

Diagnosing Dementia in Long Term Care Facilities

37th Annual Meeting - CALTCM

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True or False!

- Over 75% of nursing home residents meet MDS-based criteria for dementia.
- MDS 3.0 utilizes direct mental state assessment as part of cognitive assessment.
- A delirium assessment is one component of establishing a dementia diagnosis

Overview

- Dementia prevalence
- Consequences of Cognitive Impairment
- Practical approaches to diagnosis
- MDS 3.0 – Brief Interview of Mental Status (BIMS)
- Diagnostic Conundrums
- Management Issues

Dementia Ascertainment

- Many nursing home residents have cognitive impairment
- Variety of etiologies:
 - Comorbid conditions
 - Medications
 - Dementia-related illness
- Limited data on prevalence due to:
 - Lack of reliable methods (observational approaches)
 - Lack of valid ascertainment in diverse populations
- Prevalence estimates: 25% to 74%

Prevalence – one study*

- 2285 new admissions – 59 Maryland NHs
- Interviews with residents, staff, significant others
- Medical records including MDS evaluations
- Applied DSM-III-R criteria (expert panel)
- Within-rater kappa: 0.77; agreement 83%
- 48.2 % given diagnosis of dementia
 - 20.3% indeterminate (e.g., missing data, delirium or other confounders)

* Magaziner, et al. Gerontologist 2000;40:663-72

Adverse Consequences

- 73% dependent in toileting , transfers, continence, and feeding versus 21% for others (non-demented, indeterminate)
- Advanced dementia continues to be treated with antipsychotic medications without clear indication
- Prediction of 6-month survival remains relatively poor (AUROC: 67-68%)

Mitchell SL, et al. JAMA 2010;304:1929-35.

Practical Approaches to Diagnosis

- **DSM-IV Criteria**
- **Screening**
- **Observation (subjective) versus Objective Assessment**

DSM-IV Dementia Diagnosis

- An acquired impairment in multiple areas of intellectual function: memory + (language, praxis, object recognition, or executive function)
- Interferes with either occupational or social functioning or interpersonal relationships and represents a decline
- Is not secondary to delirium

Screening

- A basic tenet of geriatric assessment and nursing home care
- USPHTF conclusions about primary care do not apply
- 50% pre-test probability
- Prevalence of related symptoms moves us past the screening debate
- Creates greater risk for false attribution

Subjective versus Objective Assessment

- Prior MDS 2.0 assessment was observational (subjective)
- Observational items included in MDS derived cognitive scales (Cognitive Performance Scale (CPS); MDS Cogs)
- Correlation between facility-originated scales and Mini-Mental State Exam scores: $r = .65-.75$
- CPS requires complex calculation
- MDS Cogs may over-estimate level of severity

Rationale for Specific Cognitive Changes

- **New cognitive items:**
 - **Directly test domains common to most cognitive tests in other settings – working memory, temporal orientation, recall**
 - **Partial credit for close answers & response to prompts increases population-based relevance**
 - **Similar to those used in other well-known brief screeners**
 - **Direct measurement of cognitive function improves accuracy and is feasible in long-term care setting**

Cognitive Performance Scale (CPS)

- MDS items completed during routine MDS assessments by staff who knew residents and typically perform assessments
- Items include:
 - Whether resident is comatose (excluded)
 - Intact short-term memory
 - Cognitive skills for daily decision-making
 - Understood by others
 - Independence in eating
- Hierarchical scoring system: 0="intact"; 6="very severe impairment"

BIMS Test Details

Task	Points
Repeat 3 words	3
Give category cues (for use later)	
Current year if correct	3
If incorrect but within – 1 year	(2)
– 2 to 5 years	(1)
Current Month correct within 5 days	2
Incorrect, but within 6 days to 1 month	(1)
Current day of week	1
Recall of 3 words	6
2 points for each word	
1 point for each word requiring cue	
Total Score	15

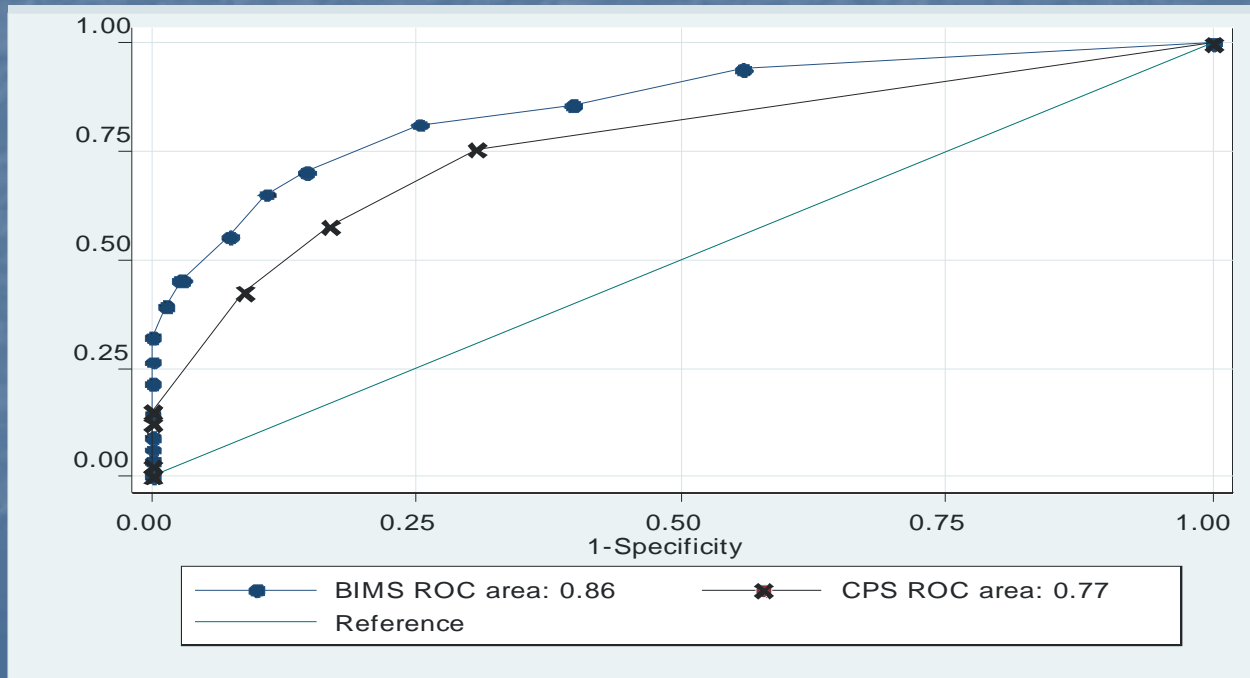
Pilot Results

- 374 of 417 residents approached (89.7%) completed both the 3MS and BIMS-R
- 212 residents also received a facility nurse-administered BIMS (BIMS-N)
- Mean age: 74 yrs; SD: 11.7; Range: 37-99
- 19.0% were 85 years and older (n=71)
- 214 at least high school educated (25% missing data)
- 213 (68.7%) White/Caucasian

Instrument Development₁

Receiver Operator Characteristic Curves (ROC)

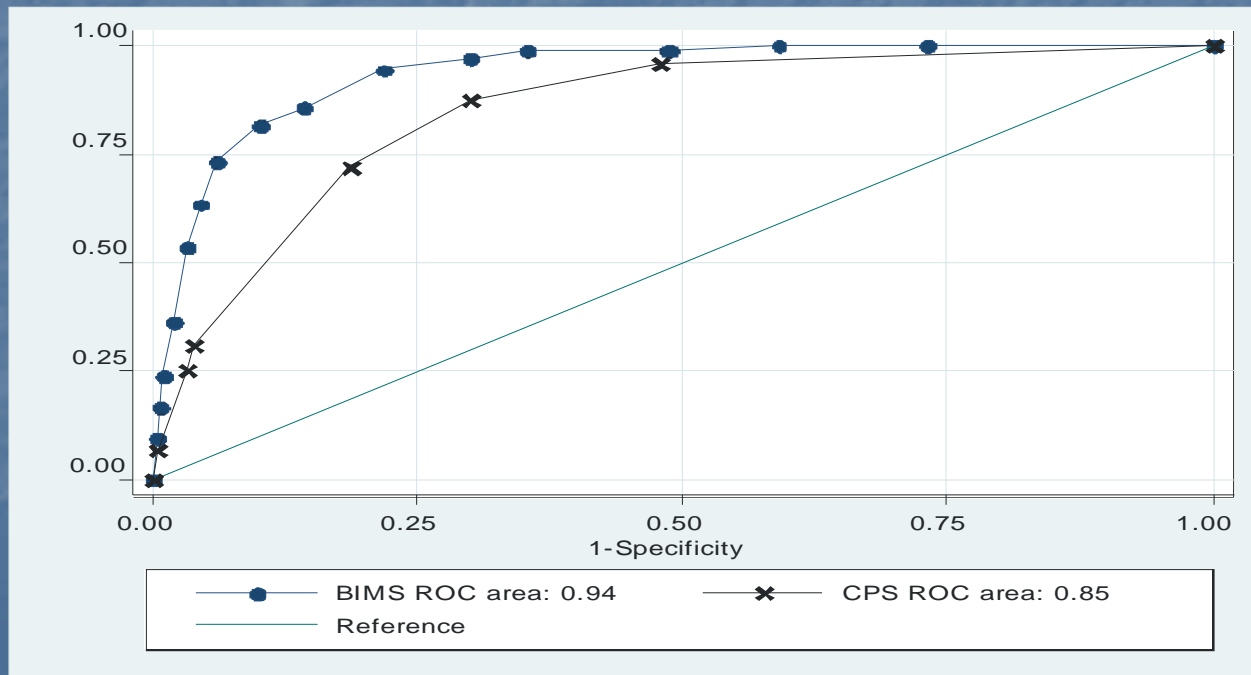
BIMS Versus CPS for Identifying Any Impairment (3MS < 78)



Instrument Development₂

Receiver Operator Characteristic Curves (ROC)

BIMS Versus CPS for Identifying Severe Impairment (3MS < 48)



MDS 3.0 Cognitive Assessment National Validation

Brief Interview for Mental Status (BIMS)

New structured test replaces staff assessment for residents who can be understood

Staff Assessment for Mental Status

Only completed for residents who cannot complete interview

Modified Mini-Mental State Exam (3MS)

Gold standard measure, an expanded version of the Mini-Mental State exam (MMSE) range: 0-100

BIMS Validation Test

- One gold standard nurse administered BIMS
- The other administered the 3MS
- Conducted independently within 24 hours of each other
 - Order and assessor switched for ½ the sample
- MDS 2.0 collected per facility protocols on entire validation sample in same time frame
- 85% were able to complete the BIMS

Validation Sample

Age Distribution for Validation Sample

<u>Age</u>	<u>Percent (%) n=418</u>
<65	15
65-84	43
<u>≥85</u>	42

Validation Sample₂

3MS (Gold Standard Measure) Distribution

<u>3MS Groups</u>	<u>Percent</u>
Intact/Mild (78-100)	43
Moderate impairment (77-48)	30
Severe impairment (<48)	26

Time to Complete BIMs

- From Validation Interviews
- Most common time
 - 2 Min
- Average time
 - 4 Min



How Well Does BIMS Versus CPS Detect Impairment?

Predicting Any Cognitive Impairment (3MS <78)

	AUC	Optimal Cut Point	Sensitivity	Specificity
BIMS Score	.930	≤ 12	0.83	0.91
CPS Score	.824	2	0.84	0.67

Predicting Severe Cognitive Impairment (3MS <48)

	AUC	Optimal Cut Point	Sensitivity	Specificity
BIMS Score	.960	≤ 7	0.83	0.92
CPS Score	.857	3	0.75	0.82

BIMS Has Excellent Test Performance

- BIMS: higher correlation with gold-standard measure
 - MDS 3.0 BIMS = 0.91 ($p < .0001$)
 - MDS 2.0 CPS = -0.74 ($p < .0001$)
- BIMS predicting 3MS: gender & age not significant
- MDS 2.0 CPS predicting 3MS: $p = .0001$ for age

DSM-IV Dementia Diagnosis

- An acquired impairment in multiple areas of intellectual function: memory + (language, praxis, object recognition, or executive function)
- Interferes with either occupational or social functioning or interpersonal relationships and represents a decline
- Is not secondary to delirium

A Confusing Case of Confusion

- 89 year old woman, Mrs. D., transferred from the inpatient unit, unable to care for herself
- Hospitalized for pneumonia
- Living at home, clearly failing at home (retrospective review)
- Trouble with bathing, dressing, transfers, and continence
- Transient “confusion” during hospitalization

First Questions

- Has there been pre-hospitalization cognitive impairment?
- Is there cognitive impairment now?
- Are there current exacerbating factors?

“Pre-morbid” State

- **Essential to establish prior to “institutionalization”**
- **Family interview: waning memory of past year, less social interaction**
- **Check on her home during hospitalization: uncharacteristically dirty, multiple unpaid bills and late notices**

Admission NH Assessment

- History and physical
- BIMS = 7
- Delirium assessment
- Medications

BIMS Test Details

Task	Points
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Confusion Assessment Method

- 1) Acute onset and fluctuating course
 - AND
- 2) Inattention
 - AND EITHER
- 3) Disorganized thinking
 - OR
- 4) Altered level of consciousness
 - 95% sensitivity and specificity
 - Meta-analysis (2008) of 1,071 patients:
 - Sens:94%; Spec: 89%

Relationship Between Dementia and Delirium

- Dementia strongest risk factor: 25-75% of patients with delirium have dementia (5-fold risk increase)
- Cohort of 193 older patients diagnosed with delirium at admission or 1st week of hospitalization

Delirium Type	Overall (N=193)	Dementia (N=136)	No Dementia (N=45)
Prevalent	165 (85.5)	123 (90.4)	33 (73.3)
Incident	28 (14.5)	13 (9.6)	12 (26.7)

Mrs. D.

- History revealed atrial fibrillation treated with Digoxin 0.125mg and warfarin 2 mg with an INR of 2.1; osteoarthritis; and stress incontinence
- On clonazepam for anxiety
- Other hospital labs: mild anemia, otherwise normal
- Not inattentive (3 of 3 on immediate recall); attended to the interview

Medications That Challenge Cognition

- Benzodiazepines
- Tricyclic antidepressants (amitriptyline)
- Other anticholinergic medications (diphenhydramine, meclizine)
- Narcotics
- Drugs with narrow therapeutic windows (digoxin)
- Withdrawal states

Does Mrs. D. Have Dementia?

- 92% specificity of severe cognitive impairment per 3MS criteria
- Consider taper of clonazepam in favor of antidepressant (serotonin reuptake inhibitor – SSRI)
- Monitor and retest cognition in 6 weeks
- If unchanged, probable dementia

Does Mrs. D. Have Depression?

Major Depression

Depressive symptoms/anxiety
Subacute onset of dementia
associated with mood changes
History of depression
Aphasia, apraxia absent
Orientation generally intact
Concentration impaired
Patient emphasizes memory
complaints
Patient gives up on testing

Alzheimer's

Euthymia
Insidious onset of dementia
History of depression less
common
Aphasia, apraxia present
Orientation impaired
Recent memory impaired
Patient minimizes memory
complaints
Patient makes effort on testing

True or False

- Over 75% of nursing home residents meet MDS-based criteria for dementia.
- MDS 3.0 utilizes direct mental state assessment as part of cognitive assessment.
- A delirium assessment is one component of establishing a dementia diagnosis

Conclusion

- Dementia is common but there is a risk to attribute other symptoms to this diagnosis.
- MDS 3.0 represents a significant improvement in cognitive impairment recognition and in diagnostic accuracy.
- Dementia can be diagnosed using a practical application of DSM-IV in a majority of cases.

Additional Slides

How Well Does BIMS Detect Impairment of Different Severity?

BIMS Scores Predicting Any Cognitive Impairment (3MS <78)

BIMS Scores	True Positive	False Positive	Sensitivity	Specificity
11	0.65	0.01	0.65	0.99
12	0.73	0.03	0.73	0.97
13	0.83	0.09	0.83	0.91

Receiver Operating Characteristic Curve (ROC) AUC = 0.93

BIMS Scores Predicting Severe Cognitive Impairment (3MS <48)

BIMS Scores	True Positive	False Positive	Sensitivity	Specificity
6	0.73	0.03	0.73	0.97
7	0.79	0.05	0.79	0.95
8	0.83	0.08	0.83	0.92

Receiver Operating Characteristic Curve (ROC) AUC= 0.96

N= 375 for all analyses (for residents completing BIMS, MDS 2.0 CPS, and 3MS)

How Well Does MDS 2.0 CPS Detect Impairment of Different Severity?

CPS Scores Predicting Any Cognitive Impairment (3MS < 78)

CPS Scores	True Positive	False Positive	Sensitivity	Specificity
3	0.59	0.12	0.59	0.88
2	0.83	0.33	0.84	0.67

Receiver Operating Characteristic Curve (ROC) AUC = 0.82

CPS Scores Predicting Severe Impairment (3MS < 48)

CPS Scores	True Positive	False Positive	Sensitivity	Specificity
5	0.27	0.02	0.27	0.98
4	0.37	0.02	0.37	0.98
3	0.82	0.25	0.82	0.75

Receiver Operating Characteristic Curve (ROC) AUC = 0.86

(AUC: 1 = a perfect test ; 0.5 = worthless)

N= 375 for all analyses (for residents completing BIMS, MDS 2.0 CPS, and 3MS)

Instrument Development₁

- Focused on 3 commonly tested domains of cognitive function (memory, orientation, judgment)
- Selected from existing interview and scoring metrics typically used for testing such domains
- Candidate items tested in 374 residents in 6 VA NHs

Instrument Development₂

- Compared Brief Interview of Mental Status (BIMS) and MDS 2.0 CPS
- Modified Mini-Mental State Exam (3MS) expanded version of Mini-Mental State Exam (MMSE) range: 0-100 as gold standard
- Research assistants administered BIMS and 3MS to all subjects; Facility nurses administered same BIMS to sub-sample

References

- McCusker J. The course of delirium in older medical inpatients: a prospective study. *J Gen Intern Med.* 2003;18:696-704.
- Magaziner, et al. The prevalence of dementia in a statewide sample of new nursing home admission aged 65 and older: diagnosis by expert panel. *Gerontologist* 2000;40:663-72.
- Inouye SK, et al. Clarifying confusion: the confusion assessment method. A new method for detection of delirium. *Ann Int Med.* 1990;113:941-948.
- Chodosh J, et al. Nursing home assessment of cognitive impairment: Development and testing of a brief instrument of mental status. *J Am Geriatr Soc.* 2008;56:2069-2075.
- Gallagher PF, et al. Inappropriate prescribing in an acutely ill population of elderly patients as determined by Beers' criteria. *Age and Ageing* 2008;37:96-101.
- Mitchell SL, et al. Prediction of 6-month survival of nursing home residents with advanced dementia using ADEPT vs. hospice eligibility guidelines. *JAMA* 2010;304:1929-35.