Code	82607
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Alternate Collection Media:	Call laboratory for additional acceptable specimen collection containers.
Minimum	3 mL whole blood in light green top tube or TWO microtainers.
Reference Range	<pre> Normal: 243 - 894 pg/mL Indeterminant: 175-242 pg/mL Deficient: is less than 175 pg/mL</pre>
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Electrochemiluminescence Immunoassay
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Vitamin B12/Folic Acid Deficiency

See:	 Folate, Serum Homocysteine, Plasma Methylmalonic Acid, Blood Methylmalonic Acid, Urine (24 hr or random) Vitamin B12, Plasma Vitamin B12, Reflexive, Serum

Vitamin B6

Laboratory	Commercial Mail-out Laboratory
Order Code	VTB6
CPT Code	84207
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Green top tube (Lithium </tr> </table>
Minimum	Preferred Minimum: 1 mL lithium plasma in an amber transport tube (transport tubes are located in Specimen Control)
Rejection Criteria:	Any specimens other than heparinized plasma or serum. Non-frozen specimens. Serum separator tubes. Specimens collected in EDTA yield a higher pyridoxal 5’-phosphate concentration; therefore, EDTA is not acceptable. Hemolyzed specimens.
Reference Range	20-125 nmol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	High Performance Liquid Chromatography (HPLC)
Analytic Time	4 working days upon receipt at reference laboratory

Vitamin sub2</sub>

Laboratory	Commercial Mail-out Laboratory
Order Code	VTB2
CPT Code	84252
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Green top tube (Lithium </tr> </table>
Minimum	Preferred Minimum: 1 mL plasma
Rejection Criteria:	Specimens collected in EDTA provide a lower value of riboflavin concentration, therefore EDTA is not acceptable. Serum, whole blood, or body fluids. Non-frozen, hemolyzed, or lipemic specimens.
Reference Range	5-50 nmol/L
Order Form:	A-1a Miscellaneous Request or Epic Req
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative High Performance Liquid Chromatography
Analytic Time	1-6 days upon receipt at reference laboratory

Vitamin C

Laboratory	Commercial Mail-out Laboratory
Order Code	VTC
CPT Code	82180
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Green top tube (Lithium </tr> </table>
Minimum	2 mL oxalic acid-preserved plasma (oxalic acid plasma preservation done in Specimen Control during processing).
Rejection Criteria:	Serum and hemolyzed plasma. Nonfrozen samples, and samples that are not preserved with oxalic acid. Body fluids other than plasma.
Reference Range	0.4-2.0 mg/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	<u>Note</u>: Vitamin C concentrations between 0.2 and 0.4 mg/dL indicate risk of deficiency. Concentrations less than 0.2 mg/dL are consistent with deficiency.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Spectrophotometry
Analytic Time	7 working days upon receipt at reference laboratory

Vitamin D (1,25 Dihydroxy)

Laboratory	Commercial Mail-out Laboratory
Order Code	VD125S
CPT Code	82652
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2.0 mL serum Absolute Minimum: 1.0 mL serum
Rejection Criteria:	SST or gels tubes are not appropriate (per Medical Director, Core Pathology).
Reference Range	15 - 75 pg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Vitamin D, 25-Hydroxy, Plasma
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Radioimmunoassay
Analytic Time	2 working days upon receipt at reference laboratory

Vitamin D, 25-Hydroxy

Laboratory	Chemistry
Order Code	VITD25
CPT Code	82306
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Plasma Separator Tube</td> </tr> </table>
Minimum	3 mL whole blood from light green top tube or TWO microtainers for pediatric patients.
Reference Range	<u>Reference range in Epic</u>: 20-80 ng/mL Deficiency: Less than 20 ng/mL Borderline: 20-29 ng/mL Optimum level: 30-80 ng/mL Possible toxicity: > 150 ng/mL
Order Form:	A-1a General Lab or Epic Req
Comments	<u>References</u> Endocrine Society Clinical Guidelines. J Clin Endocrinol Metab 96: 1911-1930, 2011. Holick MF, NEJM 357: 266-281, 2007. Krasowski MD, Am J Clin Pathol 136: 507-514, 2011. Vieth R. Am J Clin Nutr 69:842-856, 1999. Wharton B, Bishop N. Lancet 362:1389-1400, 2003.
See:	 Vitamin D (1,25 Dihydroxy), Serum
Methodology	Chemiluminescent microparticle immunoassay (CMIA)
Analytic Time	2 hours (upon receipt in laboratory)

Vitamin E

Laboratory	Commercial Mail-out Laboratory
Order Code	SVTE
CPT Code	84446
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1.0 mL serum Absolute Minimum: 0.3 mL serum
Reference Range	<pre> Alpha-Tocopherol (Vitamin E) Age Reference Interval 0 - 1 month 1.0 - 3.5 mg/L 2 - 5 months 2.0 - 6.0 mg/L 6 months - 1 year 3.5 - 8.0 mg/L 2 - 12 years 5.5 - 9.0 mg/L 13 + years 5.5 - 18.0 mg/L Gamma-Tocopherol (Vitamin E) 0 - 6.0 mg/L</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Sample requires an overnight (12 hr) fast. Patient should not consume alcohol for one day prior to blood draw. Avoid hemolysis. Includes both Alpha-Tocopherol and Gamma-Tocopherol.
See Appendix	See Additional Information: Fasting Specimen Requirements Specimens Requiring Immediate Delivery
Methodology	Quantitative High Performance Liquid Chromatography
Analytic Time	1-4 days upon receipt at reference laboratory

Vitamin K

Laboratory	Commercial Mail-out Laboratory
Order Code	VTK
CPT Code	84597
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 2.0 mL serum Absolute Minimum: 1.2 mL serum
Rejection Criteria:	Any specimen other than serum or EDTA plasma. Hemolyzed specimens.
Reference Range	0.10 - 2.20 ng/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Overnight 12 hour fast preferred. Do not consume alcohol for one day prior to blood draw. Avoid hemolysis. Separate samples must be submitted when multiple tests are ordered.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Quantitative High Performance Liquid Chromatography
Analytic Time	2-6 days upon receipt at reference laboratory

Voltage-Gated Calcium Channel Antibodies

Laboratory	Commercial Mail-out Laboratory
Order Code	VGCCA
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	2 mL in red top tube
Rejection Criteria:	Plasma. Hemolyzed or grossly lipemic specimens.
Reference Range	<pre>Effective November 14, 2011 Negative: 0.0 to 24.5 pmol/L Indeterminate: 24.6 to 45.6 pmol/L Positive: 45.7 pmol/L or greater</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Voltage-gated calcium channel antibodies are found in the Lambert-Eaton myasthenic syndrome.
See:	 NMDA Receptor Antibodies, Serum Paraneoplastic Autoantibodies, Serum, Serum Voltage-Gated Potassium Channel Antibodies, Serum
Methodology	Quantitative Radioimmunoassay
Analytic Time	1-8 days upon receipt at reference laboratory.

Voltage-Gated Potassium Channel Antibodies

Laboratory	Commercial Mail-out Laboratory
Order Code	VGKCA
CPT Code	83519
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	4 mL in red top tube
Rejection Criteria:	Plasma. Grossly lipemic or icteric specimens.
Reference Range	<pre> Effective April 18, 2011 Negative: 31 pmol/L or less Indeterminate: 32-87 pmol/L Positive: 88 pmol/L or greater</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 NMDA Receptor Antibodies, Serum Paraneoplastic Autoantibodies, Serum, Serum Voltage-Gated Potassium Channel Antibodies, Serum
Methodology	Quantitative Radioimmunoassay
Analytic Time	1-8 days upon receipt at reference laboratory.

Von Hippel-Lindeau Gene, Deletion Detection

Laboratory	Commercial Mail-out Laboratory
Order Code	VHLDEL
CPT Code	83900, 83901 (x14), 83909, 83914
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	3 mL whole blood in a lavender (EDTA) tubes
Reference Range	An interpretive report will be provided.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Please print, complete and submit the Informed Consent Form for DNA Testing from the Mayo Medical Laboratories with the specimen and the A-1a Miscellaneous Request. This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test.
Methodology	Polymerase Chain Reaction (PCR) Amplification/DNA Sequencing and Deletion Detection by Multiplex-Ligation-Dependent Probe Amplification (MLPA).
Analytic Time	2 weeks upon receipt at reference laboratory

Von Willebrand Antigen Assay

Laboratory	Hemostasis/Thrombosis
Order Code	VWAG
CPT Code	85246
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Full draw; 2.7 mL light blue top
Reference Range	41-152%
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test needs a separate tube! It CANNOT be done with any other coagulation tests.
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw
Methodology	Latex agglutination, absorption spectrophotometry
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Von Willebrand Factor Assay (FVIIIR:RCF)

Laboratory	Hemostasis/Thrombosis
Order Code	VWFA
CPT Code	85245
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	<pre> Full draw; 2.7 mL light blue top (mix well). Measured as ristocetin cofactor activity in agglutination of fixed washed platelets.</pre>
Reference Range	40-164%
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This test needs a separate tube! It CANNOT be done with any other coagulation tests.
See Appendix	See Additional Information: Phlebotomy Tubes and Order of Draw
Methodology	A coagulation instrument measures the change in absorbance.
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Von Willebrand Multimeric

Laboratory	Commercial Mail-out Laboratory
Order Code	VWMUL
CPT Code	85247
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Light Blue top tube 2.7 mL (N </tr> </table>
Minimum	Preferred Minimum: 1 mL platelet-poor plasma in light blue top tube. Absolute Minimum: 0.5 mL platelet-poor plasma in light blue top tube.
Rejection Criteria:	Serum. Specimens collected in wrong anticoagulant. Clotted, hemolyzed, or non-frozen specimens.
Reference Range	By report
Order Form:	A-1a Miscellaneous Request or Epic Req
See:	 Von Willebrand Antigen Assay, Plasma Von Willebrand Factor Assay (FVIIIR:RCF), Plasma
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Qualitative Electrophoresis
Analytic Time	4-11 days upon receipt at reference laboratory

Voriconazole Antifungal Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	VORI
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Draw blood in a plain red-top tube(s). Spin down and send 2 mL of serum frozen in plastic vial.
Reference Range	<pre> 1.0-5.5 mcg/mL Trough level (i.e., immediately before the next dose) monitoring is recommended.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS)
Analytic Time	2 days upon receipt at reference laboratory

VZV

See:	 Varicella Zoster IgG Detection, Plasma

VZV Qualitative PCR

Laboratory	Microbiology/Molecular Infectious Disease
Order Code	VZVPCR
CPT Code	87798
Collection Medium	<table> <tr> <td align=center></td><td <td align=center><a href="javascript:larger_tube('994.jpg')"><img src="/p <tr> <td width="110" valign="top" align="center">Chlamydia/Viral Transport Kit <td width="110" valign="top" align="center">Swab Kit Straight HSV--VZV/Vi </tr> </table>
Minimum	Collect 0.5 mL CSF in CSF container, OR collect vesicle fluid/swab (first three days of rash) in viral transport media.
Rejection Criteria:	Sputum, tracheal aspirate or skin scrapings.
Reference Range	Negative
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Methodology	Real Time PCR
Analytic Time	24 hours (upon receipt in laboratory)
Testing Schedule	0800-1630 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

W

Walker-Warburg Syndrome

See:	 POMT1 Full Gene Sequence with Interpretation, Whole Blood POMT2 Full Gene Sequence with Interpretation, Whole Blood

Warfarin Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	WARF
CPT Code	82486
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 3 mL serum Absolute Minimum: 1.1 mL serum</pre>
Rejection Criteria:	Gel separator tubes
Reference Range	<pre> Therapeutic concentration: 2.0-5.0 mcg/mL Toxic concentration: > or =10.0 mcg/mL</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Patients transfused with fresh-frozen plasma may have a disparity between their warfarin level (elevated) and a relatively normal PT.
Methodology	High-Pressure Liquid Chromatography (HPLC)
Analytic Time	1 week upon receipt at reference laboratory

Warfarin Sensitivity

Laboratory	Commercial Mail-out Laboratory
Order Code	WARFSENS
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Alternate Collection Media:	Pink top tube
Minimum	Preferred Minimum: 3 mL whole blood in lavender top (EDTA) tube Absolute Minimum: 1 mL whole blood in lavender top (EDTA) tube
Reference Range	By report.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Polymerase Chain Reaction/DNA Hybridization/Electrochemical Detection
Analytic Time	One week upon receipt at reference laboratory.
Testing Schedule	Testing performed Mondays and Thursdays at reference laboratory.

WBC Count

Laboratory	Hematology
Order Code	WBC
CPT Code	85048
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA) </tr> </table>
Minimum	Full draw; 3.0 mL lavender top; (or fingerstick)
Reference Range	<pre> 18 years+ 3.7-10.5 k/mm3 6 years - <18 years 4.5-13.0 k/mm3 4 years - <6 years 5.0-15.5 k/mm3 2 years - <4 years 5.5-15.5 k/mm3 1 year - <2 years 6.0-17.0 k/mm3 3 months - <1 year* 6.0-17.5 k/mm3 31 days - <3 months* 5.0-19.5 k/mm3 0 day - <31 days* 9.0-30.0 k/mm3 *values refer to full term infants. Critical value: <u><</u>1.0 k/mm3 and <u>></u>50.0 k/mm3</pre>
Order Form:	A-1a General Lab or Epic Req
See Appendix	See Additional Information: Hematology Critical Lab Values Hematology Pediatric Reference Ranges
Methodology	Flow Cytometry
Analytic Time	1 hour (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

Wellbutrin

See:	 Bupropion Drug Level, Serum

West Nile Virus, IgM

Laboratory	Commercial Mail-out Laboratory
Order Code	ARBWNV
CPT Code	86788
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum in a red top tube Absolute Minimum: 0.15 mL serum in a red top tube
Rejection Criteria:	Plasma. Heat-inactivated, severely lipemic, contaminated, or hemolyzed specimens.
Reference Range	0.89 IV or less: Negative - No significant level of West Nile virus IgM antibody detected. 0.90-1.10 IV: Equivocal - Questionable presence of West Nile virus IgM antibody detected. Repeat testing in 10-14 days may be helpful. 1.11 IV or greater: Positive - Presence of IgM antibody to West Nile virus detected, suggestive of current or recent infection.
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Semi-Quantitative Enzyme-Linked Immunosorbent Assay
Analytic Time	within 10 days upon receipt at reference laboratory

Wet Prep

See:	 Wet Prep for Trichomonas, Candida and Gardnerella, Vaginal Swab

Wet Prep for Trichomonas, Candida and Gardnerella

Laboratory	Microbiology
Order Code	C TRIC
Collection Medium	<table> <tr> <td align=center></td></ <tr> <td width="110" valign="top" align="center">Affirm Ambient Temperature Tr </tr> </table>
Minimum	Specimens must be collected using the VPIII Collection and Transport Kit (Hospital Stores No. 74472).
Order Form:	A-1a Clinical Microbiology Laboratory or Epic Req
Comments	This test is used as a screen for Trichomonas vaginalis, Candida species and Gardnerella vaginalis in vaginal secretions. Test is run daily. Refer to the VPII Collection and Transport product insert for detailed sample collection instructions.
Methodology	Nucleic Acid Hybridization
Analytic Time	1.5 hours (upon receipt in laboratory)
Testing Schedule	24 hrs/day, 7 days a week, including holidays.

WFS1 (Deafness Genetic Test)

Laboratory	Commercial Mail-out Laboratory
Order Code	WFS1
CPT Code	83891, 83894, 83898 (x8), 83903 (x6), 83904 (x8)
Collection Medium	<table> <tr> <td align=center></td><td rowspan=2 width=20 align=center>and</td> <td align=center><img src="/path_handbook/gifs/tubes/pink.png" class="alt <tr> <td width="110" valign="top" align="center">Pink top tube</td> <td width="110" valign="top" align="center">Pink top tube</td> </tr> </table>
Minimum	<pre> Preferred Minimum: 8 mL whole blood Absolute Minimum: 4 mL whole blood</pre>
Reference Range	None detected
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	This mailout test requires pathologist approval for orders during inpatient encounters. Mailouts staff will not process order without approval. The pathologist covering mailouts approval can be reached at pager #5379. If approval is given, the name of the pathologist can be selected in the drop-down menu to the right of the approval warning in Epic when ordering the test. Please print, complete and submit the Hearing Loss Testing Requisition from the Molecular Otolaryngology & Renal Research Laboratory, to Specimen Control/Mailouts with the specimen and the Epic Requisition.
Methodology	Screening for WFS1 is performed by DHPLC and sequencing. Oligonucleotide primers have been designed to amplify each coding exon (2-8). Amplified samples are resolved by DHPLC; abnormal elution profiles are sequenced to identify the specific mutation. Because exon 8 of WFS1 (aa 289-891) contains many non-disease causing polymorphisms, it is sequenced directly using overlapping primer sets.
Analytic Time	3 months

Whipple's Disease Associated Bacteria DNA

Laboratory	Commercial Mail-out Laboratory
Order Code	WDBPCR
CPT Code	87798
Collection Medium	Sterile container
Minimum	Submit only 1 of the following specimens: <u>Spinal Fluid, Synovial Fluid, or Vitreous Humor Fluid</u> 0.5 mL of spinal fluid, synovial fluid, or vitreous humor fluid. (Green-top [heparin] tube is not acceptable.) Send specimen refrigerated in a screw-capped, <u>sterile vial</u>. Maintain sterility and forward promptly. Specimens grossly contaminated with blood may inhibit the PCR and produce false-negative results. The high sensitivity of amplification by PCR requires the specimen to be processed in an environment in which contamination of the specimen by Tropheryma whipplei DNA is not likely. <u>Biopsy</u> Send fresh gastrointestinal biopsy specimen (5 mm) frozen in a screw-capped, sterile, plastic container. Maintain sterility and forward promptly. Frozen specimen preferred, but refrigerated specimen is acceptable if received within 48 hours of collection. Specimens grossly contaminated with blood may inhibit the PCR and produce false-negative results. The high sensitivity of amplification by PCR requires the specimen to be processed in an environment in which contamination of the specimen by Tropheryma whipplei DNA is not likely. <u>Note</u>: A tissue or biopsy specimen of brain, gastrointestinal tissue, heart valve, lymph node, small intestine, synovial tissue, or other visceral tissue fixed in a paraffin block is also acceptable.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Useful as an aid in diagnosis of Whipple disease, especially for identifying inconclusive or suspicious cases.
Methodology	Rapid Polymerase Chain Reaction (PCR)
Analytic Time	Test performed on Mondays, Wednesdays and Fridays at reference laboratory.

Whipple's Disease Blood PCR

Laboratory	Commercial Mail-out Laboratory
Order Code	WDPCR
CPT Code	87798
Collection Medium	<table><tr><td align=center></td></tr><tr><td width="110" valign="top" align="center">Lavender top tube 3 mL (EDTA)</tr></table>
Alternate Collection Media:	Pink top tube
Minimum	<pre>Draw blood in a lavender-top (EDTA) tube(s), and send 1.0 mL of EDTA whole blood.</pre>
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Rapid Polymerase Chain Reaction (PCR)
Testing Schedule	<pre>Test performed on Mondays, Wednesdays and Fridays at reference laboratory.</pre>

White Blood Cell

See:	 Gram Stain, Fluids and Exudates WBC Count, Blood

White Blood Cell Cystine

Laboratory	Commercial Mail-out Laboratory
Order Code	WBCCYS
CPT Code	82131
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Green top tube 10 mL (Na Hepa </tr> </table>
Minimum	10 mL whole blood from green top (Na Heparin) tube.
Reference Range	When blood is drawn five-six hours post medication, a cystine value < 1.0 nmole / 1/2 cystine / mg protein is optimal.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Testing must be scheduled with Mailouts one week in advance of testing.
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Analytic Time	2 weeks upon receipt at reference laboratory

White Blood Cell, Cystine

See:	 White Blood Cell Cystine, Whole Blood

White Blood Count, Fecal

Comments	<pre> The Microbiology laboratory does not perform microscopic analysis for fecal leukocytes without laboratory consultation. The presence of fecal leukocytes has only a 29% sensitivity and a 20% positive predictive value (PPV) for Shigella, Salmonella,and Campylobacter spp. (J. Clin Microbiol. 31: 2233, 1993). The sensitivity and PPV of fecal leukocytes in predicting the results of C. difficile toxin assay are only 28% and 27%, respectively (Diagn. Microbiol. Infect. Dis. 16: 313, 1993). For approval, contact the Clinical Pathology resident at 131-4903 Monday through Friday 0800-1700 and 131-3404 after 1700 and on weekends. If approved, specimens are analyzed daily 0800-2300.</pre>

Whole Mount Platelets

Laboratory	Electron Microscopy Lab
CPT Code	88348
Minimum	2 mL of platelet rich plasma is delivered to Electron Microscopy Laboratory before 2:00 p.m.
Order Form:	H-1 Surgical Pathology or Epic Req
Analytic Time	3 days
Testing Schedule	0800-1700 Monday through Friday.

Y

Yeast Culture

See:
Fungal Culture

Yersinia Culture

See:
Bacterial Culture

Yo

See:
Paraneoplastic Autoantibody, CSF

Z

ZAP-70 for Chronic Lymphocytic (CLL) Prognosis

Laboratory	Flow Cytometry Service
Order Code	SZAP
CPT Code	<pre> Technical: 88184 x1 and 88185 x4 Professional: 88187</pre>
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top tube (ACD solution </tr> </table>
Minimum	10 mL peripheral blood in ACD yellow top tube
Reference Range	<pre> Interpretive Report by Pathologist Antibodies routinely included are: CD3, CD19, CD45, CD56 and ZAP-70.</pre>
Order Form:	A-1a Immunopathology or Epic Req
Comments	The ZAP-70 antigen is labile. Immediate delivery to Specimen Control.
See:	 Chronic Lymphocytic Leukemia, Various
See Appendix	See Additional Information: Specimens Requiring Immediate Delivery
Methodology	Flow Cytometry
Analytic Time	2 days
Testing Schedule	0800-1430 Monday through Friday. For additional services, contact Clinical Pathology Resident on-call at pager #3404.

Zarontin

See:	 Ethosuximide Drug Level, Serum

Zinc

Laboratory	Commercial Mail-out Laboratory
Order Code	ZNS
CPT Code	84630
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Royal Blue K2 EDTA tube</td> </tr> </table>
Minimum	<pre> Preferred Adult Minimum: 2.0 mL plasma from royal blue K2 EDTA tube Absolute Pediatric Minimum 0.5 mL plasma from royal blue K2 EDTA tube</pre>
Rejection Criteria:	Separator tubes and specimens that are not separated from the red cells or clot. Hemolyzed specimens.
Reference Range	60-120 mcg/dL
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Royal Blue K2 EDTA tubes (trace metal tubes) are available from Specimen Control, 6240 RCP.
Methodology	Inductively Coupled Plasma/Mass Spectrometry
Analytic Time	3 days upon receipt at reference laboratory

Zolpidem Screen

Laboratory	Commercial Mail-out Laboratory
Order Code	ZOLPIDEM
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Yellow top conical tube (no a </tr> </table>
Minimum	<pre> Preferred Minimum: 1 mL random urine Absolute Minimum: 0.5 mL random urine</pre>
Rejection Criteria:	Separator tubes.
Reference Range	By report.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	NOTE: If screen is positive, then confirmation will be added at no additional charge.
Methodology	Quantitative High Performance Liquid Chromatography/Tandem Mass Spectrometry
Analytic Time	3-10 days upon receipt at reference laboratory.

Zolpidem

Laboratory	Commercial Mail-out Laboratory
Order Code	ZOLPID
CPT Code	82491
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum: 1 mL serum
Rejection Criteria:	Separator tubes.
Reference Range	By report.
Order Form:	A-1a Miscellaneous Request or Epic Req
Comments	Confirmation and quantitation will result in additional charge to patient.
Methodology	Quantitative High Performance Liquid Chromatography-Tandem Mass Spectrometry
Analytic Time	3-10 days upon receipt at reference laboratory

Zonisamide (Zonegran) Drug Level

Laboratory	Commercial Mail-out Laboratory
Order Code	ZONI
CPT Code	83520
Collection Medium	<table> <tr> <td align=center></td></tr> <tr> <td width="110" valign="top" align="center">Red top tube</td> </tr> </table>
Minimum	Preferred Minimum 2 mL serum Absolute Minimum: 0.5 mL serum
Rejection Criteria:	Citrated plasma. Tubes that contain liquid anticoagulant.
Reference Range	Therapeutic Range: Not well established. Toxic Level: Greater than 80 μg/mL
Order Form:	A-1a Miscellaneous Request or Epic Req
Methodology	Immunoassay
Analytic Time	4 days upon receipt at reference laboratory

Zyban

See:	 Bupropion Drug Level, Serum

Zyloprim

See:	 Allopurinol and Metabolite Drug Level, Serum or Plasma

Zyprexa

See:
Olanzapine, Serum