Adult Opioid Reference Guide

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Opioid Analgesics

These are general guidelines. Patient care requires individualization based on patient needs and responses. Lower doses should be used initially, then titrated up to achieve pain relief, especially if the patient has not been taking opioids for the past week (opioid naïve). Patients who have been taking scheduled opioids for at least the previous 5 days may be considered "opioid tolerant". These patients may require higher doses for analgesia.

Drug #	Route	Starting Dose (Adults > 50 Kg)	Onset	Peak	Duration	Metabolism	Half Life	Comments
Buprenorphine Example: Butrans®	Trans-dermal	5 mcg/hr q 7 DAYS	17 hr	60 hr	7 DAYS	Liver	26 hr	• Maximum dose = 20 mcg/hr patch • Extensively metabolized by CYP3A4 enzymes – watch for drug interactions • Transdermal patches are not available at UIHC
Codeine	PO	30 - 60 mg q 4 hr	30 min	1½ hr	6 hr	Liver	2 - 4 hr	• Oral not recommended first-line therapy. Some patients cannot metabolize codeine to active morphine.
Fentanyl Example: Duragesic®	IM IV SQ Trans-dermal	5 mcg/Kg q 1 - 2 hr 0.25 - 1 mcg/Kg as needed 25 mcg/hr	7 - 8 min Immediate 12 - 24 hr	20 - 50 min 1 - 5 min 24 hr	1 - 2 hr 30 - 60 min 48 - 72 hr	Liver	1 - 6 hr*	• Give IV slowly over several minutes to prevent chest wall rigidity • Refer to the formulary for administration and monitoring. • May be used in patients with renal impairment as it has no active metabolites. • Accumulates in adipose tissue with continuous infusion. • Transdermal should NOT be used to treat acute pain. • Transdermal patch should be used only in opioid tolerant patients. 25 mcg/hr patch = 60 mg oral morphine/day • Effects of patch last for 18 - 24 hours after the patch is removed.
Hydrocodone Examples: Vicodin® Lortab®	PO	5 - 10 mg hydrocodone q 4 - 6 hr	60 min	2 hr	4 - 6 hr	Liver	4 hr	Available at UIHC as: • Tablet with 5 mg hydrocodone and 325 mg acetaminophen.** • Elixir with 2.5 mg hydrocodone and 167 mg acetaminophen per 5 ml.** • Other strengths are available outside UIHC
Hydromorphone (Dilaudid®) Hydromorphone ER (Exalgo)®	PO IM/SQ Slow IV PO-SR	2 - 4 mg q 4 - 6 hr 2 mg q 4 - 6 hr **0.2 - 0.6 mg** q 2 - 3 hr 8 mg q 24 hr	20 min 15 - 20 min 15 - 20 min 6 – 8 hr	60 min 60 min 60 min 12 hr	4 - 5 hr 4 - 5 hr 4 - 5 hr N/A	Liver	2 - 3 hr 11 hr	• IV doses should be administered over at least 2-3 minutes. • Oral doses are approximately 5-10 times greater than IV doses. • Long-acting formulation should ONLY be used in opioid-tolerant patients • Long-acting formulation is not available at UIHC

Drug # (cont)	Route	Starting Dose (Adults > 50 Kg)	Onset	Peak	Duration	Metabolism	Half Life	Comments
Meperidine (Demerol®)	IM/SQ IV	50 - 150 mg q 3-4 hr 25 - 50 mg q 1-2 hr	10 - 45 min 2 - 5 min	30 - 60 min 20 min	2 hr 2 hr	Liver	2 - 3 hr	• More than 72 hr of continuous use can cause accumulation of normeperidine which can lead to neuroexcitability (seizures). • Naloxone administration will increase neuroexcitibility. • Not recommended in **elderly or patients with renal dysfunction.** • **Not for use in chronic pain.** Do not exceed 600 mg / 24 hours.
Methadone	PO	2.5 mg 1 to 4 times daily	30 - 240 min	2 - 4 hr	4 - 24 hr	Liver	24 hr*	• Used in chronic pain. • Dosing adjustments should be made every 5 days. • More frequent dose increases can result in accumulation and respiratory depression. • Monitor for QT interval prolongation in patients with heart disease
Morphine MS Contin®	PO IM IV SQ PO-SR	10 - 15 mg q 3 - 4 hr 4 - 10 mg q 3 - 4 hr 2 - 4 mg q 2 - 4 hr 4 -10 mg q 3 - 4 hr 15 mg q 12 hr	15 min 15 - 60 min 2 - 5 min 15 - 30 min N/A	1½ - 2 hr 30 - 60 min 20 min 30 - 60 min N/A	4 hr 4 hr 3 - 4 hr 4 - 7 hr 8 -12 hr	Liver	1.5 - 2 hr 2 - 4 hr	• Oral liquid concentrate is available. • Active metabolite renally eliminated; use caution in elderly and patients with renal insufficiency. • Long-acting dosage forms should not be crushed. • **Long-acting dosage forms should not be used to treat acute pain.** • Other long-acting formulations are dosed differently – consult prescribing information on these products
Oxycodone Examples: Percocet® Roxicet® Endocet® OxyContin®	PO PO-SR	5 -10 mg q 4 - 6 hr 10 mg q 12 hr	15 - 30 min 60 min	1 - 2 hr 2 - 3 hr	4 - 6 hr 12 hr	Liver	4 hr	• Oral liquid concentrate is available • Oxycodone may be combined with acetaminophen • Strength available at UIHC is 5mg oxycodone/325mg acetaminophen.** • Other strengths available outside UIHC • OxyContin® is a sustained-release tablet. **Do not crush.** • **OxyContin® should not be used to treat acute pain.**
Oxymorphone Opana® Oxymorphone ER Opana ER®	PO IV IM SQ PO-SR	5 - 10 mg q 4 – 6 hr 0.5 mg 1 – 1.5 mg q 4 – 6 hr 1 – 1.5 mg q 4 – 6 hr 5 mg q 12 hr	30 min 5- 10 min 10 – 15 min 10 – 15 min 2 hr	1 hr 1.5 – 3.5 hr	4 - 6 hr 3 – 6 hr 3 – 6 hr 3 – 6 hr 12 hr	Liver	7 – 9 hr 1.5 hr 1.5 hr 1.5 hr 9 - 11 hr	• Reduce dose for renal, hepatic impairment • Take oral formulations on an empty stomach • Extensively conjugated with glucuronide • Also a metabolite of oxycodone • Not available at UIHC

Refer to MicroMedex for a complete list of available products

** Do not give more than 4 grams of acetaminophen per day (from all sources).

*Analgesic duration of action does not correlate with half-life.

SR - sustained release product

Guidelines for Patient-Controlled Intravenous Opioid Administration (PCA) for Adults with Acute Pain

The amount of opioid required to achieve comfort varies from patient to patient. Adjust dosing to achieve patient comfort with minimal side effects.

Drug§	Usual Loading Dose	Usual PCA Demand Bolus (Range)	Usual Lockout Range	Usual Basal Rate
Morphine (1 mg/ml)	5 – 10 mg	1 mg (0.5 - 2.5 mg)	5 - 10 min	None or 1 - 2 mg/hr
Hydromorphone (Dilaudid®) (0.2 mg/ml)	0.5 – 1.5 mg	0.2 mg (0.05 - 0.4 mg)	5 - 10 min	None or 0.1 - 0.4 mg/hr
Fentanyl (10 **mcg**/ml)	(15 – 50 **mcg**)	10 **mcg** (10 mcg)	3- 10 min	None or (20 – 100 **mcg**/hr)

Partially adapted from the Principles of Analgesic Use in the Treatment of Acute Pain and Cancer Pain, American Pain Society, 6th Ed. 2008.
§ Standard concentrations are listed in parentheses.
Also refer to UIHC Policy and Procedure for Patient Controlled Analgesia
Basal infusion rates are discouraged unless the patient has been taking scheduled opioids daily for the previous 7 days. The addition of basal infusions to PCA increases the incidence and severity of opioid-induced adverse effects, including respiratory depression.

Initial Fentanyl Transdermal Dosage (use only when converting FROM another opioid TO fentanyl patch)*

Oral 24-hour morphine equivalent (mg/day)	**Fentanyl transdermal (mcg/hr)**
60 -134	25
135-224	50
225-314	75
315-404	100
405-494	125
495-584	150
585-674	175
675-764	200
765-854	225
855-944	250
945-1034	275
1035-1124	300

*Note: Do not use this table to convert from fentanyl transdermal system to other opioid analgesics because these conversion dosage recommendations are conservative. Use of this table for conversion from fentanyl to other opioids can overestimate the dose of the new agent and may result in an overdosage.

Equianalgesic Chart

Doses listed are equivalent to 10 mg of parenteral morphine. Doses should be titrated according to individual response. When converting to another opioid, the dose of the new agent should be reduced by 30-50% due to incomplete cross-tolerance between opioids.

Analgesic	Dosage	
	Parenteral	Oral
Codeine	----------	200 mg
Fentanyl	100 – 200 **mcg**	----------
Hydrocodone	----------	30 mg
Hydromorphone (Dilaudid®)	1.5 mg	7.5 mg
Meperidine	75 - 100 mg	300 mg § (N)
Morphine	10 mg	30 mg §§
Oxycodone	----------	20 mg
Oxymorphone (N)	1 mg	10 mg

§ Dosage in this range may lead to neuroexcitability.
§§ For a single dose, 10 mg IV morphine = 60 mg oral morphine. For chronic dosing, 10 mg IV morphine = 30 mg oral morphine.
(N) Non-formulary at UIHC

Example of opioid conversion:

1. Patient is receiving a total of 5 mg of parenteral hydromorphone in a 24-hour period via a PCA pump. The goal is to convert this to oral morphine for discharge.
   When converting from PCA administration, add the total amount of opioid ***that the patient received*** in the last 24 hours, including
   a. Basal infusion
   b. Demand boluses administered by the patient
   c. Bolus doses administered by the medical/nursing staff
2. The equianalgesic chart indicates that 1.5 mg of parenteral hydromorphone equals 7.5 mg of oral hydromorphone (a 5-fold increase).
3. The patient's current dose of 5 mg per day of parenteral hydromorphone is equal to 25 mg per day of oral hydromorphone.
4. The next step is to convert 25 mg of oral hydromorphone to the daily oral morphine equivalent dose (DOMED).
5. The equianalgesic chart indicates that 7.5 mg of oral hydromorphone is equal to 30 mg of oral morphine.
6. The patient's calculated dose of 25 mg of oral hydromorphone is equal to 100 mg of oral morphine.
7. The oral dose of morphine should be reduced by 30% to 50% to prevent any risk of overdose after the conversion, since opioids do not have complete cross-tolerance. A 33% dose reduction from the calculated dose of 100 mg is equal to 67 mg of oral morphine per day.
8. The recommended dosing frequency of long-acting morphine (MS Contin®) is every 12 hours (2 doses per day).
9. MS Contin® is available in 15 mg, 30 mg, 100 mg and 200 mg controlled-release tablets. The tablet strength closest to the calculated dose is 30 mg. The proper starting dose should therefore be 30 mg of sustained-release morphine every 12 hours.

Use of Oral Methadone for Chronic Pain

1. Opioid-naïve patients
    a. Recommended starting dose range is 2.5 mg daily to 2.5 mg TID.
    b. For frail and/or older patients, the starting dose is 2.5 mg daily.
2. Patients taking opioids
    a. Determine the daily oral morphine equivalent dose of current opioids.
    b. Convert daily oral morphine equivalent dose (DOMED) to oral methadone.
    c. Methadone dose should be adjusted every 5 days due to delayed onset of respiratory depression.

Methadone Conversion Ratios

Current DOMED	Conversion ratio (morphine : methadone)	Conversion factor (approximate % of DOMED)
<30 mg	2 : 1	50%
30 – 99 mg	4 : 1	25%
100 – 299 mg	8 : 1	12.5%
300 – 499 mg	12 : 1	8.3%
500 – 999 mg	15 : 1	6.6%
> 1,000 mg	20 : 1	5%

Example of conversion to oral methadone:

1. Patient is taking 80 mg OxyContin® orally 3 times daily.
2. The total daily dose of oxycodone is 240 mg daily.
3. The next step is to convert 240 mg of oral oxycodone to the daily oral morphine equivalent dose (DOMED).
4. The equianalgesic chart indicates that 20 mg of oral oxycodone is equal to 30 mg of oral morphine.
5. The patient's current dose of 240 mg per day of oral oxycodone is equal to 360 mg per day of oral morphine.
6. The methadone conversion table indicates that a conversion factor for a DOMED of 360 mg equals 8.3% or a 12 to 1 ratio of morphine to methadone.
7. The patient's DOMED of 360 mg is equal to 30 mg of methadone daily.
8. The recommended dosing frequency of methadone for chronic pain is 1 to 3 times daily, so the proper daily methadone dose would be 10 mg three times daily.
9. May need to use breakthrough medication as needed for the first week, while methadone achieves steady-state blood levels.

Guidelines for Administering Naloxone for Reversal of Opioid-Induced Respiratory Depression

Opioid overdose:

- 0.4 mg – 0.8 mg IV/IM/SQ, titrated in accordance with the patient's response; repeat as needed. If given IV, each 0.4 mg should be given over 15 seconds.

Opioid-induced respiratory depression

- 0.04 mg/ml (40 mcg/ml) dilution in syringe (mix 0.4 mg/1 ml of naloxone and 9 ml of normal saline in a syringe for IV administration).
  - ⇒ Administer 0.5 ml of diluted solution (0.02 mg or 20 mcg) every 2 minutes until a change in alertness is observed.
  - ⇒ Titrate naloxone until patient is responsive or a total of 0.8 mg (20 ml of diluted solution) has been given. Continue looking for other causes of sedation and respiratory depression.
  - ⇒ Discontinue naloxone when patient is responsive to physical stimulation, respiratory rate is ≥ 8 breaths per minute, and able to take deep breaths when told to do so.

Special considerations

- May need repeated doses or continuous infusion. Depending on amount and type of opioid given and time interval since last opioid administration, the duration of action of some opioids may exceed that of naloxone. Please refer to UIHC IV administration guidelines for further information about naloxone infusions.
- Titrate dose cautiously to avoid precipitation of profound withdrawal, seizures, and severe pain.

Resources at UIHC

For difficulties with pain management, contact the Pain Medicine Service (pager 3832), Opioid Teaching Team (pager 2337), Palliative Care Service (pager 5200), or the patient care unit pharmacist (pager available from unit clerk).

References:

American Hospital Formulary Service Drug Information 2012. American Society of Health-System Pharmacists.
American Pain Society (2008). Principles of analgesic use in the treatment of acute pain and cancer pain (6th ed.) Glenview, IL.

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