Dementia Screening in the Elderly

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Conflicts of Interest

Within the past 12 months, I have had NO financial relationships with proprietary entities that produce health care goods and services.
Teaching Objectives

Epidemiology of dementia
Medical screening evaluation of dementia
Cognitive Assessment Screening tools
Risks and benefits of screening for dementia
Cognitive Impairment

Measurable impairment in one of the cognitive domains with preservation of independence and function.
Dementia

Impairment in memory and decline in one of the following

- Ability to generate speech or understand written/spoken language
- Ability to recognize objects
- Ability to execute motor functions
- Ability to make judgments, plan and carry out tasks

Deficits cause significant impairment in social or occupational functioning
Dementia affects 3-11% of all age > 65

Estimates of 18.5 million Americans to have dementia in 2050

Estimated annual cost $100,000,000,000

Up to 2/3 of all dementia remains undiagnosed
Epidemiology of Dementia

- Alzheimer’s type dementia effects 5.3 million
- Alzheimer’s type dementia = 60%
- Vascular Dementia = 17%
- LBD, alcoholic dementia and FTD = 13%
Clinical Queues for Dementia Screening

Patient complains of memory problems
Informant has concerns for patient memory
Decreased functional performance
Depressed or anxious patients
Clinical Evaluation of Dementia

Thorough patient history

Review of risk factors

past medical history (eg. Hypothyroidism)
alcohol use
head injury
heavy metal exposure
medications/drugs/toxins
sexual history
level of education
Clinical Evaluation of Dementia

Complete physical exam w/ neurological exam and gait assessment

Cognitive Assessment Screening tool

Assessment of IADLs and ADLs

< 5% reversible causes of dementia
Partial Differential Diagnosis of Dementia
Dementia Screening Tools
Dementia Screening

USPSTF and American Academy of Neurology do not recommend routine screening in asymptomatic patients.

USPSTF does recommend cognitive assessment if cognitive impairments are suspected by the provider the patient or the patient’s informant.

Cognitive test should assesses multiple functional domains

Test must be quick, easy, and able to identify mild dementia

These are not diagnostic tests
Instrumental Activities of Daily Living

• These are the skills to maintain a household
  • Medication management
  • Financial management
  • Preparing meals
  • Housework
  • Shopping
  • Telephone
Functional Domains

Language

Attention

Memory

Cognitive Assessment

Visuospatial Skills

Executive Functioning
Functional Domains

1. Attention
2. Memory
3. Language
4. Visuospatial Skills
5. Executive Function
Attention

- Ability to focus on a task
- When impaired may be difficult to assess other domains
- Effected by Delirium
Memory

- Episodic
  - Supper Last Night
- Semantic
  - State Capitol
- Procedural
  - Tying shoes
- Working
  - Phone number
Language

- Word formation, rhythm and verbal fluency
- Tested through naming, syntactically complex sentences and fluency task
Visuospatial Skills

- ability to interact with the environment
- Visual processing and imagery
- Important for navigating
Executive Function

- Planning, abstract thought, and judgment.
- Effects function and independence more than any other domain

Dog-Cat = Pet
Cognitive Assessment Tools

- Used to screen for cognitive impairment
- Aid to establish a differential diagnosis
- Rating severity of dementia
- Monitor progression of disease
- Document response to treatment
## Dementia Screening Instruments

<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>Minutes to Perform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini-Mental State Examination</td>
<td>83</td>
<td>82</td>
<td>8</td>
</tr>
<tr>
<td>Mini-Cog</td>
<td>76-99</td>
<td>89-93</td>
<td>3</td>
</tr>
<tr>
<td>Memory Impairment Screen (MIS)</td>
<td>86</td>
<td>97</td>
<td>4</td>
</tr>
<tr>
<td>Montreal Cognitive Assessment (MoCA)</td>
<td>100</td>
<td>87</td>
<td>10</td>
</tr>
<tr>
<td>Clock Draw</td>
<td>45-77</td>
<td>81-91</td>
<td>1-2</td>
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<td>95</td>
<td>86</td>
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<tr>
<td>6CIT (Short Blessed)</td>
<td>79-90</td>
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<td>5</td>
</tr>
<tr>
<td>Short Portable Mental Status Questionnaire</td>
<td>67</td>
<td>100</td>
<td>10</td>
</tr>
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<td>The general practitioner assessment of cognition (GPCOG)</td>
<td>85</td>
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<td>6</td>
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Recommended Screening Instruments

Validated for Primary Care

- Memory Impairment Screen
- General Practitioner Assessment of Cognition
- Mini-cognitive Assessment
- MMSE

MIS, GPCOG, and Mini-Cog administered in <5 minutes

Similar negative predictive compared to MMSE

American Journal of Geriatric Psychiatry and AAFP recommendations for primary care provider
**Mini-Mental State Exam (MMSE)**

<table>
<thead>
<tr>
<th>Temporal orientation (5 points)</th>
<th>What is the approximate time?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What day of the week is it?</td>
</tr>
<tr>
<td></td>
<td>What is the date today?</td>
</tr>
<tr>
<td></td>
<td>What is the month?</td>
</tr>
<tr>
<td></td>
<td>What is the year?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spatial orientation (5 points)</th>
<th>Where are we now?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What is this place?</td>
</tr>
<tr>
<td></td>
<td>In what district are we or what is the address here?</td>
</tr>
<tr>
<td></td>
<td>In which town are we?</td>
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<tr>
<td></td>
<td>In which state are we?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Registration (3 points)</th>
<th>Repeat the following words: CAR, VASE, BRICK</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Attention and calculation (5 points)</th>
<th>Subtract: 100 - 7 = 93 - 7 = 86 - 7 = 79 - 7 = 72 - 7 = 65</th>
</tr>
</thead>
</table>

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<tr>
<th>Remote memory (3 points)</th>
<th>Can you remember the 3 words you have just said?</th>
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</table>

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<tr>
<th>Naming 2 objects (2 points)</th>
<th>Watch and pen</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>REPEAT (1 point)</th>
<th>&quot;NO IFS, ANDS OR BUTS&quot;</th>
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</thead>
</table>

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<tr>
<th>Stage command (3 points)</th>
<th>&quot;Take this piece of paper with your right hand, fold it in half, and put it on the floor&quot;</th>
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</table>

<table>
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<th>Writing a complete sentence (1 point)</th>
<th>Write a sentence that makes sense</th>
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<table>
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<tr>
<th>Reading and obey (1 point)</th>
<th>Close your eyes</th>
</tr>
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</table>

<table>
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<tr>
<th>Copy the diagram (1 point)</th>
<th>Copy two pentagons with an intersection</th>
</tr>
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MMSE score interpretation

- Normal cognitive function 27-30
- Mild cognitive impairment 21-26
- Moderate cognitive impairment 11-20
- Severe cognitive impairment 0-10
MMSE Positives

Traditional “Gold Standard” of Cognitive Assessment

Tests language, attention, memory, visuospatial skills.

10 minutes to administer

cutoff of 24/30 it has 87% specificity and 82% sensitivity

Normative data available for different ages, gender, and education level
MMSE Negatives

Ceiling Effect - May miss cognitive impairment in highly educated

Floor effect - Inability to detect changes in severely demented

Insensitive for detecting very mild dementia

Does not test Executive Function

Lengthy to administer
Steps of the Mini-Cognitive Assessment

1. Instruct the patient to remember 3 unrelated words.

2. Instruct the patient to draw the face of a clock and set the time to 10 past 11.

3. Ask the patient to repeat the 3 previously stated words.
Mini-Cog

Mini-Cog

Assess Visuospatial and Memory domains
Quick to administer
May be used in all healthcare settings
Reasonable sensitivity (76-99%) and specificity (88-93%)
Better at identifying dementia than MMSE
Mini-Cog

Significantly better at identifying dementia then PCP alone

Excellent at identifying very mild dementia

Subjects perceived less stress taking this test

Not limited by subjects education or language

Not appropriate for aphasic patients

Does not aid in differentiating dementia type
General Practitioner Assessment of Cognition (GPCOG)

Part 1
1. “I am going to give you a name and address. After I’ve said them, I want you to repeat them. Remember the name and address because I’m going to ask you to repeat them again in a few minutes. John Brown, 42 West Street, Kensington.” Allow the patient up to four attempts to repeat the name and address, but do not score yet.

2. “What is the date?”
Correct answer requires the exact date.

3. Give the patient a piece of paper with a printed circle on it.
   “Please mark in all the numbers to indicate the hours of a clock.”
   Correct answer requires that 3, 6, 9, and 12 are correctly placed, and that the other numbers have approximately the correct spacing.

4. “Please mark in the hands on the clock to show 10 minutes past eleven o’clock (11:10).”
   Hands should point to the 11 and 2; do not penalize if the patient fails to distinguish between long and short hands.

5. “Can you tell me something that happened in the news recently?”
   Correct answer demonstrates awareness of a specific event in the previous week; if a general answer is given, such as “war” or “a lot of rain,” ask for details.

6. “What was the name and address I asked you to remember?”
   Give one point each for first name, last name, street number, street name, and city (five points total).

Scoring: Give one point for each correct answer (maximum score of 10 points). A score of 9 points or more makes dementia unlikely, whereas a score of less than 5 points suggests dementia. If the patient scores between 5 and 8 points, ask the following questions of someone who has known the patient for at least five years.

Part 2
Compared with a few years ago:

1. Does the patient have more trouble remembering things that have happened recently?

2. Does the patient have more trouble recalling conversations a few days later?

3. When speaking, does the patient have more difficulty in finding the right word or tend to use the wrong words more often?

4. Is the patient less able to manage money and financial affairs (e.g., paying bills, budgeting)?

5. Is the patient less able to manage his or her medication independently?

6. Does the patient need more assistance with transportation (private or public)?

Scoring: Give one point for each “No” answer, and add to the points from Part 1 (maximum score of 15 points). Patients with a score of 10 points or less should be evaluated further for dementia.
General Practitioner Assessment of Cognition

2 step screening instrument, part one for the patient and part two for the informant

Quicker to administer than MMSE

Equal sensitivity and specificity as MMSE

Provides a systematic way of obtaining informant data
General Practitioner Assessment of Cognition

Good Positive Predictive and Negative Predictive value

Ranked by providers as efficient, economical and acceptable by patients

Performance of patient independent of education, gender, age, GDS score.

Limited usefulness without informant
Receiver Operator Curve

![ROC Curve Diagram](http://www.sprawls.org/ppmi2/IMGCHAR/)
Memory Impairment Screen

4 Minute 4 item delayed free and cued recall test
4 words from 4 different categories given to patient
The 4 items are then cued by examiner until the words are recognized by cue.
2-3 minutes of interference with counting such as 1-20 then 20-1
4 word recall with or without cues
Memory Impairment Screen

Less than 5 minutes to administer

NPV and misclassification equivalent to MMSE

Age, education and gender did not affect results

It does not measure executive or visuospatial domains

Tests memory, attention, and language
Figure 1. A receiver operating characteristic (ROC) curve, which plots detection of true positives (sensitivity) against detection of false positives (1–specificity), showed a high level of discrimination (0.97) with the MIS for Alzheimer's disease.
Montreal Cognitive Assessment (MoCA)

- **VISUOSPATIAL / EXECUTIVE**
  - Copy cube: 3 points
  - Draw clock (Ten past eleven): 5 points

- **NAMING**
  - Animals: [ ] Rhino, [ ] Lion, [ ] Camel

- **MEMORY**
  - Read list of words, subject must repeat them. Do 2 trials. Do a recall after 5 minutes.
  - FACE: [ ]
  - VELVET: [ ]
  - CHURCH: [ ]
  - DAISY: [ ]
  - RED: [ ]

- **ATTENTION**
  - Read list of digits (5 digits/sec).
  - Subject has to repeat them in the forward order: [ ] 2 1 8 5 4
  - Subject has to repeat them in the backward order: [ ] 7 4 2

- **LANGUAGE**
  - Repeat: I only know that John is the one to help today. [ ]
  - The cat always hid under the couch when dogs were in the room. [ ]

- **ABSTRACTION**
  - Similarity between e.g. banana - orange = fruit [ ]
  - train - bicycle [ ]
  - watch - ruler [ ]

- **DELAYED RECALL**
  - Has to recall words with no cue
  - Category cue:
    - FACE [ ]
    - VELVET [ ]
    - CHURCH [ ]
    - DAISY [ ]
    - RED [ ]
  - Optional:
    - Multiple choice cue

- **ORIENTATION**
  - Date: [ ]
  - Month: [ ]
  - Year: [ ]
  - Day: [ ]
  - Place: [ ]
  - City: [ ]

**TOTAL**

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www.mocatest.org

Add 1 point if ≤ 12 yr ed.
MoCA score interpretation

- Normal cognitive function > 26
- Mild cognitive impairment average 22
- Alzheimer’s type dementia average 16
Montreal Cognitive Assessment

Initially designed for mild cognitive impairment
Evaluates multiple domains of function
Excellent sensitivity = AD 100% and MCI 90%
Specificity of 87% compared to 82% by MMSE
Test-retest reliability and internal consistency
If concern for MCI then MOCA
If functional decline and cognitive complaints then MMSE
Has been validated by several studies across cultures
MOCA vs. MMSE ROC for Mild Cognitive Impairment

http://www.mocatest.org/normative_data.asp
Other screening tools

Functional Assessment Questionnaire

Geriatric Depression Scale
# Functional Assessment Questionnaire

**FUNCTIONAL ASSESSMENT QUESTIONNAIRE**

* **Key:** (0 = normal) (1 = minimally difficult) (2 = moderately difficult) (3 = very difficult) (4 = unable) Activity Score

<table>
<thead>
<tr>
<th>Activity</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sleep normally</td>
<td></td>
</tr>
<tr>
<td>2. Up and down stairs</td>
<td></td>
</tr>
<tr>
<td>3. Food Prep, cooking, eating</td>
<td></td>
</tr>
<tr>
<td>4. Walking</td>
<td></td>
</tr>
<tr>
<td>5. Grooming (bath, comb hair, shave, etc)</td>
<td></td>
</tr>
<tr>
<td>6. Getting up and down from a chair or bed</td>
<td></td>
</tr>
<tr>
<td>7. Dressing—manage normal dressing activities</td>
<td></td>
</tr>
<tr>
<td>8. Dressing—tie shoes, button shirt</td>
<td></td>
</tr>
<tr>
<td>9. Lifting, carrying up to 10 pounds</td>
<td></td>
</tr>
<tr>
<td>10. Sitting for normal periods of time</td>
<td></td>
</tr>
<tr>
<td>11. Standing for normal periods of time</td>
<td></td>
</tr>
<tr>
<td>12. Reaching above head or across body</td>
<td></td>
</tr>
<tr>
<td>13. Leisure, recreational, sports activities</td>
<td></td>
</tr>
<tr>
<td>14. Squatting down to pick up item</td>
<td></td>
</tr>
<tr>
<td>15. Running, jogging</td>
<td></td>
</tr>
<tr>
<td>16. Driving</td>
<td></td>
</tr>
<tr>
<td>17. Job requirements—can do all activities required of my job</td>
<td></td>
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Geriatric Depression Scale

Choose the best answer for how you have felt over the past week:

1. Are you basically satisfied with your life?  YES / NO
2. Have you dropped many of your activities and interests?  YES / NO
3. Do you feel that your life is empty?  YES / NO
4. Do you often get bored?  YES / NO
5. Are you in good spirits most of the time?  YES / NO
6. Are you afraid that something bad is going to happen to you?  YES / NO
7. Do you feel happy most of the time?  YES / NO
8. Do you often feel helpless?  YES / NO
9. Do you prefer to stay at home, rather than going out and doing new things? YES / NO
10. Do you feel you have more problems with memory than most?  YES / NO
11. Do you think it is wonderful to be alive now?  YES / NO
12. Do you feel pretty worthless the way you are now?  YES / NO
13. Do you feel full of energy?  YES / NO
14. Do you feel that your situation is hopeless?  YES / NO
15. Do you think that most people are better off than you are?  YES / NO
Diagnosis and Other Consideration
Diagnosing Dementia

History + mental status examination lead to diagnosis

History + screening tool = inconsistency

further evaluation may be necessary
Further Evaluation

Neuroimaging such as CT or MRI (low yield)

Lab evaluation

  TSH
  CMP
  CBC
  Folate
  B12
  Calcium
Further Evaluation

Neuropsychological evaluation

Current Living Situation/Home Safety

Perform The Clinical Dementia Rating Scale
  • Dementia Staging
Harms for Screening

- Screening does not affect long term outcomes
- Increased risk for depression/anxiety
- Time and cost for screening
- Long wait for diagnostic neuropsychiatric testing may cause anxiety
- Neuropsychiatric testing takes several hours
- No effective treatment of MCI
Harms of Screening

- Dementia may preclude long-term care insurance or enrollment in continuous care retirement community
- Side effects of medical treatment
- Many times medical therapies do not alter course of the illness
- Economic burden of increased screening
- Community resources may not be sufficient to accommodate case load
Benefit of Screening

 Allows the patient time to develop advanced directives

 Assign Power of Attorney for financial and healthcare decisions

 Time to establish last will and testament

 Patient/family can consider issues such as driving and long term care
Benefit of Screening

Delay the necessity for institutional care
Improve quality of life for caregivers
Potential pharmacological interventions
Provides families with explanation for recent behavior changes
Per USPSTF - No high-quality study to verify these claims
Summary

Epidemiology of dementia

Medical screening evaluation of dementia

Cognitive Assessment Screening tools

Further Evaluation

Risks and benefits of screening for dementia


Dementia: DSM-IV-TR #290.40-290.44, 294.10, 294.11, 294.8.

Malaz Boustanian, MD, MPH; Britt Peterson, MD, MPH; Laura Hanson, MD, MPH; Russell Harris, MD, MPH; Kathleen N. Lohr, PhD. Screening for dementia in primary care: A summary of the evidence for the U.S. preventive services task force. Ann internal Med. 2003: 138; 927-937.


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- Callahan, Christopher MD. Unverzagt, Frederick PhD.  Hui, Siu PhD.  Perkins, Anthony, MS.  Hendrie, Hugh MB, ChB.  Six-item screener to identify cognitive impairment among potential subjects for clinical research.  Medical Care.  volume 40, Number 9, pp 771-781. 2002


Questions