



A Team Approach to Delirium Prevention



OREGON
GERIATRIC
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CENTER

The Oregon Geriatric Education Center

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Why delirium?

- Delirium is a medical emergency that causes permanent brain damage if not managed quickly and correctly
- Most practitioners currently under-recognize delirium, potentially harming our patients
- Prevention and treatment of delirium requires a true interprofessional approach, and is worth the effort...**it saves lives!**





Ms. Perez

84 years old, admitted to the hospital with a heart attack

Receives appropriate medical care including a stent but becomes restless, agitated, confused, and pulls her lines and Foley catheter on the third night



More on Ms. Perez:

The social worker talks with Ms. Perez's daughter and discovers that over the last year or two, the patient has become more forgetful and hadn't taken her cardiac medications in several weeks. She has gotten lost driving a couple times, but has never told her doctor any of this. She drinks two cocktails daily. The social worker relays this information to Ms. Perez's doctor.

Ms. Perez' doctor reviews her medication list which includes metoprolol, atorvastatin, lisinopril, and diphenhydramine. Since hospitalization, clopidogrel and oxycodone were added. She's gotten a few doses of promethazine for nausea, and a dose of lorazepam last night for trouble with sleep.

Could you have prevented delirium in Ms. Perez?

How common is delirium?

Delirium Rates

Hospital:

- Prevalence (on admission) 14-24%
- Incidence (in hospital) 6-56%

Postoperative:

15-53%

Intensive care unit:

70-87%

Nursing home/post-acute care:

20-60%

Delirium Mortality ...

In-hospital mortality:

22-76%

One-year mortality:

35-40%



What causes delirium?

Dementia

Electrolytes

Lungs, liver, heart, kidney, brain

Infection

Rx (especially medications)

Injury, pain, stress

Unfamiliar environment

Metabolic



Preventing versus Treating Delirium

- Delirium complicates 2.3 million hospitalizations annually and accounts for 49% of all hospital days
- 20% of hospitalized patients over 65 develop delirium
- Mortality rate in older patients with delirium is 22-76%
- We spend over \$8 billion annually on delirium
- 30% of patients with delirium **STILL HAVE SYMPTOMS** 6 months later
- **GOOD EVIDENCE** that we can prevent delirium
- **NO EVIDENCE** that we can change the course of delirium once it develops

We really need to focus our attention on prevention!



Preventing Delirium: Things to do on Admission

Assessing for risk of delirium

Medical Doctor	Pharmacist	Registered Nurse	PT/OT	Social Work
High risk medications	High risk medications	Underlying dementia Tool: Mini-cog	Poor functional status	Obtain hx: Med adherence, substance abuse, personal losses, support
Alcohol use Tool: CAGE	Risk of withdrawal; Paxil if NPO	Functional impairment	Poor physical performance	



Drugs most likely to cause delirium

Direct Medication Effects:

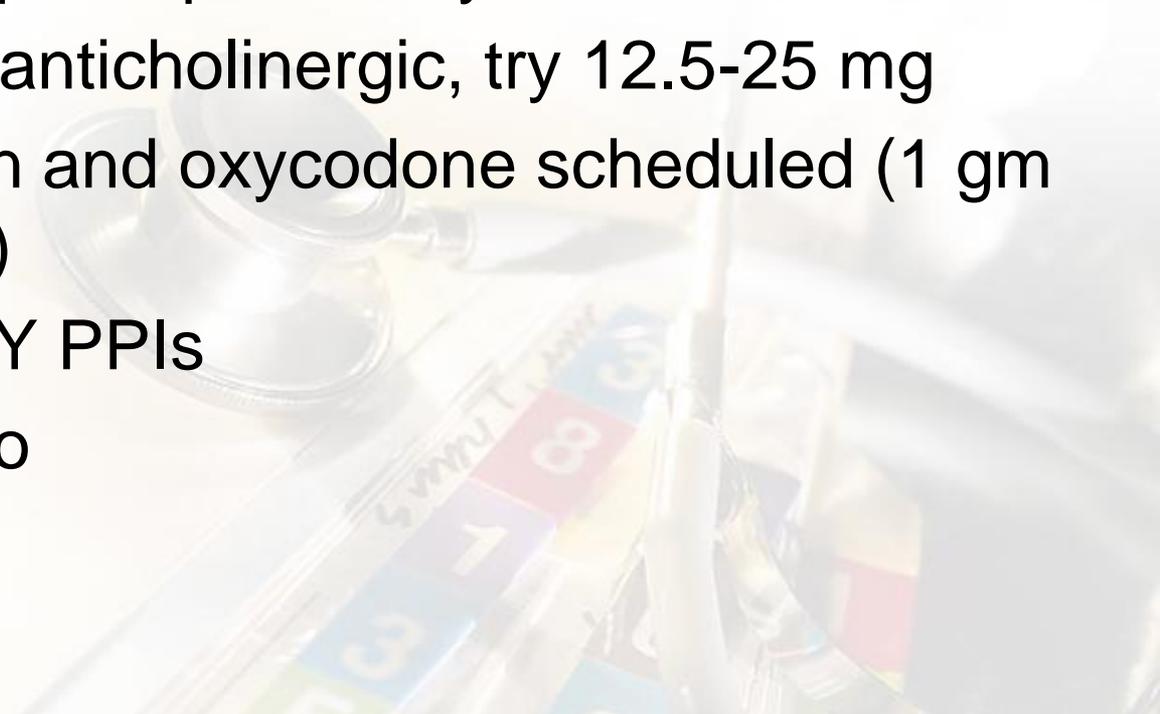
- *Anticholinergics* (e.g., diphenhydramine), TCAs (e.g., amitriptyline, imipramine), antipsychotics (e.g., chlorpromazine, thioridazine)
- Anti-inflammatory agents, including prednisone
- Benzodiazepines or alcohol — acute toxicity or withdrawal
- Cardiovascular (e.g., digitalis, antihypertensives)
- Diuretics
- Histamine blockers (e.g., cimetidine, ranitidine)
- Lithium
- Opioid analgesics (especially meperidine)

Medication/Substance Withdrawal syndromes

- Clozapine, Paxil, alcohol are biggest offenders



What should you use instead?

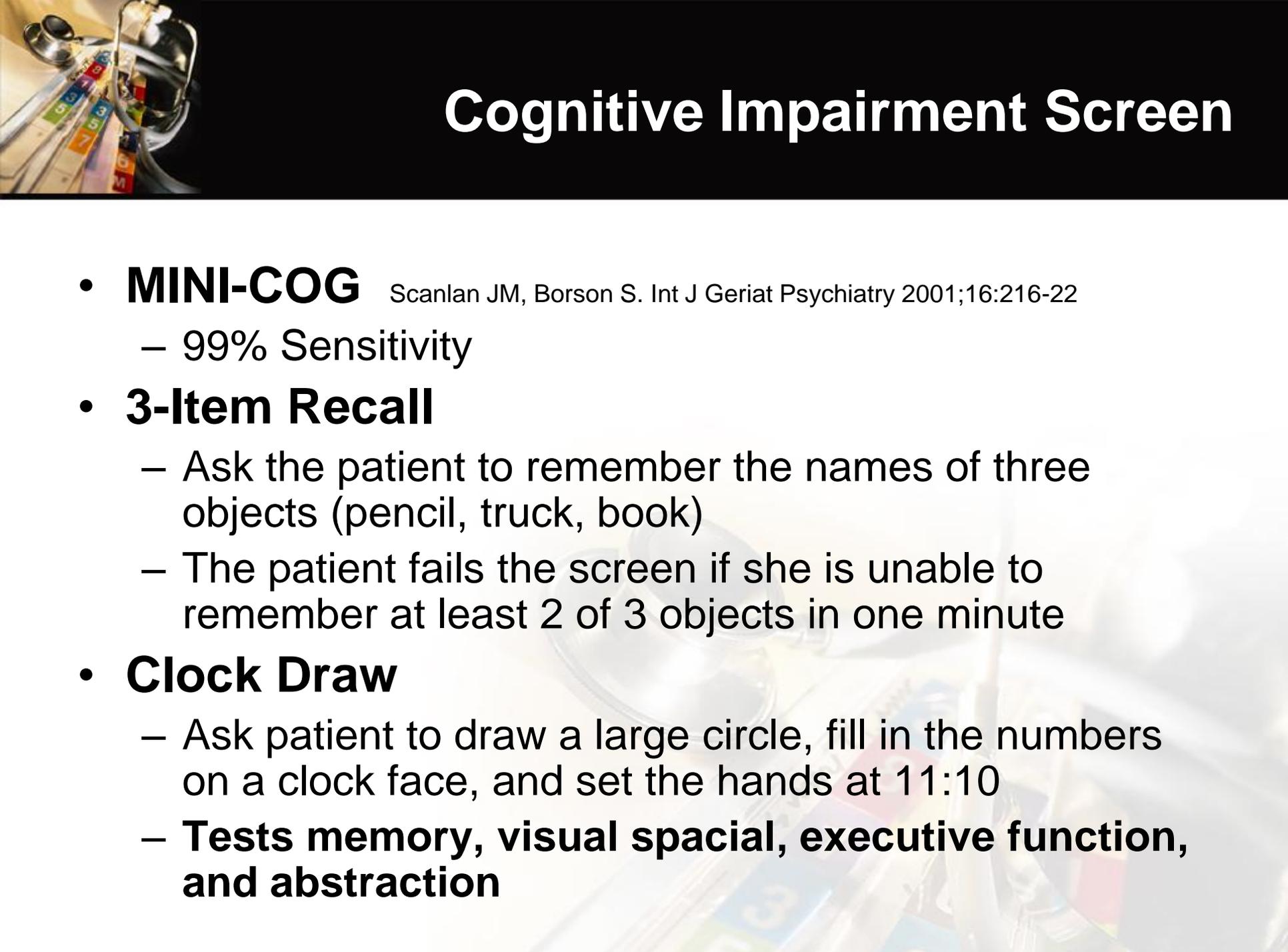
- Nausea- suggestive evidence that ondansetron is better
 - Sleep- No drugs are truly safe in older people
 - Back rub, warm milk, relaxing music
 - Rozerem may help sleep/wake cycle
 - Trazodone mildly anticholinergic, try 12.5-25 mg
 - Pain- acetaminophen and oxycodone scheduled (1 gm q8 and 2.5-5 mg q 8)
 - GI prophylaxis: ONLY PPIs
 - Citalopram or lexapro
- 



CAGE Questions for Alcohol Use

- Have you ever felt the need to **Cut** down on drinking?
- Have you ever felt **Annoyed** by criticism of your drinking?
- Have you ever had **Guilty** feelings about your drinking?
- Do you ever take a morning **Eye opener** (a drink first thing in the morning to steady your nerves or get rid of a hangover)?

*NOTE: 2 Positive answers yields →
75% sensitivity & 95% specificity for alcoholism*



Cognitive Impairment Screen

- **MINI-COG** Scanlan JM, Borson S. Int J Geriatr Psychiatry 2001;16:216-22
 - 99% Sensitivity
- **3-Item Recall**
 - Ask the patient to remember the names of three objects (pencil, truck, book)
 - The patient fails the screen if she is unable to remember at least 2 of 3 objects in one minute
- **Clock Draw**
 - Ask patient to draw a large circle, fill in the numbers on a clock face, and set the hands at 11:10
 - **Tests memory, visual spacial, executive function, and abstraction**



Functional Assessment

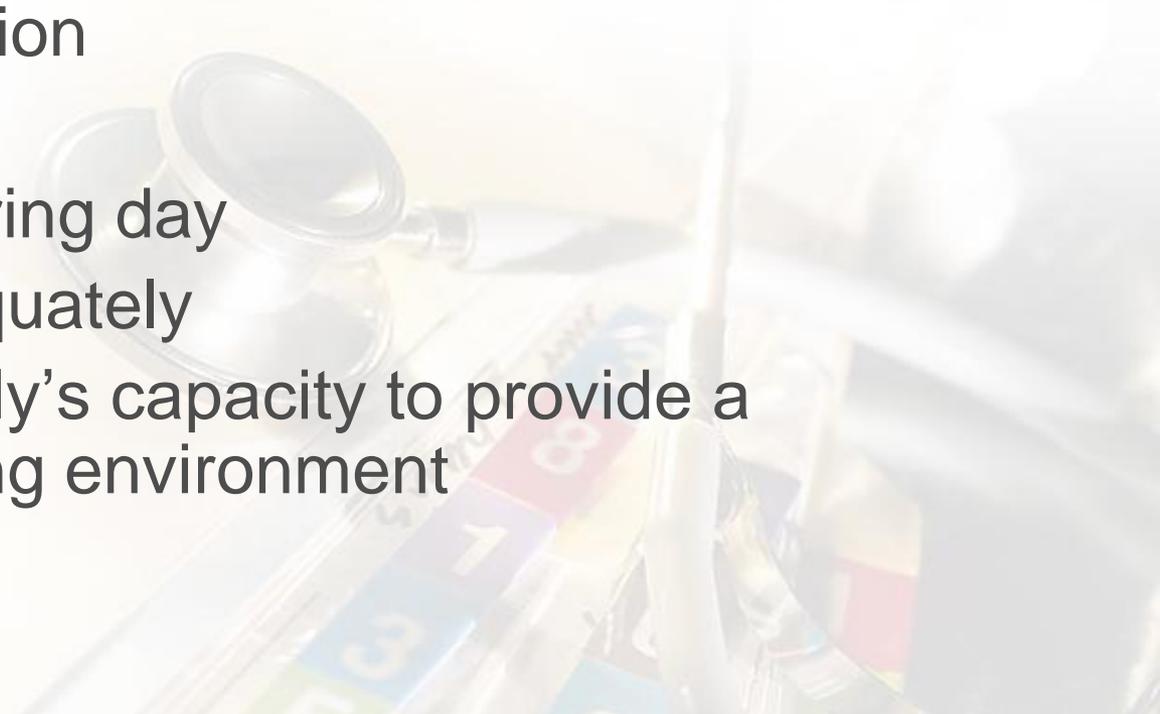
- Poor functional status increases risk of delirium
- Easy to perform
 - Timed Up and Go
 - Activities of Daily Living
- Impairment may be minimized by PT and OT
- If impairment present or likely after surgery or medical illness, early planning for short term rehab can optimize hospital length of stay

Malani PN. JAMA 2009;302:1582-3.



If the patient is high risk for delirium

The entire team (MD, RN and SW) work together to develop a plan of care which may include:

- Frequent orientation
 - Ensure hearing aids and/or glasses always on
 - Maintain hydration
 - Manage sleep
 - Keep active during day
 - Treat pain adequately
 - Determine family's capacity to provide a calming/orienting environment
- 



Applying what we know to Ms. Perez

**Ms. Perez is at
very high risk.**

Ms. Perez has at least a 50%
risk of developing delirium
due to:

- Underlying dementia
- Impairment in IADLs
- Alcohol use
- Diphenhydramine,
promethazine, lorazepam



A better care plan



She could have benefitted from:

- Frequent orientation
- Use of glasses and hearing aids
- Increased mobility
- Removal of the Foley Catheter.

In terms of medication:

- Best practices would recommend stopping diphenhydramine
- Using a non-pharmacological sleep protocol
- Avoiding lorazepam and promethazine

It is best to partner with your entire team to accomplish all these things!



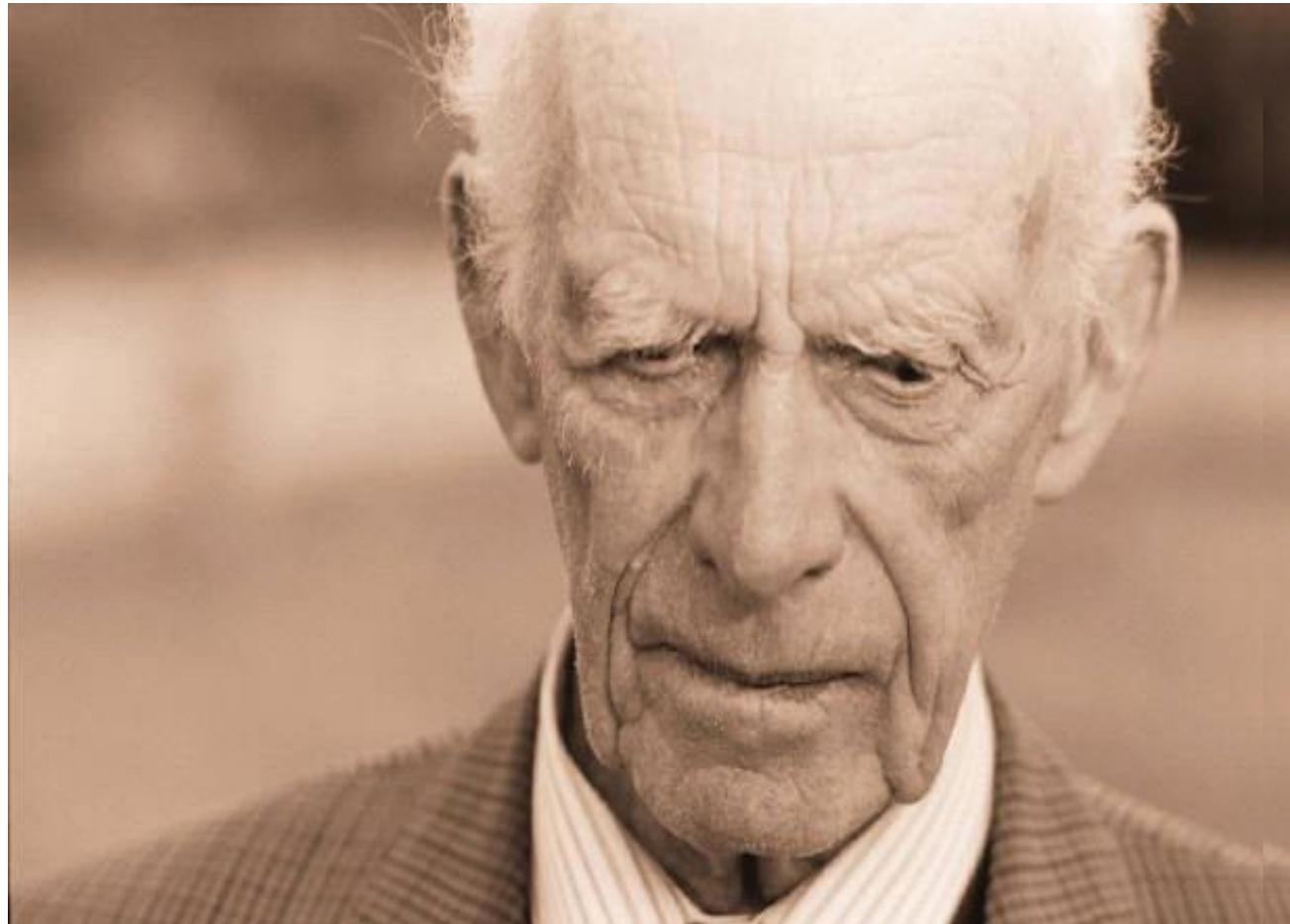
Mr. Drew

82 YO, Alzheimer's

Brought to ED with
combative behavior

Diagnosed with
pneumonia

In hospital, restless,
given Lorazepam 2
mg IV and slept till
next day. Then
combative again



Mr. Drew



More on Mr. Drew:

In the ED he was febrile, tachycardic and short of breath. O2 saturation was 84%. CXR showed L lower lobe consolidation, and he was admitted for treatment of pneumonia.

During his first night in the hospital, he was restless, pulling at his IV and oxygen tubes and needing frequent redirection to stay in bed. Several times during the night he attempted to get out of bed. The nursing staff called the on call MD who gave 2 mg IV of lorazepam which caused Mr. Drew to fall asleep after 25 minutes. Nursing staff were unable to rouse him until the following afternoon. Upon awakening, Mr. Drew became agitated and struck out at staff again.





Assessing for delirium using the CAM

Applicable to patients in any hospitalized setting
(Different versions used in acute care and ICU)

Can be done in one minute conversation with the verbal patient or with specific assessments for the non-verbal patient

CAM assessment has four features:

1. Is there an acute change in mental status over baseline?
Does it fluctuate over time – are there periods of lucidity?
Does it increase and decrease in severity?
2. Does the patient exhibit inattention?
3. Is the patient's thinking disorganized?
4. Does the patient have an altered level of consciousness?

-Inouye, SK et al Annals Int Med 1990;113:941-48



Feature 1: *Acute Onset/Fluctuating Course**

Is there evidence of an acute change in mental status from the patient's baseline?

Does the (abnormal) behavior fluctuate over time – are there periods of lucidity? Does it come and go during the day or increase and decrease in severity?

This feature is best obtained from someone close to the patient or at the patient's bedside. Positive responses indicate the presence of Feature 1.

*Assessed in the same way for both verbal and non-verbal patients.



Feature 2: *Inattention*

Does the patient exhibit inattention?

For verbal patients:

Does the patient have difficulty focusing attention, for example, being easily distractible, or having difficulty keeping track of what was being said?

Have the patient spell WORLD backwards or name the days of the week backwards. Inability to do these things indicates inattention

For non-verbal patients, use the ASE Letter test:

- ASE letters
 - Directions: Say to the patient “I am going to read you a series of 10 letters. Whenever you hear the letter “A” indicate by squeezing my hand.”
Read letters from the following letter list in a normal tone.
S A V E A H A A R T
 - Scoring: Errors are counted when patient fails to squeeze on the letter “A” and when the patient squeezes on any letter other than “A”.
 - > 3 errors indicates inattention**



Feature 3: *Disorganized thinking*

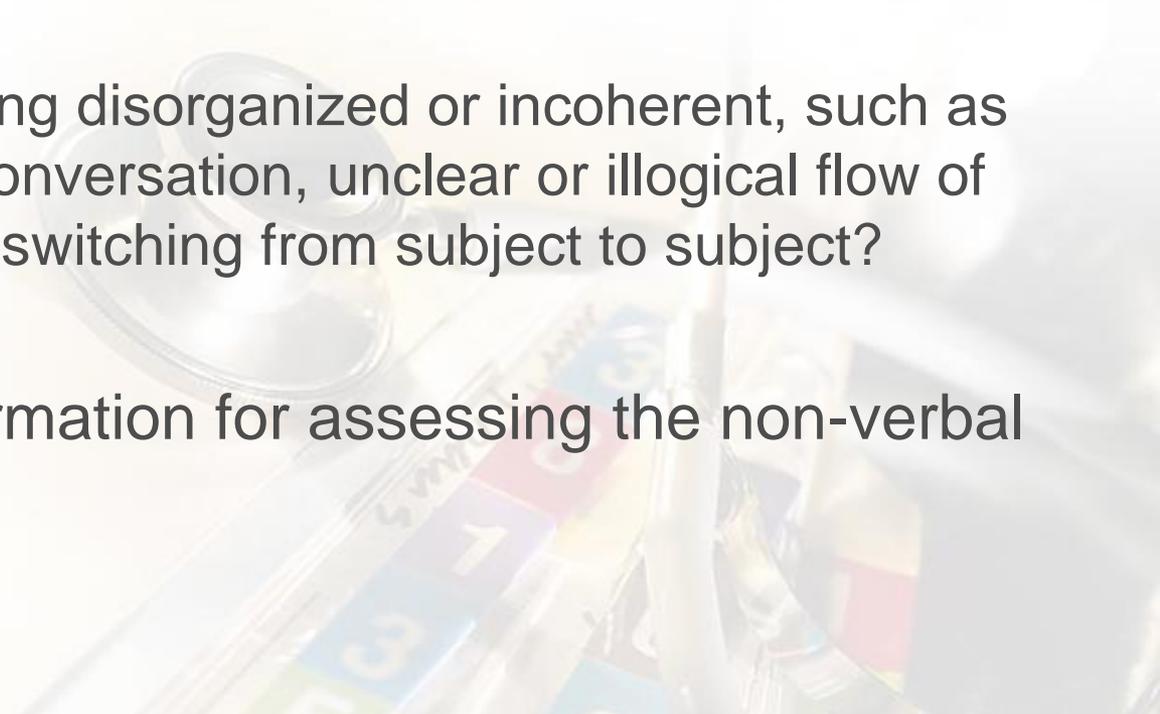
Is the patient's thinking disorganized?*

Verbal patients

This feature is shown by a positive response to the following question:

Was the patient's thinking disorganized or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject?

*Next slide provides information for assessing the non-verbal patient.



Disorganized Thinking for Non-verbal patients

Part A:

Directions: Say to the patient “I am going to read you a series of questions. Whenever you agree with the statement indicate ‘yes’ by squeezing my hand.”

Yes/No Questions (Use either Set A or Set B, alternate on consecutive days if necessary)

Set A

Will a stone float on water?

Are there fish in the sea?

Does 1 lb. Weigh more than 2 lbs?

Can you use a hammer to pound a nail?

Set B

Will a leaf float on water?

Are there elephants in the sea?

Do 2 lbs weigh more than 1 lb?

Can you use a hammer to cut wood?

Score: ____ (Pt earns 1 point for each correct answer out of 4)

Part B: Command

Say to pt: “hold up this many fingers” (Examiner holds two fingers in front of pt)

“Now do the same thing with the other hand” (Not repeating the number of fingers.)

** If pt is unable to move both arms, for the second part of the command, ask pt “add one more finger”

Score: ____ (Pt earns 1 pt if able to successfully complete the entire command)

Combined Score (part A + part B): ____ (out of 5)

Disorganized Thinking is present for any score < 4



Feature 4: *Altered Level of Consciousness*

Does the patient have an altered level of consciousness?

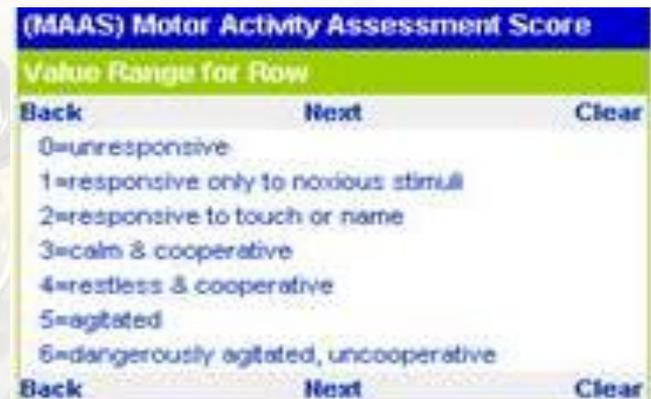
Non-ICU patient

This feature is shown by any answer other than “alert” to the following question: Overall, how would you rate this patient’s level of consciousness?

- Alert [normal]
- Vigilant [hyperalert]
- Lethargic [drowsy, easily aroused]
- Stupor [difficult to arouse]
- Coma [unarousable]

ICU patients

Use the Motor Activity Assessment Score (MAAS) – **any score other than 3** indicates altered level of consciousness



(MAAS) Motor Activity Assessment Score

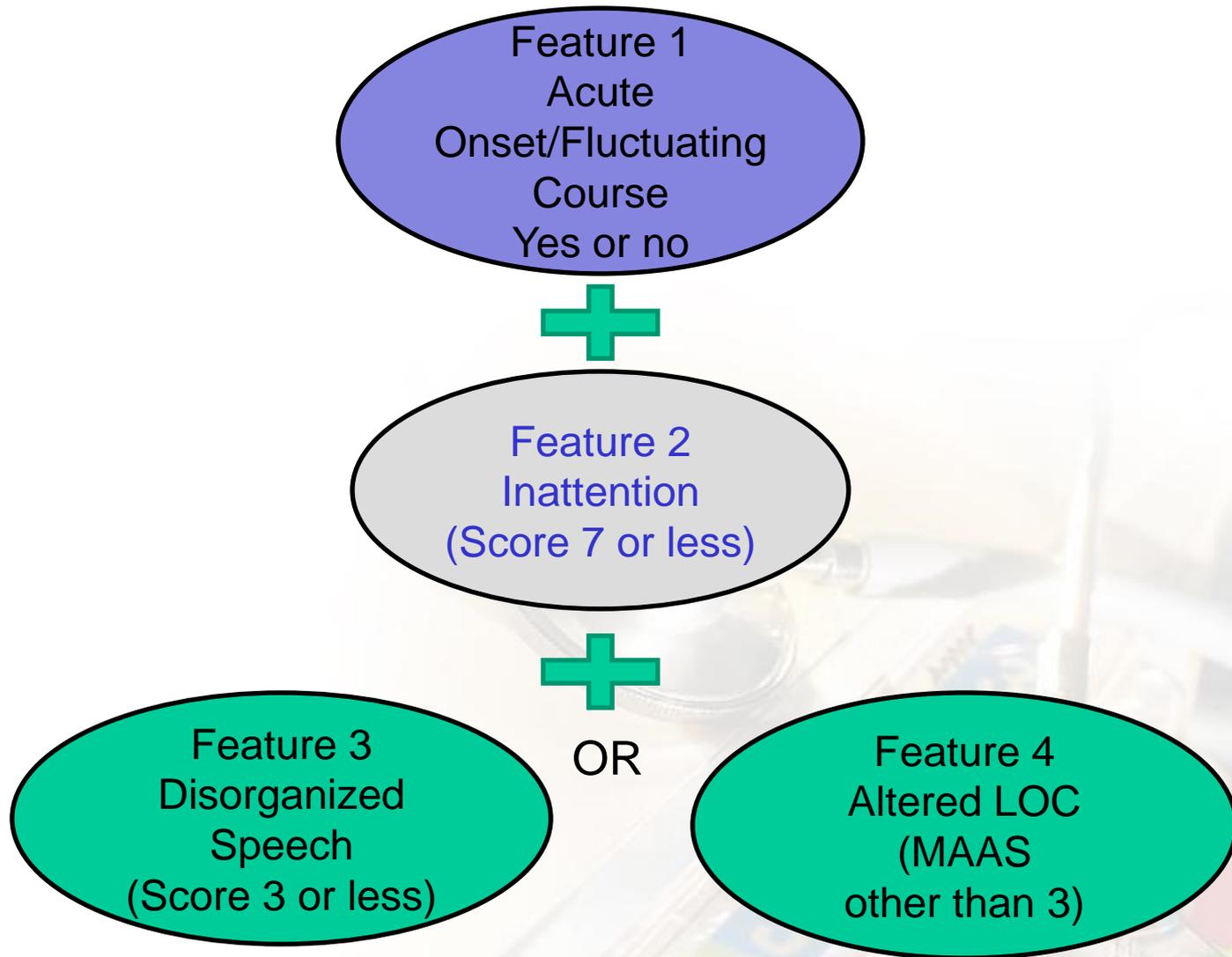
Value Range for Row

Back	Next	Clear
0=unresponsive		
1=responsive only to noxious stimuli		
2=responsive to touch or name		
3=calm & cooperative		
4=restless & cooperative		
5=agitated		
6=dangerously agitated, uncooperative		

Back Next Clear

A POSITIVE CAM

Must have feature 1 and 2 and either 3 or 4





Recognition of Delirium

- 32-66% of patients with delirium are unrecognized by physicians
- 69% of patients with delirium are unrecognized by nurses
- Risk factors for under-recognition: hypoactive delirium; advanced age, vision impairment, dementia

Inouye SK, Foreman MD, Mion LC, Katz KH, Cooney LM. Arch Intern Med. 2001;161:2467-2473

Mr. Drew



Disoriented, swats at air,
CAM positive

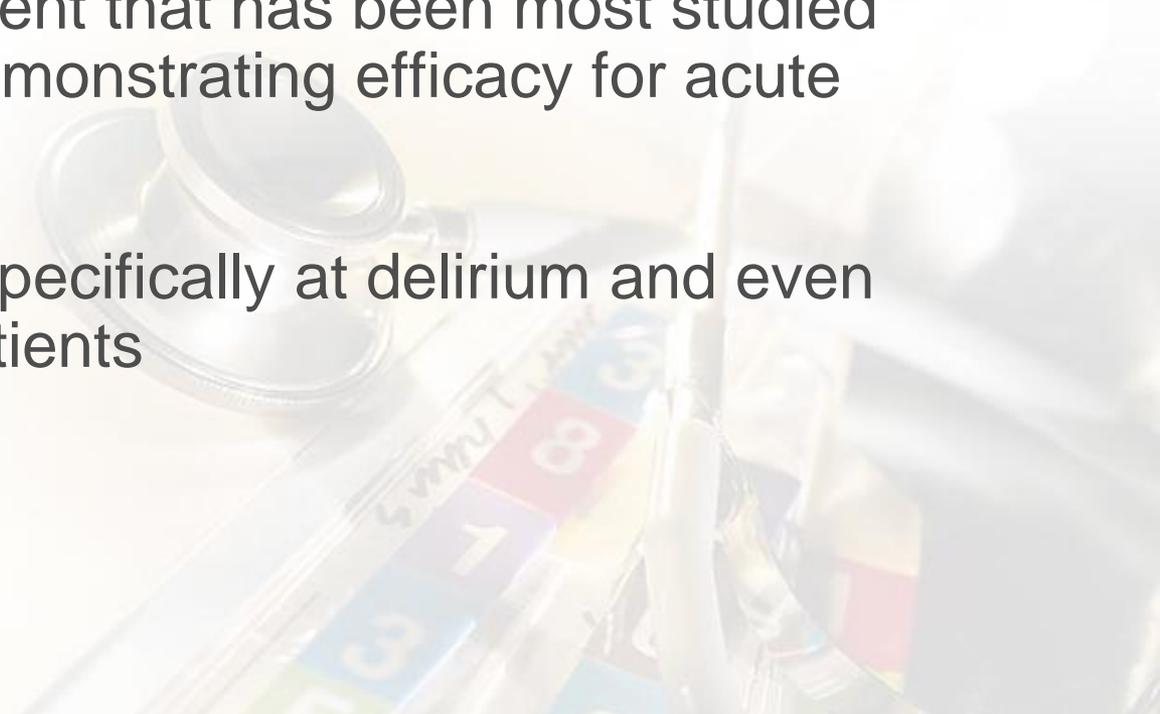
Treated with .5 mg IV
haloperidol, quetiapine
12.5 mg each night.
Given an additional dose
of haldol at 2 am and
stays in bed during the
night

Next day he awakes
clearer. Haldol is
discontinued.
Discharged to care
facility on oral antibiotics
and standing quetiapine
on day 3





Pharmacological Treatment of Delirium

- No drug has an official indication for treating behavioral symptoms of delirium
 - Haloperidol is the agent that has been most studied through the years demonstrating efficacy for acute agitation
 - Fewer studies look specifically at delirium and even fewer study older patients
- 

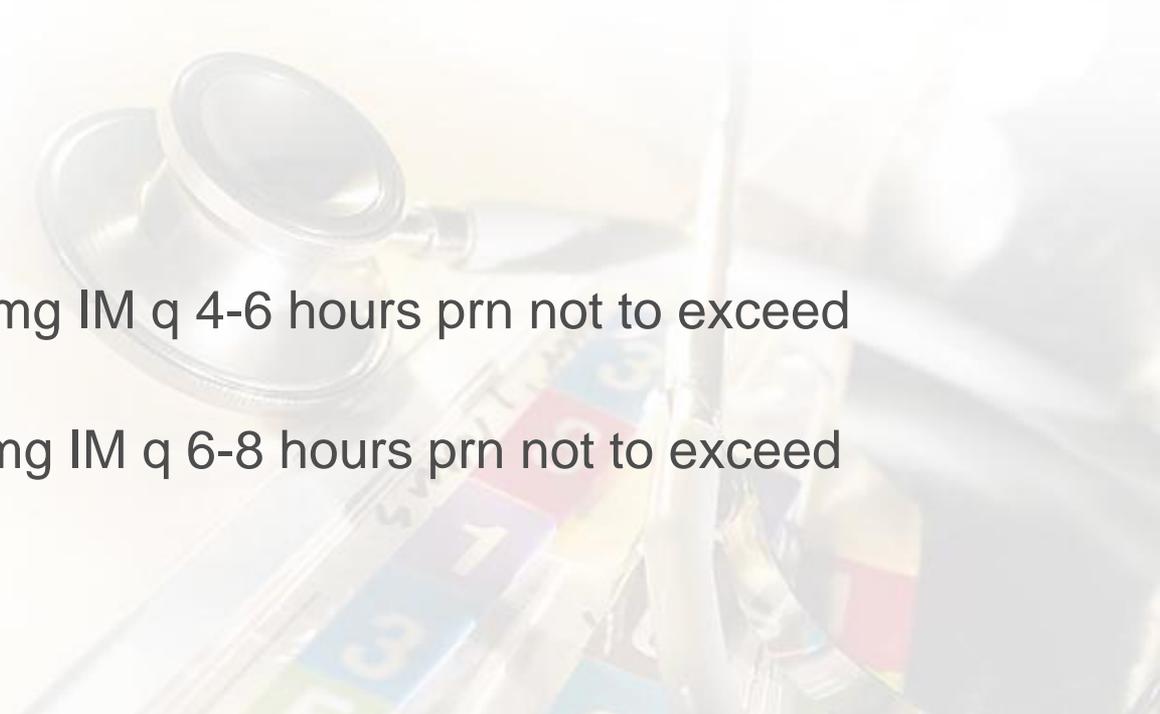


Why is haloperidol usually the first choice?

- First line agent in psychiatry and critical care practice guidelines – but not FDA approved, and no RCTs for efficacy and safety in critically ill patients to date
- Reasons it is first line:
 - Minimal anticholinergic side effects
 - No active metabolites
 - Can be administered IV - less Extra Pyramidal Side Effects (EPS) when given IV (**Rule of thumb: Patients over 65 should never get more than 4.5 mg haloperidol daily due to EPS**)
 - Less sedation than other neuroleptics/ benzodiazepines
 - Rare CV side effects
 - prolonged QT interval, may lead to torsades
 - usually high doses (>35mg/day)
 - obtain baseline ECG and monitor QTc interval



Can I use Atypical Antipsychotics?

- Studies suggest they are as efficacious as haloperidol
 - Possibly less EPS especially when compared with haloperidol dosages of $> 4.5\text{mg/d}$
 - Not available IV
 - IM options:
 - Olanzapine 2.5 - 5mg IM q 4-6 hours prn not to exceed 20mg/d
 - Ziprasidone IM 10mg IM q 6-8 hours prn not to exceed 30mg/d
- 



Treatment with Antipsychotics

- Can start with prn but if being used frequently consider adding low dose standing order:
 - Haloperidol 0.5-1 mg po qd - q4 hr up to 10 mg/d (best to stay below 4.5 mg/d if patient is over 65)
 - Quetiapine 12.5-25 mg po qd - q 4hr up to 150 mg/d (best choice for Parkinson's or Lewy Body)
 - Risperidone 0.25-0.5 mg po qd- q 4hr up to 2 mg/d
 - Olanzapine 2.5-5 mg po qd - q 4hr up to 10 mg/d
- Break through: haloperidol 0.25-1 mg IV or 0.5-2 mg IM or PO q1-2 hr prn
- Baseline and repeat EKG - for QT interval



Pharmacological Treatment Benzodiazepines

- Sedative/anxiolytic - generally avoid
- **EXCEPTION:** alcohol or benzodiazepine withdrawal
- Side effects: sedation, behavioral disinhibition, amnesia, ataxia, respiratory depression, physiological dependence, rebound insomnia, withdrawal reactions and delirium
- Benzodiazepine monotherapy ineffective as a treatment for delirium

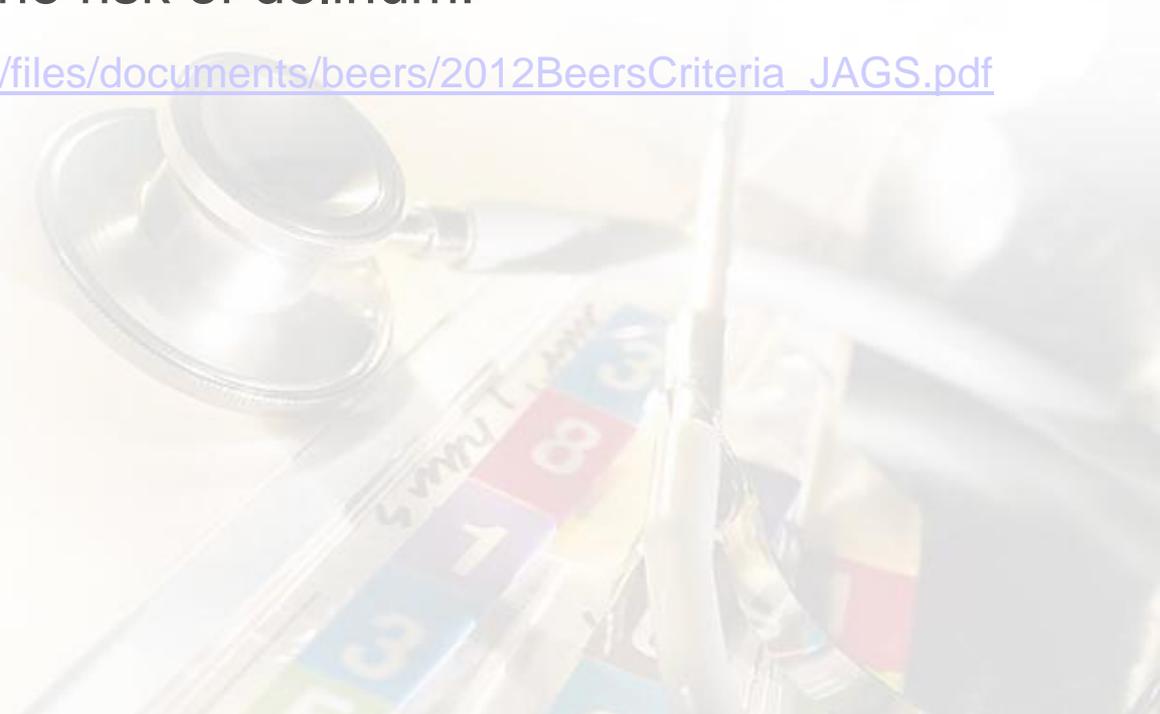


2012 Beers Criteria

American Geriatrics Society Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

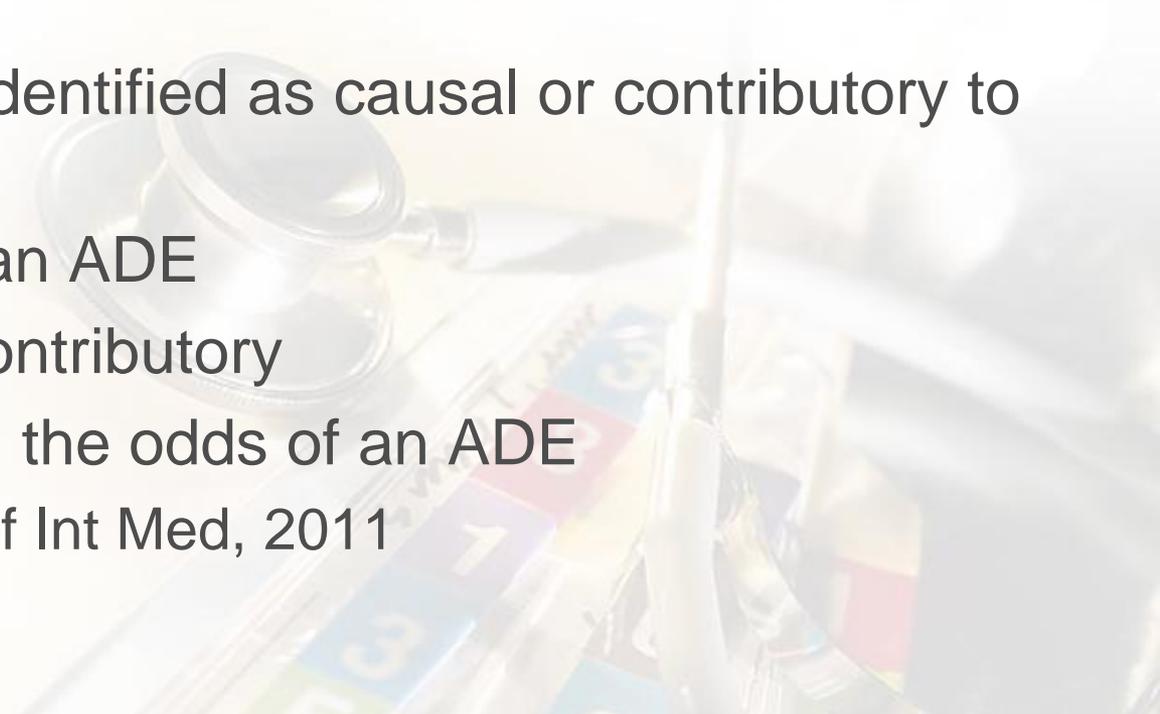
Medications increasing the risk of delirium:

http://www.americangeriatrics.org/files/documents/beers/2012BeersCriteria_JAGS.pdf





STOPP Criteria and Risk of ADEs in Hospitalized Older Adults

- 600 consecutive patients
 - 65 years or older, admitted with acute illness over a 4-month interval.
 - Potentially inappropriate medicines defined by both Beers and STOPP criteria.
 - Adverse drug events identified as causal or contributory to current hospitalization
 - 26% of patients HAD an ADE
 - 66% were causal or contributory
 - STOPP meds doubled the odds of an ADE
 - Hamilton, Archives of Int Med, 2011
- 



STOPP Medications

- PPIs for uncomplicated PUD at full dose for 8 weeks or longer
- Aspirin with no hx of CAD, CVD, PAD or occlusive arterial events
- Benzos in patients who have had 1 fall in the past 3 mo
- Duplicate drug class prescriptions
- Long-term (1 mo), long-acting benzodiazepines or benzodiazepines with long-acting metabolites
- Loop diuretic as first-line monotherapy for hypertension
- Long-term use of NSAIDs(3 mo) for mild joint pain in OA
- Long-term opiates in recurrent falls (1 fall in past 3 mo)
- Neuroleptic drugs in recurrent falls (1 fall in past 3 mo)

Hamilton H, Gallagher P, Ryan C, Byrne S, O'Mahony D. Arch Intern Med 2011;171:1013-9.



Depression or Delirium?



74 YO, admitted for elective knee replacement

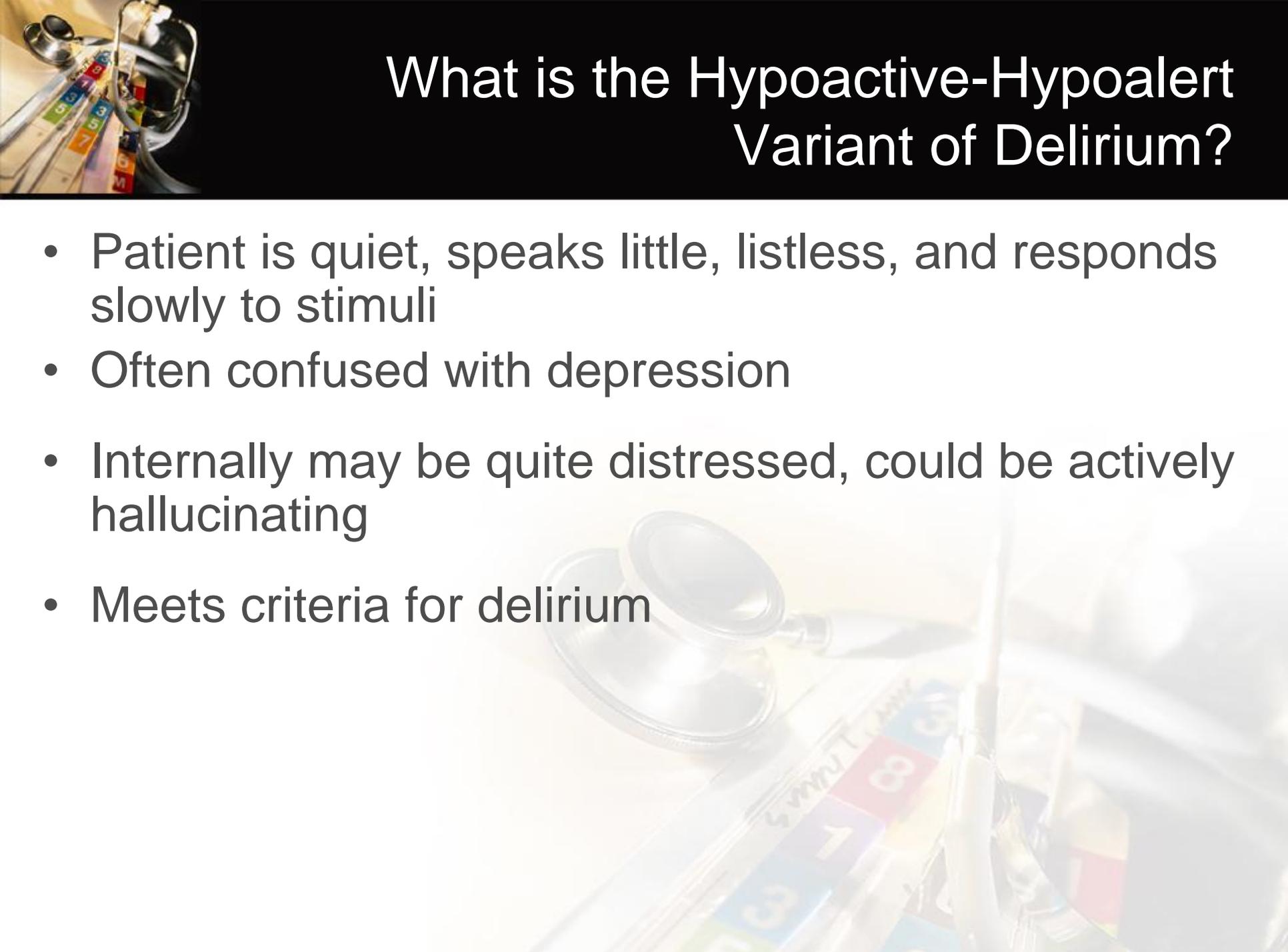
Day 1 doing well, follows 3 step command, exercises with PT

Day 2 staff notice he “isn’t as bright”, sleeping during the day, refuses to get out of bed and appears confused. He refuses to participate in OT exam and thinks he’s at home. His medication includes morphine for pain and diphenhydramine for sleep.

CAM positive for Delirium

Knee swollen, red, tender

Mr. Jones has a Foley and has been placed in a wrist restraint because he has been pulling at his IV.

A stethoscope and a pen are resting on a medical chart with colorful tabs. The stethoscope is silver and black, and the pen is silver. The chart has tabs in various colors (red, yellow, green, blue) with some text on them, including 'Symptoms' and 'Diagnosis'.

What is the Hypoactive-Hypoalert Variant of Delirium?

- Patient is quiet, speaks little, listless, and responds slowly to stimuli
- Often confused with depression
- Internally may be quite distressed, could be actively hallucinating
- Meets criteria for delirium



Mr. Jones is not depressed

Mr. Jones meets the criteria for hypoactive variant of delirium – multiple etiologies possible

Best practices:

- Discontinue diphenhydramine using minimal effective opioid doses and adding the non-pharm pain management strategies.
- Discontinue Foley and take off restraints





Consent for additional treatment

The surgeon recommends draining Mr. Jones' knee

Does he have the capacity to consent to the procedure?





Assessing Capacity for Decision Making

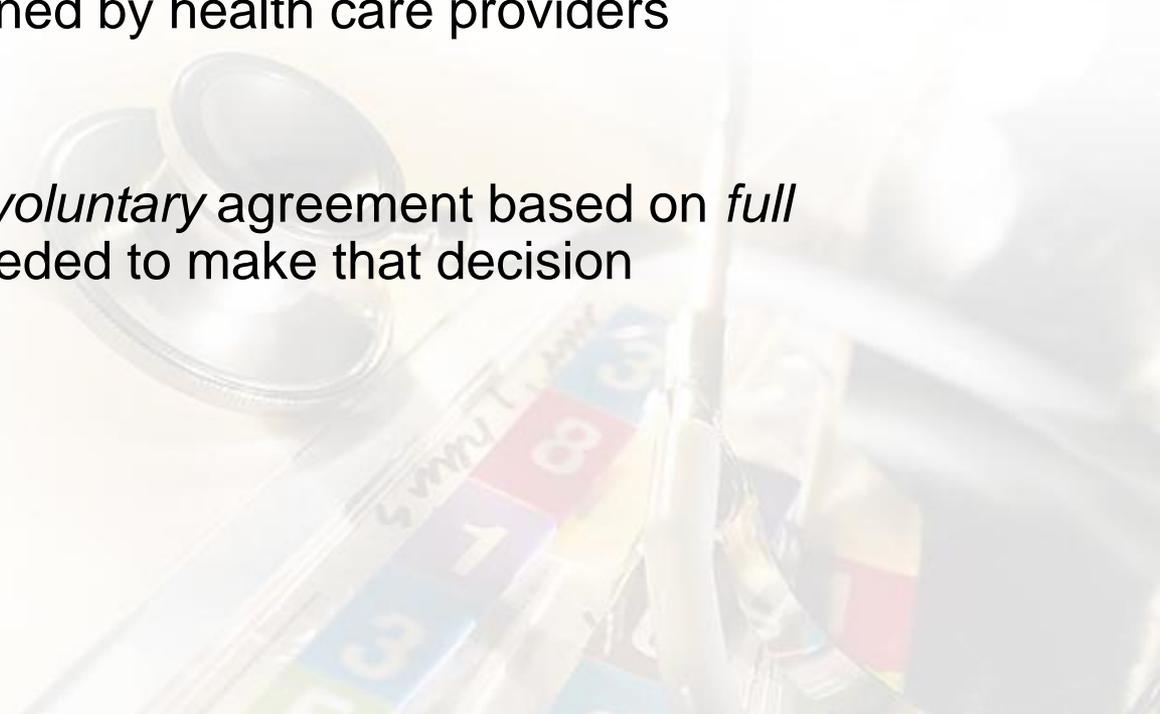
Competency

- Legal term, determined in a court of law

Capacity

- Clinical term, determined by health care providers

Informed Consent

- *Competent* person's *voluntary* agreement based on *full disclosure* of facts needed to make that decision
- 

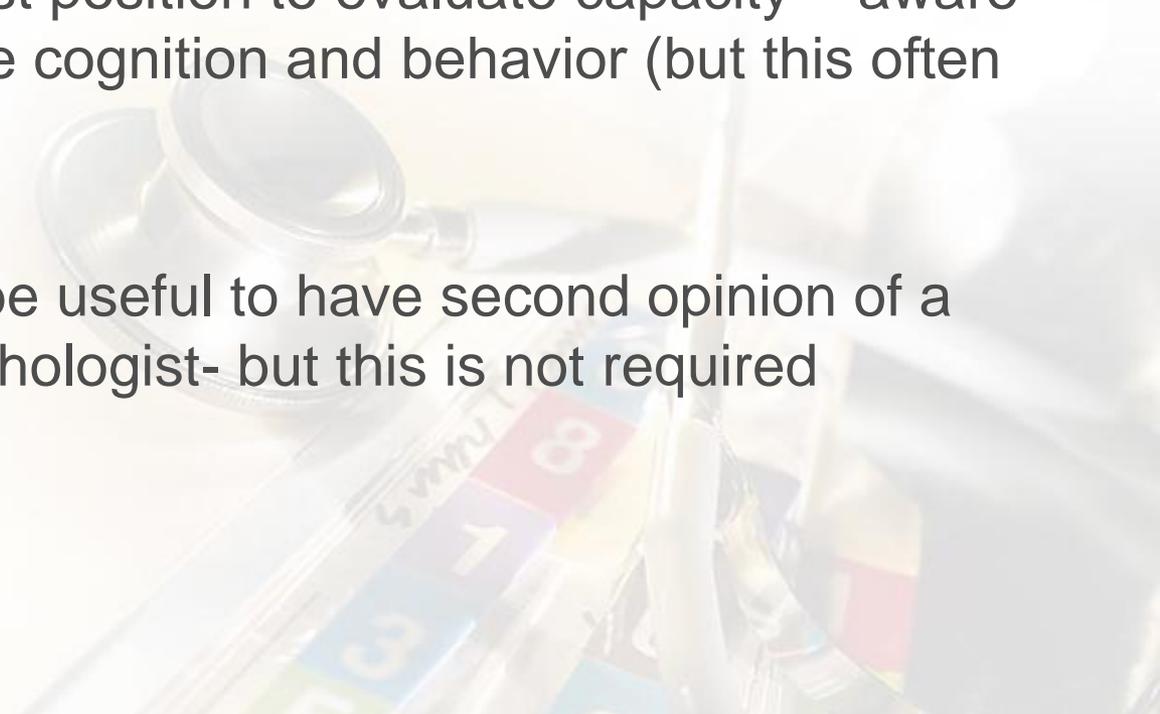


Legal Standards of Capacity

- **Understand** an individual treatment choice or recommendation being proposed
- **Appreciate** the available options
- **Demonstrate rational** decision making
- **Communicate a stable choice** that is *voluntary* and made *without coercion, and that fits with your values (this one can be difficult if the patient is previously unknown to the provider)*



Who Can Determine Capacity?

- Physicians, nurse practitioners, physician assistants can determine capacity
 - Sometimes the provider who has known the patient the longest is in the best position to evaluate capacity – aware of patient’s baseline cognition and behavior (but this often isn’t possible)
 - Occasionally may be useful to have second opinion of a psychiatrist or psychologist- but this is not required
- 



Capacity Is Not 'All or Nothing'

- Focused assessment –must be a specific question
- Medical decision making capacity is limited to a particular medical decision
- A patient can have capacity in one area but not others and vice versa
- A patient may have capacity some but not all of the time (eg, someone with schizophrenia could have capacity when symptoms controlled, and not have capacity when in an acute psychotic event)



Mr. Jones- Assessing Capacity

Mrs. Jones comes to the bedside. The doctor carefully goes through the standards of capacity with them.

Mr. Jones can repeat back to you each of the 4 items and consents to surgery. Mrs. Jones agrees that his decision fits with his values.

The second procedure is successful and Mr. Jones goes home with PT.





Mr. Jones isn't better yet



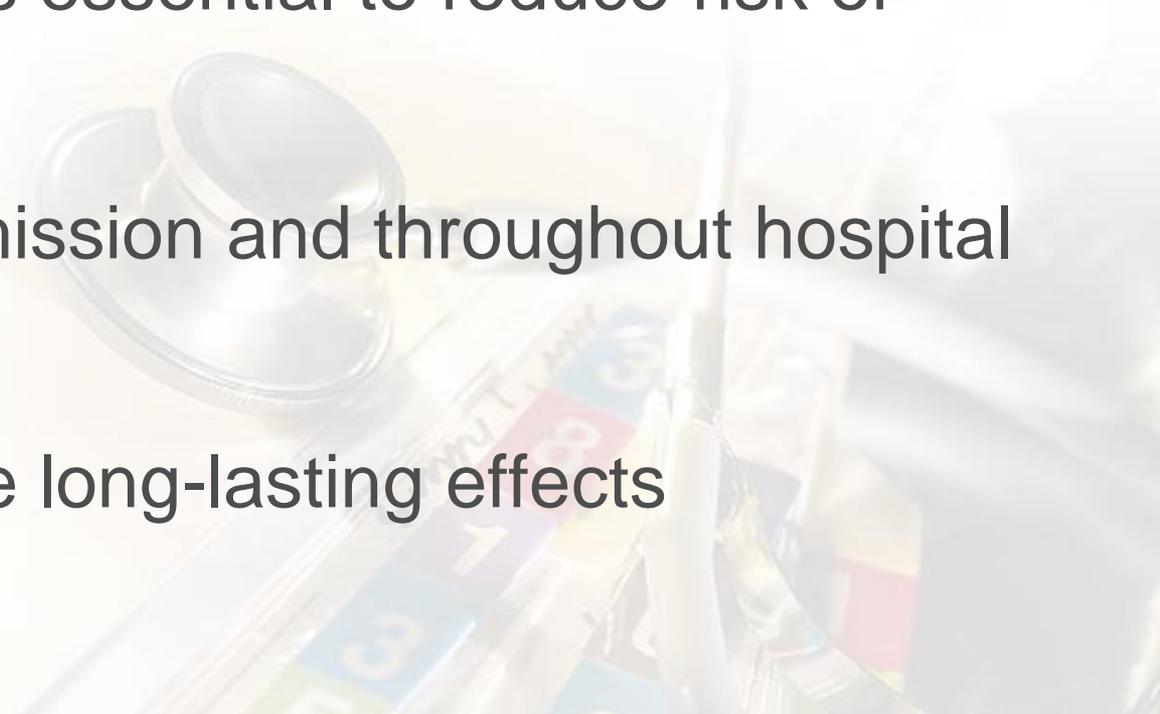
Mr. Jones begins home based PT 3x/week.

During the second week, Mr. Jones' wife pulls the PT aside and says "he doesn't seem himself." The PT probes further and finds out Mr. Jones is forgetful and having trouble keeping track of things. Mrs. Jones says "he's always kept on top of the bills and, even though he was at his desk for 2 hours yesterday, he didn't pay one of them! I've never paid the bills and I don't even know what account pays for what."

The PT has Mr. Jones and his wife come in for follow-up to discuss the extended course that delirium can have.



Summary

- Delirium is a common, severe illness
 - Team approach is essential to reduce risk of delirium
 - Assess upon admission and throughout hospital stay
 - Delirium can have long-lasting effects
- 



References

Hamilton H, Gallagher P, Ryan C, Byrne S, O'Mahony D. Potentially inappropriate medications defined by STOPP criteria and the risk of adverse drug events in older hospitalized patients. Arch Intern Med 2011; 171:1013-9.

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