Cognitive Screening Tests

Did You Forget Something?

January 28, 2013
Goals of Session

To review and understand

– the new definition of mild cognitive impairment (MCI)
– that MCI is part of the continuum of Alzheimer’s disease
– the prevalence of MCI
– the risk of conversion from MCI to dementia
– the morbidity of cognitive impairment
– the mortality of cognitive impairment and dementia
– current insurance screening for cognitive impairment
– the very basics of neuropsychological testing
“So much time and so little to do.”
Definition – Mild Cognitive Impairment (MCI)

Mild Cognitive Impairment Due to Alzheimer’s Disease (AD)

– Establish clinical and cognitive criteria
  • Cognitive concern reflecting a change in cognition reported by patient, informant or clinician
  • Objective evidence of impairment in one or more cognitive domains, typically including memory

– Examine etiology of MCI consistent with AD pathophysiological process
  • Rule out vascular, traumatic, medical causes of cognitive decline, where possible
  • Provide evidence of longitudinal decline in cognition when feasible
  • Report history of consistent with AD genetic factors, where relevant

Albert MS, et al. *Alzheimer’s & Dementia* 2011;7:270
Definition - Dementia

Cognitive or behavioral symptoms that:

- Interfere with ability to function at work or at usual activities
- Represent a decline from previous levels of functioning
- Are not explained by delirium or psychiatric disorder
- Cognitive impairment detected by history and cognitive testing
- The cognitive or behavioral impairment involves a minimum of two of the following domains:
  • Impaired ability to acquire and remember new information
  • Impaired reasoning and handling of complex tasks, poor judgment
  • Impaired visuospatial abilities
  • Impaired language functions (speaking, reading, writing)
  • Changes in personality or behavior

Causes of Dementia

VaD = vascular dementia

DLB = dementia with Lewy bodies

FTD = frontotemporal dementia

http://www.cmglinks.com/cmg/lectures_dementia/part1/003.htm
Prevalence of Alzheimer’s Disease (AD)

Number of People with AD

- 2000: 4.0 million (85+), 1.5 million (75-84), 0.5 million (65-74)
- 2010: 4.5 million (85+), 2.0 million (75-84), 1.0 million (65-74)
- 2020: 5.0 million (85+), 2.5 million (75-84), 1.5 million (65-74)
- 2030: 5.5 million (85+), 3.0 million (75-84), 2.0 million (65-74)
- 2040: 6.0 million (85+), 3.5 million (75-84), 2.5 million (65-74)
- 2050: 6.5 million (85+), 4.0 million (75-84), 3.0 million (65-74)

Prevalence of Alzheimer’s by Age

Adapted from Nussbaum RL, Ellis CE. N Engl J Med 2003;348:348-1356
### Stages of Alzheimer’s Disease

#### Functional Assessment Staging (FAST)

<table>
<thead>
<tr>
<th>FAST Scale Stage</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Normal Adult</td>
<td>No memory/cognitive deficit</td>
</tr>
<tr>
<td>2 – Forgetfulness (Normal Older Adult)</td>
<td>Self reported forgetfulness</td>
</tr>
<tr>
<td>3 – Mild Cognitive Decline</td>
<td>Noticeable deficits perhaps in more than one area (e.g., getting lost, decrease job performance, decreased concentration)</td>
</tr>
<tr>
<td>4 – Moderate Cognitive Decline (Mild Alzheimer’s)</td>
<td>Requires assistance with complicated tasks. Orientation intact.</td>
</tr>
<tr>
<td>5 – Moderately Severe Cognitive Decline (Moderate AD)</td>
<td>Requires assistance in choosing attire. Unable to recall major events.</td>
</tr>
<tr>
<td>6 – Severe Cognitive Decline (Moderately Severe AD)</td>
<td>Requires assistance with dressing, bathing and toileting. Incontinence. Delusions, agitation, anxiety.</td>
</tr>
<tr>
<td>7 – Very Severe Cognitive Decline (Severe AD)</td>
<td>Declining speech and ambulatory ability.</td>
</tr>
</tbody>
</table>

Adapted from Reisberg B. NYU.
Alzheimer’s Pathology

Definitive diagnosis requires autopsy

Neuronal loss

Amyloid plaques
  – beta-amyloid

Neurofibrillary tangles
  – tau protein
The Continuum of Cognitive Decline

Source: [Alzheimer's & Dementia: The Journal of the Alzheimer's Association](https://doi.org/10.1016/j.jalz.2011.03.003)
# Prevalence of Mild Cognitive Impairment

<table>
<thead>
<tr>
<th>Author</th>
<th>Country</th>
<th>n</th>
<th>Prevalence MCI (%)</th>
<th>Modified Prevalence Of MCI (%)</th>
<th>Rate of Conversion to AD (%)/yrs</th>
<th>Incidence</th>
</tr>
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<tbody>
<tr>
<td>Busse et al</td>
<td>Germany</td>
<td>1265</td>
<td>3.1</td>
<td>5.1</td>
<td>33/2.6</td>
<td>8/1000</td>
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<tr>
<td>Fisk et al</td>
<td>Canada</td>
<td>1790</td>
<td>1.03</td>
<td>3.02</td>
<td>46.7/5</td>
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<tr>
<td>Ritchie et al</td>
<td>France</td>
<td>833</td>
<td>3.2</td>
<td>19.3</td>
<td>11/2</td>
<td>58/1000</td>
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<tr>
<td>Tervo et al</td>
<td>Finland</td>
<td>806</td>
<td>8.8</td>
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<td>26/1000</td>
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<td>Lopez et al</td>
<td>USA</td>
<td>3608</td>
<td>19</td>
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<tr>
<td>Qiu et al</td>
<td>China</td>
<td>3910</td>
<td>2.4</td>
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</table>

Conversion of MCI to Dementia

Annual Rates of Conversion

LTC Insurance Industry Claims Experience

Nursing Home Claims
- 27% Alzheimer's
- 12% Circulatory
- 10% Injury
- 10% Cancer
- 8% Arthritis
- 7% Nervous
- 6% Respiratory
- 5% Mental
- 13% Other
- 2% Other

Home Care Claims
- 18% Alzheimer's
- 15% Cancer
- 15% Arthritis
- 11% Stroke
- 11% Injury
- 8% Circulatory
- 7% Nervous
- 4% Respiratory
- 2% Digestive
- 9% Other

Source: Society of Actuaries LTC Experience Committee Fifth Intercompany Report – November 2007
LTC Insurance Industry Claims Experience

Nursing Home

<table>
<thead>
<tr>
<th>Condition</th>
<th>Avg Days</th>
<th>Avg Pay/Day</th>
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<tr>
<td>Alzheimer's</td>
<td>659</td>
<td>$89</td>
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<tr>
<td>Stroke</td>
<td>525</td>
<td>$83</td>
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<tr>
<td>Circulatory</td>
<td>422</td>
<td>$72</td>
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<tr>
<td>Injury</td>
<td>396</td>
<td>$72</td>
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<tr>
<td>Cancer</td>
<td>182</td>
<td>$80</td>
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<tr>
<td>Arthritis</td>
<td>457</td>
<td>$79</td>
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<tr>
<td>Nervous</td>
<td>543</td>
<td>$92</td>
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<tr>
<td>Respiratory</td>
<td>342</td>
<td>$75</td>
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<td>Mental</td>
<td>600</td>
<td>$71</td>
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<tr>
<td>Other</td>
<td>412</td>
<td>$72</td>
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</tbody>
</table>

Source: Society of Actuaries LTC Experience Committee Fifth Intercompany Report – November 2007
LTC Insurance Industry Claims Experience

Home Care

<table>
<thead>
<tr>
<th>Condition</th>
<th>Avg Visits</th>
<th>Avg Pay/Visit</th>
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</thead>
<tbody>
<tr>
<td>Alzheimer’s</td>
<td>231</td>
<td>$106</td>
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<tr>
<td>Cancer</td>
<td>78</td>
<td>$112</td>
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<tr>
<td>Arthritis</td>
<td>161</td>
<td>$105</td>
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<tr>
<td>Stroke</td>
<td>255</td>
<td>$113</td>
</tr>
<tr>
<td>Injury</td>
<td>136</td>
<td>$100</td>
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<tr>
<td>Circulatory</td>
<td>168</td>
<td>$100</td>
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<tr>
<td>Nervous</td>
<td>284</td>
<td>$95</td>
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<tr>
<td>Respiratory</td>
<td>160</td>
<td>$102</td>
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<tr>
<td>Digestive</td>
<td>123</td>
<td>$106</td>
</tr>
<tr>
<td>Other</td>
<td>173</td>
<td>$105</td>
</tr>
</tbody>
</table>

Source: Society of Actuaries LTC Experience Committee Fifth Intercompany Report – November 2007
Mortality of Dementia

Survival After Initial Diagnosis of Alzheimer’s Disease

– Base population 23,000; age 60+; Seattle based HMO
– 521 newly diagnosed persons with Alzheimer’s; 1987-1996
– Population mostly white
– Followed on average 5.2 years
– Median survival for men 4.2 years
– Median survival for women 5.7 years

Mortality of Dementia

**Table 2. Comparison of Life Expectancy by Quartiles of Study Participants and U.S. Population***

<table>
<thead>
<tr>
<th></th>
<th>Life Expectancy Quartiles†</th>
<th>Age 70 y</th>
<th>Age 75 y</th>
<th>Age 80 y</th>
<th>Age 85 y</th>
<th>Age 90 y</th>
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<tr>
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<td>75% 50% 25% 75% 50% 25% 75% 50% 25% 75% 50% 25% 75% 50% 25% 75% 50% 25%</td>
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<td>Women</td>
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<tr>
<td>U.S. population</td>
<td>21.3 15.7 9.5 17 11.9 6.8 13 8.6 4.6 9.6 5.9 2.9 6.8 3.9 1.8</td>
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<tr>
<td>Patients with Alzheimer disease (n = 341)</td>
<td>12.3 8.0 5.9 10.0 5.8 4.0 8.7 5.3 3.2 6.7 3.9 2.4 5.2 2.1 1.6</td>
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<tr>
<td>Men</td>
<td>18 12.4 6.7 14.2 9.3 4.9 10.8 6.7 3.3 7.9 4.7 2.2 5.8 3.2 1.5</td>
<td></td>
<td></td>
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<tr>
<td>U.S. population</td>
<td>5.1 4.4 3.1 7.2 4.5 2.3 6.8 3.6 2.2 5.0 3.3 2.3 4.9 2.7 0.9</td>
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<tr>
<td>Patients with Alzheimer disease (n = 180)</td>
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</tbody>
</table>

* The source of the data on life expectancy in the U.S. population is cited in Walter I.C and Covinsky KE (27).
† Life expectancy quartiles presented in the table correspond to upper, middle, and lower quartiles of estimated survival at each age–sex strata, that is, 75%, 50%, and 25% of the population will live less than the corresponding years listed, respectively.

Mortality of Cognitive Impairment

Cognitive Impairment and Mortality in the Cardiovascular Heart Study

- Multi-center study of Medicare eligible individuals
- 5888 persons from 1989-1999
- Mostly white
- Cognitive impairment based on MMSE scores
- Analyzed six groups
  - All persons with/without cognitive impairment
  - All persons based on severity of cognitive impairment
  - All persons with co-morbid with/without cognitive impairment
  - All persons with co-morbid based on severity of cognitive impairment
  - All persons otherwise healthy with/without cognitive impairment
  - All persons otherwise healthy based on severity of cognitive impairment

# Mortality of Cognitive Impairment

<table>
<thead>
<tr>
<th>Cognitive Impairment Level</th>
<th>Group 2</th>
<th>Group 4</th>
<th>Group 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild Cognitive Impairment</td>
<td>1.31*</td>
<td>1.19</td>
<td>2.01</td>
</tr>
<tr>
<td>Moderate Cognitive Impairment</td>
<td>1.59</td>
<td>1.50</td>
<td>5.25</td>
</tr>
<tr>
<td>Severe Cognitive Impairment</td>
<td>2.4</td>
<td>1.98</td>
<td></td>
</tr>
</tbody>
</table>

*Relative Risk of Death

Underwriting for Cognitive Impairment

Initial Signs and Symptoms Are Subtle and Insidious
Long Timeline of Earliest Symptoms
Family May Notice Earliest Signs
Physicians Often Do Not Screen
No Simple Effective Screening Test
Physician Reluctance to Note Diagnosis in Medical Record
Indications for Cognitive Screening

Older Ages – 70+ (?)

Self-reported Memory/Forgetfulness Complaints in Medical Record

Friend/Family Reported Memory/Forgetfulness Complaints in Medical Record

Memory/Forgetfulness Complaints Referring to Applicant Found in Spouse/Partner Medical Record
### Risk of Anti-Selection

Percentage of Participants Who Changed or Thought About Changing Insurance Coverage During a One-Year Period, Stratified by Testing Status

<table>
<thead>
<tr>
<th>Type of insurance</th>
<th>Percent reporting an actual change</th>
<th>Percent reporting “thinking about” making a change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No APOE disclosure</td>
<td>€4-negative</td>
</tr>
<tr>
<td>Health</td>
<td>6.52</td>
<td>5.56</td>
</tr>
<tr>
<td>Life</td>
<td>6.52</td>
<td>7.41</td>
</tr>
<tr>
<td>Disability</td>
<td>4.35</td>
<td>3.70</td>
</tr>
<tr>
<td>Long-term Care</td>
<td>4.35</td>
<td>1.85</td>
</tr>
</tbody>
</table>

Goals of an Insurance Screening Test

Easy to Administer
Relatively High Sensitivity and Specificity
High Reliability
Cost Effective
Wide Availability
Easy for Underwriter to Interpret Results
Minimize Risk/Maximize Cost Benefit
Evolution of Cognitive Testing

1\textsuperscript{st} Generation
- Mini-Mental State Exam (MMSE)
- Short Portable Mental Status Questionnaire (SPMSQ)
  - Introduced 1990
- Clock Drawing

2\textsuperscript{nd} Generation
- Delayed Word Recall (DWR)
  - Introduced 1990
- Minnesota Cognitive Acuity Screen* (MCAS)
  - Introduced 1999

3\textsuperscript{rd} Generation
- Enhanced Mental Skills Test* (EMST)
  - Introduced 2004

*Proprietary Tests
### Reported Sensitivity/Specificity Rates

<table>
<thead>
<tr>
<th>Cognitive Screening Test</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMSE</td>
<td>59-92%</td>
<td>62-92%</td>
</tr>
<tr>
<td>SPMSQ</td>
<td>55-92%</td>
<td>72-87%</td>
</tr>
<tr>
<td>DWR</td>
<td>89-96%</td>
<td>98-100%</td>
</tr>
<tr>
<td>MCAS (dementia)</td>
<td>97.5%</td>
<td>98.45%</td>
</tr>
<tr>
<td>EMST* (normal vs MCI/MD)</td>
<td>96%</td>
<td>91%</td>
</tr>
<tr>
<td>(normal vs MD)</td>
<td>96%</td>
<td>99%</td>
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</table>


*From Shankle WR et al. PNAS 2005;102:4919.
## Domains of Cognitive Testing

<table>
<thead>
<tr>
<th>Domain</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>Person, Place, Time</td>
</tr>
<tr>
<td>Registration</td>
<td>Repetition</td>
</tr>
<tr>
<td>Memory</td>
<td>Recall of Objects or Words</td>
</tr>
<tr>
<td>Executive Function</td>
<td>Attention, Motivation</td>
</tr>
<tr>
<td>Language</td>
<td>Naming, 3-Stage Command, Reading, Writing</td>
</tr>
<tr>
<td>Visuospatial</td>
<td>Geometric Figure</td>
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<tr>
<td>Calculation</td>
<td>Mathematics</td>
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<tr>
<td>Automaticity</td>
<td>Speed of Performance</td>
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</tbody>
</table>
## Mini-Mental State Exam (MMSE)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>Person, place, time</td>
</tr>
<tr>
<td>Registration</td>
<td>Repeat 3 objects</td>
</tr>
<tr>
<td>Memory</td>
<td>Recall 3 words at 3 minutes</td>
</tr>
<tr>
<td>Attention</td>
<td>3-stage command</td>
</tr>
<tr>
<td>Calculation</td>
<td>Serial 7 subtraction</td>
</tr>
<tr>
<td>Language</td>
<td>Naming, repetition, reading, writing</td>
</tr>
<tr>
<td>Visuospatial</td>
<td>Geometric figure</td>
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</table>
## Mini-Mental State Exam (MMSE)

<table>
<thead>
<tr>
<th>Education</th>
<th>18-24</th>
<th>25-29</th>
<th>30-34</th>
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<th>40-44</th>
<th>45-49</th>
<th>50-54</th>
<th>55-59</th>
<th>60-64</th>
<th>65-69</th>
<th>70-74</th>
<th>75-79</th>
<th>80-84</th>
<th>&gt;84</th>
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<td>4th Grade</td>
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<td>High School</td>
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</table>

**Normative Data on the MMSE**

Clock Drawing Test (CDT)

Method – draw face of a clock, mark in the hour numbers, draw hands to indicate specified time (e.g., 10 past 10)
Assess language, memory and executive functions
Several different scoring methods
Shulman scale 1-6 points
  – Reproducible
  – Sn/Sp – 86%/72%
  – Fair correlation with MMSE

Shah J. P & S Medical Review, Spring 2001:30
Clock Drawing - Examples

Examples of Clock Drawing Test

Early Alzheimer's Disease

Moderate Alzheimer's Disease

Severe Alzheimer's Disease

http://www.dementiaguide.com/images/DGI-III_5.1-ClockDrawing.jpg
Clock Drawing Test

N. Clock Drawing

Please hand the applicant a pen or pencil and ask him/her to:

51. “First, draw a clock with all the numbers on it. Second, put hands on the clock to make it read 8:20.”

[Handwritten drawing of a clock showing 8:20]

8:20 – digital clock
Delayed Word Recall (DWR)

**Encoding Phase**
- Examiner speaks/shows 10 words (nouns), one at a time
- Individual repeats each word and uses the word in a sentence

**Delay Interval**
- 5 minute delay with interference

**Recall Phase**
- Individual recalls as many words as possible
Delayed Word Recall

Comments

– Alzheimer’s patients have rapid rate of forgetting within first 5-10 minutes
– Elaborative encoding provides benefit to normal subjects but not to Alzheimer’s patients
– Overall predictive accuracy 95% in identifying Alzheimer’s patients from normal controls (Knopman & Ryberg. *Arch Neur.* 1989;46:141)
– May be difficult to differentiate depression from Alzheimer’s disease (O’Carroll, et al. *Psych Med.* 1997;27:967)
– Can be administered via phone or in person
Delayed Word Recall and Mortality

Minnesota Cognitive Acuity Screen (MCAS)

Developed for telephonic use
Tests 9 domains
Impaired group – 210 elderly nursing home residents with dementia (avg. age 82.4 yrs)
Unimpaired group – 129 seniors without dementia (avg. age 73.8 yrs)
Weighted analysis of each domain score used to discriminate impaired from unimpaired
Reported Sn 97.5%; Sp 98.5%; PPV 88%

# Minnesota Cognitive Acuity Screen (MCAS)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>Person, place, time</td>
</tr>
<tr>
<td>Attention</td>
<td>Multiple digit repetition</td>
</tr>
<tr>
<td>Memory</td>
<td>Delayed word recall (10 words)</td>
</tr>
<tr>
<td>Language</td>
<td>Follow multi-step command</td>
</tr>
<tr>
<td>Repetition</td>
<td>Sentence repetition</td>
</tr>
<tr>
<td>Naming</td>
<td>Identify object described</td>
</tr>
<tr>
<td>Computation</td>
<td>8 simple math problems</td>
</tr>
<tr>
<td>Judgment</td>
<td>4 judgment questions</td>
</tr>
<tr>
<td>Verbal Fluency</td>
<td>Name fruits and vegetables</td>
</tr>
</tbody>
</table>

Minnesota Cognitive Acuity Screen (MCAS)

Comments

– High Sn/Sp
– Incremental improvement over MMSE and DWR alone
– Used telephonic and face-to-face
– Convenience sample used – could impact discriminating ability of test
– Not validated against mild dementia or mild cognitive impairment
– Potential for cheating exists with almost any telephonic assessment tool
MCAS and Mortality

381,049 LTCi applicants administered MCAS from 1999 to August 2008

MCAS score -3.0 to 3.0

Impaired ≤ 0.0 (5.6%); Not Impaired > 0.0 (94.4%)

Deaths determined from Social Security Death Master File

Mortality rates from 2008 smoking unknown, select and ultimate, age last birthday Valuation Basic Table

Hauser, P *On the Risk* 2010; 26:54
MCAS and Mortality

Figure 1
Mortality Ratios by MCAS Score

Figure 3
Mortality Ratios by MCAS Score and Test Age

Hauser, P, On the Risk 2010; 26:54 – Reproduced with permission
Enhanced Mental Skills Test (EMST)

Developed by Medical Care Corporation (MCC)
Based on CERAD Battery and Validated in Study
Published in the Proceedings of the National Academy of Sciences (2005)
High Sensitivity for Detecting MCI
Multiple Domains
9 Balanced Word Lists
No Reliance on a Single Cut-off Score
Can Be Administered via Phone or In-Person
# Enhanced Mental Skills Test (EMST)

<table>
<thead>
<tr>
<th>MCI vs. normal-aging test</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWL* with CA**-weighted scoring</td>
<td>94</td>
<td>89</td>
</tr>
<tr>
<td>Object delayed recall with proactive interference</td>
<td>85</td>
<td>89</td>
</tr>
<tr>
<td>Clock drawing test</td>
<td>75</td>
<td>76</td>
</tr>
<tr>
<td>MMSE</td>
<td>61-71</td>
<td>80-85</td>
</tr>
<tr>
<td>7-minute test</td>
<td>28</td>
<td>?</td>
</tr>
</tbody>
</table>

*NIA CERAD 10-word list

**Correspondence analysis

Adapted from Shankle WR et al. *PNAS* 2005;102:4919
EMST Test Components

Comprehension
– Applicant must respond to simple, clear directions

Three Learning Trials of 10 Words Each
– Repetition and Encoding: Applicant repeats each word to assure correct encoding
– Working Memory: Applicant immediately recalls as many words as possible

Metamemory/Judgment and Insight
– Applicant is told a final free recall will be completed after a time delay and is required to estimate the number of words she/he will recall

Abstract Reasoning: Distraction Phase: Triadic Animal Comparison
– Applicant chooses which of three (3) animals is least similar
– 9 animals, 12 sets of comparisons
– Roughly 3-5 minutes to complete
– Task is largely independent of race, culture and individual differences
EMST Test Components (continued)

Delayed Free Recall
- Applicant recalls as many of original 10 words as possible

Delayed Cued Recognition: Item Cues
- Applicant is asked if specific words were included in original word list

Delayed Cued Recall: Category Cues
- Applicant recalls as many animals from triadic comparison as possible
EMST and Mortality

The Relationship Between Cognitive Impairment and Mortality Among Long Term Care Insurance Applicants (LifePlans Study)

- Analyzed mortality data based on DWR and EMST results
- Telephonic and In-Person assessments from 1996 through 2008
- Mortality data from Social Security Master Death File
  - DWR
    - 764,037 lives
    - 5.8 million exposure years
    - 160,255 deaths
  - EMST
    - 132,719 lives
    - 376,000 exposure years
    - 2,263 deaths

EMST and Mortality

Survival Function for DWR Classification

EMST and Mortality

Survival Function for EMST Classification

EMST and Mortality

Table 3: Relative Mortality Ratios by Age, Gender, Test Sample, and Classification Result

<table>
<thead>
<tr>
<th>Classification</th>
<th>Grand Total</th>
<th>Male Total</th>
<th>Female Total</th>
<th>&lt;65</th>
<th>65-69</th>
<th>70+</th>
<th>&lt;65</th>
<th>65-69</th>
<th>70+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitively Impaired</td>
<td>202%</td>
<td>161%</td>
<td>236%</td>
<td>209%</td>
<td>312%</td>
<td>232%</td>
<td>121%</td>
<td>187%</td>
<td>199%</td>
</tr>
<tr>
<td>Cognitively Intact</td>
<td>98%</td>
<td>101%</td>
<td>97%</td>
<td>87%</td>
<td>97%</td>
<td>112%</td>
<td>95%</td>
<td>100%</td>
<td>108%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Classification</th>
<th>Grand Total</th>
<th>Male Total</th>
<th>Female Total</th>
<th>&lt;65</th>
<th>65-69</th>
<th>70+</th>
<th>&lt;65</th>
<th>65-69</th>
<th>70+</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWR Cognitively Impaired</td>
<td>178%</td>
<td>163%</td>
<td>190%</td>
<td>107%</td>
<td>150%</td>
<td>231%</td>
<td>108%</td>
<td>136%</td>
<td>191%</td>
</tr>
<tr>
<td>Cognitively Intact</td>
<td>91%</td>
<td>93%</td>
<td>89%</td>
<td>59%</td>
<td>93%</td>
<td>102%</td>
<td>70%</td>
<td>93%</td>
<td>103%</td>
</tr>
</tbody>
</table>

Cognitive Screens Used – LTCI Industry

LifePlans LTC Underwriting Survey  November 2010
# Cognitive Screens Used – Life Industry

<table>
<thead>
<tr>
<th>Test</th>
<th>Currently Use</th>
<th>Plan to Use</th>
<th>No Current Plan to Use</th>
<th>No of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWR</td>
<td>3</td>
<td>4</td>
<td>16</td>
<td>23</td>
</tr>
<tr>
<td>Clock Drawing</td>
<td>2</td>
<td>4</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>MMSE</td>
<td>1</td>
<td>4</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>SPMSQ</td>
<td>1</td>
<td>3</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Info from APS</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Info from PHI</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Researching</td>
<td></td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td><strong>Total No Respondents</strong></td>
<td><strong>5</strong></td>
<td><strong>5</strong></td>
<td><strong>15</strong></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>

Clinical Screening for Cognitive Impairment

Annual Medicare Wellness Visit Now Includes Screening for Cognitive Impairment

Workgroup Convened by Alzheimer’s Association to Make Recommendations on Cognitive Screening

Principles – Tool Should
- Take <5 minutes to administer
- Be appropriately validated
- Be easily administered by non-physician clinical staff
- Be available free of charge in the clinical setting

Recommended Screening Tools
- Memory Impairment Screen (MIS)
- General Practitioner Assessment of Cognition (GPCOG)
- Mini-Cog

Cordell CB et al. Alzheimer’s & Dementia. Published online Dec 2012
Mini-Cog

Components
- 3 word delayed recall
- Clock drawing – 11:10, 8:20 or 1:45

Scoring
- 0-5 scale
- 1 point for each word recalled
- 0 or 2 points for clock drawing; abnormal or normal (all numbers in correct sequence and approximately correct position; 12/2/6/9 in anchor positions; hands of appropriate lengths and in correct position)

- Interpretation
  • 4-5 normal
  • 0-3 abnormal

http://www.alz.org/documents_custom/minicog.pdf
Neuropsychological Testing - Components

**Intellectual Functioning**
- Wechsler Adult Intelligence Scale (WAIS)
- Stanford-Binet Intelligence Scale (SBIS)

**Neuropsychological Functioning**
- Orientation – Mini Mental State Exam (MMSE)
- Language – Boston Naming Test (BNT), Animal naming, verbal fluency
- Visuospatial/Construction – Rey Complex Figure Test (RCFT), Hooper Visual Organization Test (HVOT), Trail A Test
- Attention/Information Processing – Digit span, Stroop Color-Word Test
- Memory (visual/auditory) – Wechsler Memory Scale
- Executive Functioning – Wisconsin Card Sorting Test (WCST), Clock Drawing, Trails B
- Motor Functioning – Finger tapping

**Assessment of Mood**
- Beck Depression/Anxiety Inventories (BDI/BAI)
- Geriatric Depression Scale (GDS)
Summary

The prevalence of dementia is increasing
Mild cognitive impairment precedes dementia by many years and the initial symptoms are subtle
Healthcare providers often do not screen for early cognitive impairment, but this is changing
There is significant morbidity and mortality associated with dementia
Newer cognitive screening tests are available that can detect early dementia and perhaps mild cognitive impairment
Selected References


4. Cordell CB, Borson S, Boustani M. Alzheimer’s Association recommendations for operationalizing the detection of cognitive impairment during the Medicare Annual Wellness Visit in a primary care setting. *Alzheimer’s & Dementia*. Published online Dec 2012.


