Comments from the Hebrew Rehabilitation Center on Aging (HRCA):

Suggestions for Modifications to Delirium Items for MDS Version 3.0

Authors: Marcantonio ER, Murphy KM, Rabinowitz T, Morris JN.

A. Background: Delirium is a clinical syndrome characterized by the acute onset of a disturbance in consciousness accompanied by a reduced ability to focus, sustain, or shift attention[1, 2]. It may foreshadow impending death in as many as 25 percent of hospitalized inpatients[3-6] and may be a source of significant morbidity in those who present with this syndrome[7]. Elie et al[8] reported that dementia was the predisposing risk factor most strongly associated with delirium.

Delirium in the elderly has been described in the medical literature for thousands of years[9-12], and clinicians who care for elderly persons encounter the condition every day. In elders, the signal feature of the condition is a disturbance of consciousness in association with a recent decline in cognition that cannot be attributed to a preexisting or evolving dementia. Unlike dementia, which is a global deterioration of mental functioning that usually evolves over a long period of time (i.e., weeks to years with little if any waxing and waning), delirium develops rapidly, usually over hours to days, shows fluctuations in severity, and may be reversed if the causative agent(s) is removed. Delirium is frequently superimposed on a preexisting dementia and differentiation between the two conditions may be difficult or impossible[13]. Perceptual disturbances including illusions are common and delusions and hallucinations may occur because of mental disorganization.

Though the pathophysiology of the condition is unclear, delirium is often associated with causal factors outside the brain itself. It is often the first, and sometimes the only, sign of illness in old age. Conventional wisdom suggested that successful detection and treatment of the condition causing the delirium would lead to a return of baseline cognitive function in the majority of cases. However more recent findings dispute this notion and suggest that delirium may lead to irreversible dementia and in some cases death, particularly in the frailest populations[14, 15]

Studies demonstrate that delirium is a significant problem among elders in acute, post-acute care and long-term care settings. Prevalence rates of delirium in acute hospital settings vary from about 10% at admission[16] to 60% during the hospital stay[17]. Incidence rates vary from 7% among frail elders admitted to a geriatric assessment unit [18] to 41% among functionally independent, postoperative, elective orthopedic patients [19]. In post-acute settings delirium symptom prevalence rates approach 23% and have been found to be persistent and associated with poor functional recovery[14, 15]. In long nursing home settings, prevalence rates have been found to range from 6% to 13% [20, 21].

B. Diagnosis of Delirium in Elders: Signs and symptoms of delirium are often missed by clinicians, particularly in acutely ill, elderly patients, where clinical manifestations of delirium are often attributed to progressive dementia or some other cause. Studies of delirium among hospitalized elders show that it is underrecognized by both physicians and nurses[22-26]. In a study comparing diagnosis of acute confusional state in two prospective clinical studies with diagnosis in the clinical records, investigators found that both physicians and nurses diagnose the condition unsatisfactorily and document the patient's mental status poorly[23]. Even nurses, who spend more time with patients than physicians, often miss delirium among elderly patients, even when using a

standardized instrument designed for delirium detection such as the Confusion Assessment Method (CAM)[27].

The MDS 2.0 contains six items that are useful for detection of delirium in elders. It is desirable to have an assessment instrument with as few items as possible, and we believe that three or possibly two delirium-related items could be retained in the next MDS without adversely affecting sensitivity or specificity. To support our contention, we present recent clinical data below regarding the sensitivity and specificity of the six delirium items.

C. Sensitivity and Specificity of MDS Delirium Items in a Post-Acute Care Sample

A series of 146 consecutive subjects admitted to four post-acute skilled nursing facilities were studied. After informed consent, subjects were evaluated by trained interviewers using a validated four-step delirium assessment, which included the Mini-Mental State Exam, Digit Span, Delirium Symptom Interview, and Memorial Delirium Assessment Scale. Delirium was diagnosed using the Confusion Assessment Method Diagnostic Algorithm. Results from these interviews serve as the "gold standard."

Facility nurses also evaluated these patients using the six MDS delirium items. These nurses had participated in a one-hour training session focusing on assessment and management of delirium. Because this was a post-acute population, and the nurses had little knowledge of the patients baseline, they were only asked to rate whether the symptom was present or not, (codes "1 and 2" from the MDS were combined). The results of the nurse ratings are described in the table below.

MDS Symptom	Triggered in Delirious (N=37)	Triggered in not Delirious (N=109)	*Likelihood Ratio Positive (Sensitivity/1-Specificity)	**Likelihood Ratio Negative (1-sensitivity /specificity)
A. Easily Distracted	24/37=.65	9/109=.08	8.1	0.38
B. Altered Perception or Awareness	8/37=.22	4/109=.04	5.5	0.81
C. Disorganized Speech	14/37=.38	3/109=.03	12.7	0.64
D. Restlessness	8/37=.22	2/109=.02	11.0	0.80
E. Lethargy	7/37=.19	3/109=.03	6.3	0.84
F. Mental Function Varies	18/37=.49	7/109=.06	8.2	0.54
Any Symptom A-F	**27/37=.73**	**12/109=.11**	**6.6**	**0.30**
***Symptoms A, C, F**	**27/37=.73**	**11/109=.10**	**7.3**	**0.30**
***Symptoms A, F**	**27/37=.73**	**11/109=.10**	**7.3**	**0.30**

*Likelihood Ratio Positive: This tells you how much more likely delirium is if a particular item is triggered. The higher this number, the better. A value of 1 yields "no information." For instance, if "easily distracted" is triggered, delirium is 8.1 times more likely.

**Likelihood Ratio Negative: This tells you how much less likely delirium is if a particular item is NOT triggered. The lower this number, the better. A value of 1 yields "no information." For instance, if "easily distracted" is NOT triggered, delirium is 0.38 times as likely.

***The results of these analyses show that **FOR THIS DATASET**, the number of MDS delirium items could be reduced to 3, or even 2, with no loss of sensitivity, and slightly improved specificity (that is, fewer false positives). Therefore, a strategy that has nurses assess only two symptoms: "Easily Distracted" and "Mental Function Varies over the Course of the Day," has

73% sensitivity and 10% specificity for delirium. Of note, these two symptoms are those suggested for inclusion in the current MDS 3.0 version draft (along with "Acute change in mental function").

D. Sensitivity and Specificity of MDS Delirium Items in a Long-Term Care Sample

We also studied 182 long stay subjects who were current residents or new admissions/transfers to 4 nursing facility units. Facility nurses evaluated these residents on at least a bi-weekly basis using the 6 MDS delirium items for a 12 month period. These nurses had participated in a one-hour training session focusing on early detection and assessment of delirium. Because this was a long-stay population where nurses were able to determine the subjects baseline cognitive status, for purposes of this study, a subject was defined to have symptoms of delirium if he/she received a code of "2" (new onset/worsening) on any of the six delirium items. Whenever a resident met these study criteria for MDS delirium, facility nurses also completed the Confusion Assessment Method (CAM) (Inouye et al), a 5-minute validated test for detecting delirium. The results of the nursing assessments are described in the table below. Because the nurses were not asked to complete the CAM if the resident did not meet criteria for MDS delirium we are not able to calculate true sensitivity and specificity of these items in this sample. We also examined whether combinations of MDS items would lead us to the same conclusions as previously described in the PAC sample and found that combinations of items C or F (both of which have been found to be associated with death in this population), or items A, C or F yield sensitivities of .83 and .86 respectively.

MDS Symptom	Triggered in CAM Delirious (N=36)
A. Easily Distracted	15/36=.42
B. Altered Perception or Awareness	20/36=.55
C. Disorganized Speech	22/36=.61
D. Restlessness	24/36=.67
E. Lethargy	23/36=.64
F. Mental Function Varies	23/36=.64
Any Symptom A-F	36/36=1.00
Symptoms A, C, F	31/36=.86
Symptoms A, F	26/36=.72
Symptoms C, F	30/36=.83

E. Suggestions:

1) We would recommend maintaining 3 item concepts from MDS Version 2.0 for Version 3.0:
   - Easily distracted (Item E3a) – present in draft Version 3.0 and an integral item on the CAM
   - Disorganized speech (Item E3c) – concept associated with death in long term care resident samples and corresponds to the "disorganized thinking" item in the CAM
   - Mental function varies (Item E3f) – concept associated with death in LTC samples, is present in draft Version 3.0, and is an integral item on the CAM

2) Because clinicians around the country are very familiar with the MDS 2.0 definitions of the above terms we would recommend maintaining the definitions of these items in their Version 2.0 format. As noted previously, nurses have been found to miss signs of delirium during routine clinical care when using only the CAM items as defined in the proposed MDS Version 3.0.

3) We agree with including an item on acute change in mental function as noted in Version 3.0. This item should be defined to include examples of acute changes to avoid missing important cases in persons with baseline dementia: Example: "Acute change in mental status from patient's baseline (e.g., increased restlessness, lethargy, difficult to arouse, altered environmental perceptions)."

4) We believe in maintaining the coding responses in Version 2.0 as they help to differentiate delirium from dementia.

5) Because post-acute care nurses often do not know the patient's baseline mental status, the delirium RAP should be triggered in PAC patients if any of the suggested items are present (any code "1" or "2"). For the long-stay population, where facility staff usually become familiar with the resident's baseline mental status, to prevent over triggering it may be more prudent to trigger the RAP when any delirium item represents an acute change (new onset/worsening) from baseline (Code "2")

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