

# A Step by Step Approach to Assessing Cognition



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- Medical Director, Geriatric Outreach Assessment Teams
- Medical Director, GEM



# Objectives

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Approach to the detection and diagnosis of cause of cognitive impairment

1. Screening
  1. interpretation of clinical tools (i.e. MOCA, MMSE)
2. Diagnosis
  1. dementia, delirium, depression



# Disclosure; Financial Conflicts of Interest

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- I do not have any actual, potential or perceived financial conflict of interests with respect to this topic.
  - I believe my opinion and behavior (acts of commission or omission) can be influenced by contributions or gifts from the pharmaceutical industry.
  - I decline support (honoraria) and gifts (trips, meals, entertainment) from the pharmaceutical industry.

# RGPEO Dementia Assessment Tool

Patient's Name: \_\_\_\_\_

DOB: \_\_\_\_\_

Is the person Cognitively Declining?

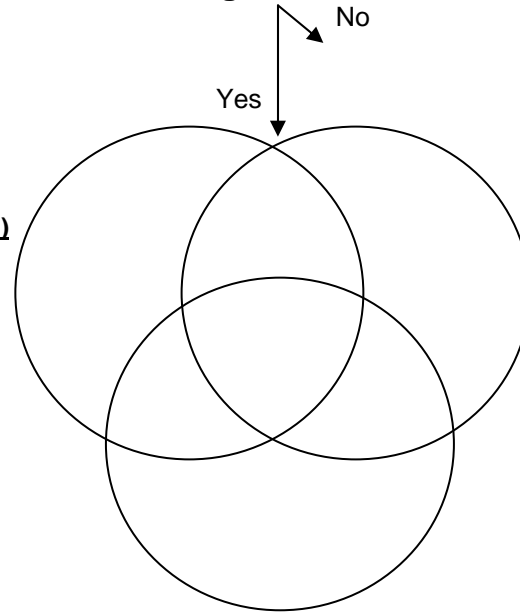
No

Yes

**CIRCLE POSITIVE FINDINGS**

**Dementia vs. mild cognitive impairment (MCI)**

- 1. Amnesia
- 2. Aphasia, apraxia, agnosia, executive dysfunction (SHAFT)
- 1. Progressive
- 2. Impacts on function



**Depression**

- M** – Persistent low **M**ood
- S** – New **S**leep disturbance
- I** – decreased **I**nterest
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- Somatization
- Increased alcohol use

**Delirium**

Fluctuation (hourly and unpredictable), Hallucinations, Drowsiness, Sudden onset, slow mentation

**MCI**  
(Does not meet all 4 criteria)

**Dementia**  
(Meets all of criteria 1 – 4)

**Lewy-Body vs. Parkinson's Dementia**

Parkinsonism, hallucination, fluctuation, decreased visuospatial

**Normal Pressure Hydrocephalus**

Brain, bladder, Balance

**Alzheimer**

Progressive decreased short-term memory  
Decreased word-finding  
Decreased insight

**Vascular**

Arterial disease  
Neuro imagine  
Risk factors

Mixed

**Frontotemporal**

Behaviour – frontal lobe  
Language – semantic dementia, primary progressive aphasia

**Other**

- 1. CJD +++ rapid with balance and swallowing change
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# Screening (detection of a potential problem); Gestalt vs. Formal Screens



**MoCA**



**In this corner...**

**MMSE**



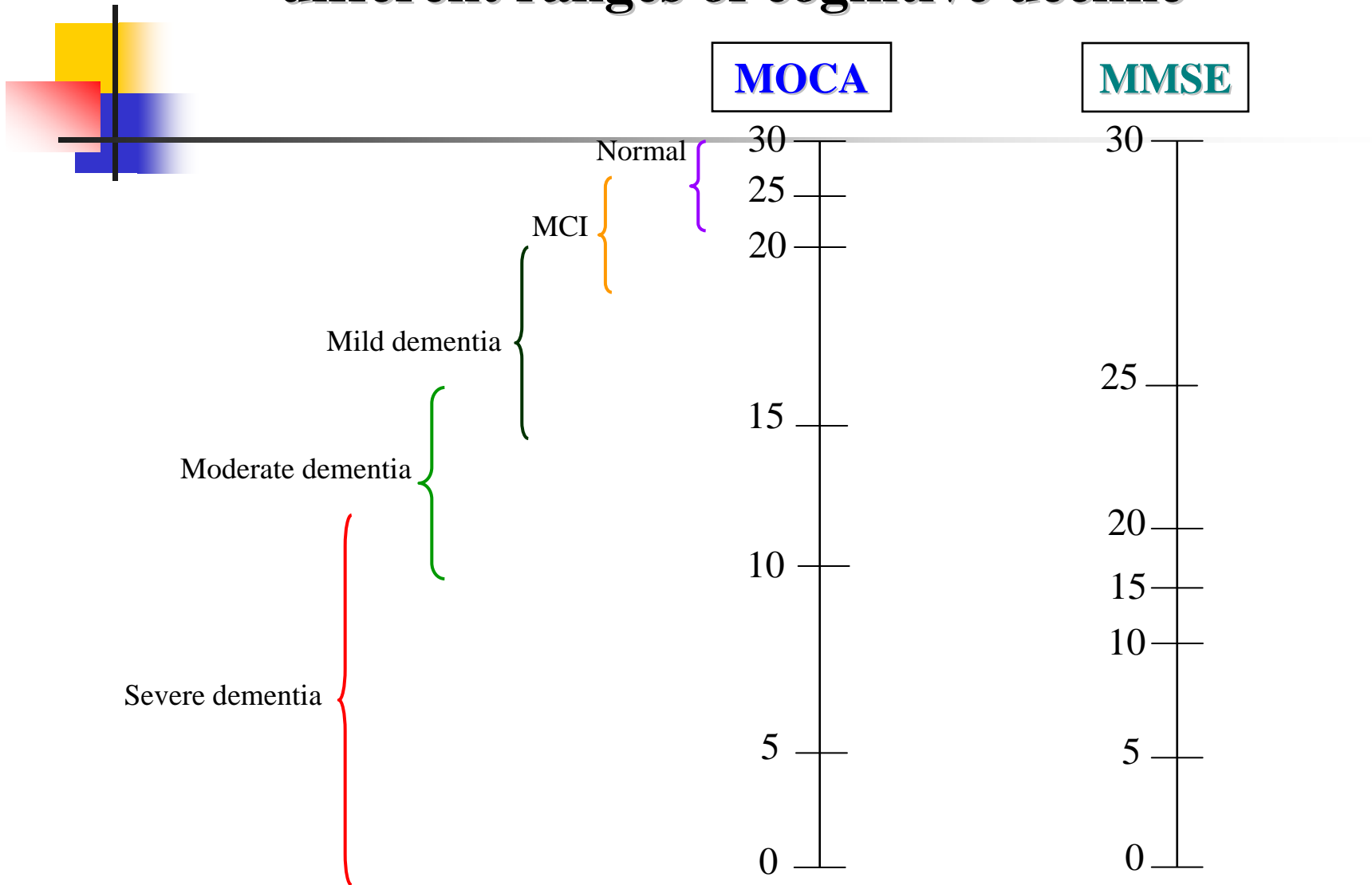


## Nasreddine et al – recommendations

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- If patients have cognitive complaints and functional impairment then likely have a dementia
  - MMSE first
  - MOCA if MMSE  $\geq$  26 (MCI, Mild dementia)
- If patients have cognitive complaints but no functional impairment then likely normal or MCI
  - MOCA first

# Tests may have differential sensitivity in different ranges of cognitive decline





# Diagnosis – my approach

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- Is the patient cognitively changing?
  - May decide not to investigate stable longstanding cognitive deficits
- Determine if the patient is depressed or delirious.
  - If history suggests an underlying dementia would inform family of the possibility and link them to the Alzheimer Society so they can learn about dementia but would defer the final diagnosis for 2 – 3 months until the patient has recovered from the depression / delirium
- Use DSM criteria as a common language in assessing Dementia, delirium, depression



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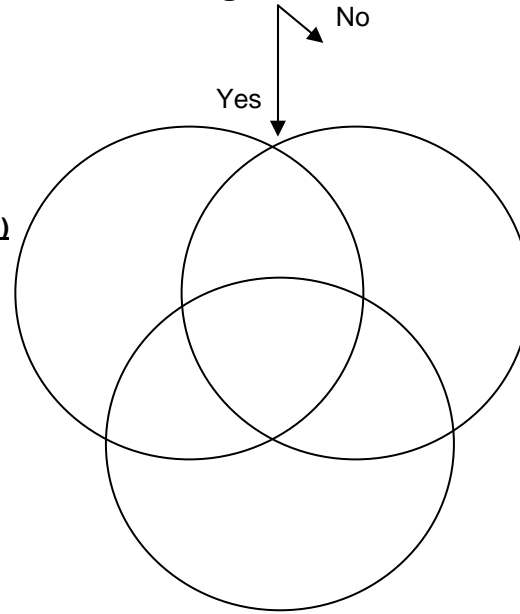
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- Neuro imagine
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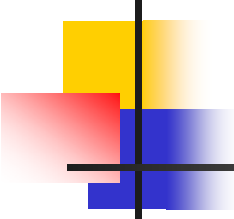
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- 2. Brain Injury



# DEPRESSION

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- DSM criteria – M SIG E CAPS
  - Derived from a younger population without medical comorbidities
  - Given that physical illness can mimic many of these features (i.e. confounding variables), would employ the criteria more flexibly than suggested by DSM
    - Physical illness can interfere with sleep and interests, can lead to worries / negative ruminations, can decrease energy and appetite, can affect concentration (via delirium)
    - Look for persistent low mood or anhedonia > 2 weeks + other features not explained by physical illness



# Persistent low mood or anhedonia > 2 weeks

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- Differentiate from labile mood, resolving grief reaction
- Differentiate from apathy of dementia
  - Older person living alone who seems withdrawn
    - If enjoys family visits (can be 'drawn out') and eats well when food is presented then suspect dementia
    - If cannot be 'drawn out' (does not respond positively to family or food) then suspect depression



# Poor SLEEP

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- 3 phases: initiation, maintenance, terminal insomnia (early AM wakening)
- Look for a change in usual pattern
- Rule out **6 Ps**
  - Pain, PND (orthopnea), Pee (BPH, UTI, diuretic), Partner (bed mate, roommate, pet), Pharmaceuticals (diuretics or stimulants such as caffeine or cholinesterase inhibitors), Physical environment (temperature, noise)
- Ask what is going through their minds when they cannot sleep (worries, regrets, negative ruminations)



# Decreased Interests

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- Determine whether patient has dropped interests due to physical reasons (pain, mobility, incontinence, acute illness ...), depression or dementia
- In depression patients “operate below their abilities”
- In dementia patients try to “operate above their abilities” and reluctantly withdraw due to social embarrassment



# GUILT

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- A dangerous word to use as some patients can become offended
- If the patient uses the word then explore further as they are showing a great deal of trust
- Use the word 'REGRETS' and judge if their regrets are reasonable given their experience or if they are exaggerated and represent negative ruminations



# Decreased ENERGY

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- Determine if the person can differentiate their physical strength from their mental / emotional energy
  - Some can if they do not have significant cognitive issues
- Determine if changes in energy occurred at a time not explained by physical illness



# Decreased CONCENTRATION

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- Measured by DLROW or serial 7s
- Noted when patient is not focussed on the assessment (drifting off)
- Think of concentration, attention and level of consciousness as a spectrum
  - All are normal in pure dementia
  - May be impaired in depression or delirium
  - Level of consciousness (head bobbing sign) indicates delirium





# Change in APPETITE

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- Rarely encounter hyperphagic patients
  - tend to be those with longstanding waxing and waning depression. Call their psychiatrist if they are becoming hyperphagic
- More commonly see loss of appetite. Ask:
  - Have you lost your appetite?
  - Have you lost weight?
  - Do you still enjoy food?
  - Do you desire food and look forward to meals?
- Patients can lose their appetite when they are ill or on appetite suppressing drugs (narcotics, Cholinesterase inhibitors, sulphas and other antibiotics, digoxin ...)



# Physical Complaints

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- Depression commonly presents with somatic complaints in older patients
- If patient has multiple complaints that constantly shift over time, think of depression.
  - Often encounter unexplained GI symptoms or pain vs. magnification of symptoms (objective vs. subjective mismatch)
  - Negotiation strategy - some patients may take antidepressants only if they believe the meds will help with pain control



# Psychomotor change

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- Positive vs. negative symptoms
  - Agitated vs. withdrawn
  - If agitated would ensure you are not dealing with a delirium
  - Would tend to get psychiatry involved in agitated depression



# SUICIDAL ideation

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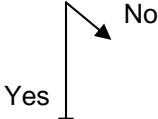
- Passive suicidal ideation
  - Do you ever wish you would not wake up in the morning?
  - Do you ever wish you were dead?
- Active suicidal ideation
  - Patient has a plan they are willing to act on
  - 'Form' patient and send to a psychiatric facility (any hospital with a psychiatric ward) for further evaluation
  - Call ER and give story to psychiatrist
  - Ask for psychiatrist's name so you can note the phone discussion in chart

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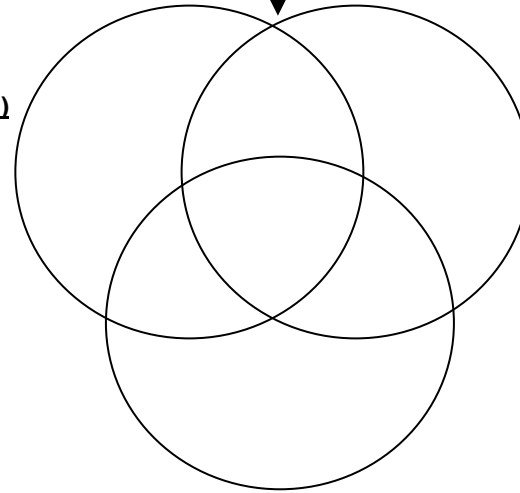
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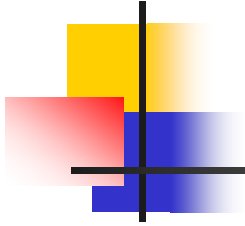


# Delirium vs. Dementia

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|                | <u>Delirium</u> | <u>Dementia</u> |
|----------------|-----------------|-----------------|
| Onset          | Abrupt          | Gradual         |
| Course         | Short           | Long            |
| Fluctuation    | Present         | Absent          |
| Hallucinations | Present         | Absent          |
| Attention      | Impaired        | Normal          |
| LOC            | Altered         | Normal          |
| Psychomotor    | Altered         | Normal          |

*It is common for Delirium to be superimposed on Dementia!*



This table oversimplifies so  
let us look at exceptions to  
the rules as well as the most  
reliable signs of Delirium



# Onset & Duration (exceptions)

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- Delirium

- May have prolonged low grade delirium with chronic ETOH, BDZ, Narcotic, Anticholinergic (e.g. TCA, Ditropan) use

- Dementia

- Can have rapid onset with strokes or CJD (see Health Canada CJD website)





# Fluctuation

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- Delirium
  - **New onset unpredictable fluctuation**  
(hour by hour not day by day)
- Depression
  - Predictable diurnal variation (worse in morning)
- Dementia
  - Predictable diurnal variation (worse in afternoon or evening)



# Hallucinations

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- Delirium
  - Especially if family describe **new onset hallucinations**
- Dementia / Psychiatric Disorders
  - Long-standing hallucinations
  - E.g. Lewy Body disease, Psychotic Depression, Bipolar disease



# Attention, Concentration, LOC

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- Delirium
  - Attention, Concentration and altered Level of Consciousness (i.e. drowsy, somnolent)
- Depression
  - Can alter Attention, Concentration but not LOC
- Dementia
  - Normal Attention, Concentration, LOC



## Patterns of Psychomotor Change in delirium

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- **Hyperactive** ("wild man!"); 25%
- **Hypoactive** ("out of it", "snowed", "pleasantly confused"); 50%
- **Mixed delirium** (features of both), with reversal of normal day-night cycle ("sundowning"); 25%



# Confusion Assessment Method (CAM)

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1. History of acute onset of change in patient's normal mental status & fluctuating course?

**AND**

2. Lack of attention?

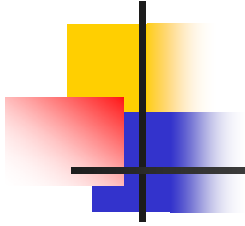
**AND EITHER**

3. Disorganized thinking?
4. Altered Level of Consciousness?

*Sensitivity: 94-100%*  
*Specificity: 90-95%*  
*Kappa: 0.81*

*Inouye SK: Ann Intern Med 1990; 113(12):941-8*

*Arch Intern Med. 1995; 155:301*



# Treatment / Management



# Once you identify Delirium, now what?

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- Identify all predisposing and precipitating factors, and consider the differential

# Causes of Delirium?



mnemonic

I WATCH DEATH



# I WATCH DEATH



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- I Infection: Most common are pneumonias & UTI in elderly, but sepsis, cellulitis, SBE and meningitis can also occur



# I WATCH DEATH

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- I Infection
- W Withdrawal:  
benzodiazapines, ETOH,  
typical neuroleptics,  
anticholinergics

# I WATCH DEATH



---

- I Infection
- W Withdrawal
- A Acute metabolic:  
electrolytes, renal  
failure, acid-base  
disorders, abnormal  
glycemic control,  
pancreatitis ...

# I WATCH DEATH



---

- I Infection
- W Withdrawal
- A Acute metabolic
- T Trauma: head injury (SDH, SAH), pain, vertebral or hip fracture, concealed bleed, urinary retention, fecal impaction

# I WATCH DEATH



---

- I Infection
- W Withdrawal
- A Acute metabolic
- T Trauma
- C CNS pathology:  
tumor, AVM,  
encephalitis, meningitis,  
abscess

# I WATCH DEATH



---

- I Infection
- W Withdrawal
- A Acute metabolic
- T Trauma
- C CNS pathology
- H Hypoxia (or increased CO<sub>2</sub>) from COPD exacerbation, CHF

# I WATCH DEATH



---

- I Infection
- W Withdrawal
- A Acute metabolic
- T Trauma
- C CNS pathology
- H Hypoxia
- D Deficiencies: B-12, folate, protein, calories, water

# I WATCH DEATH

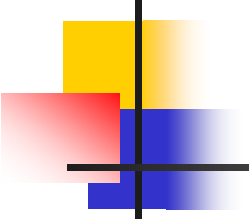


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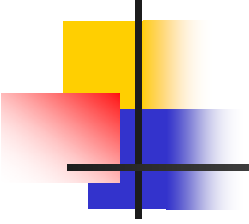
- I Infection
- W Withdrawal
- A Acute metabolic
- T Trauma
- C CNS pathology
- H Hypoxia
- D Deficiencies
- E Endocrine  
thyroid, cortisol, cancer  
cytokines



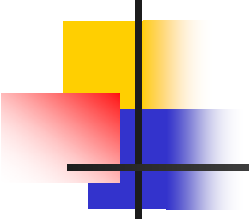
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  - E Endocrine
  - A Acute  
vascular/MI : stroke,  
intracerebral bleed

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  - H Hypoxia
  - D Deficiencies
  - E Endocrine
  - A Acute vascular/MI
  - T Toxins-drugs  
Really anything; anti-cholinergics (TCA, Ditropan), benzos (especially long-acting), narcotics, seizure meds and other psychotropics are common culprits

# I WATCH DEATH

- 
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- I Infection
  - W Withdrawal
  - A Acute metabolic
  - T Trauma
  - C CNS pathology
  - H Hypoxia
  - D Deficiencies
  - E Endocrine
  - A Acute vascular/MI
  - T Toxins-drugs:
  - H Heavy metals



# Physical Exam

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- **Vitals:** normal range of BP, HR (unexplained sinus tachycardia), Spo<sub>2</sub>, Temperature (some older patients do not become febrile with infections)?
- **Good physical exam:** particular emphasis on cardiac, pulmonary and neurologic systems
- **Hydration status**
- **Also rule out**
  - fecal impaction (DRE)
  - urinary retention (bladder U/S, in-and-out catheter)
  - Infected decubitus ulcer

# Delirium workup: Lab testing



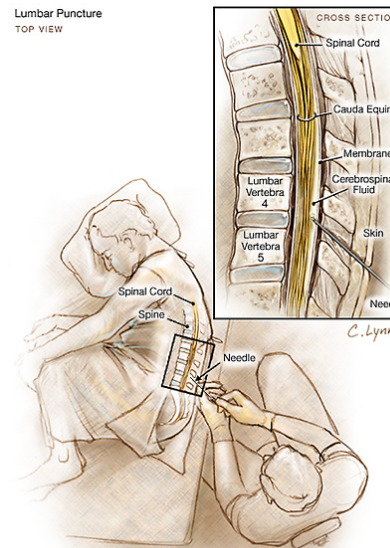
- Basic labs most helpful!
  - CBC, electrolytes, BUN/Cr, glucose
  - TSH, B-12, LFTs  
Calcium, & albumen
- Infection workup (Urinalysis, CXR) +/- blood cultures

# Other Investigations

- selected additional testing; drug levels, toxic screen, ABG
- EKG
- CT Head if focal signs
- ? EEG (if suspect seizure)
  
- ? role for LP (do last, and only if history suggests)



Lumbar Puncture  
TOP VIEW



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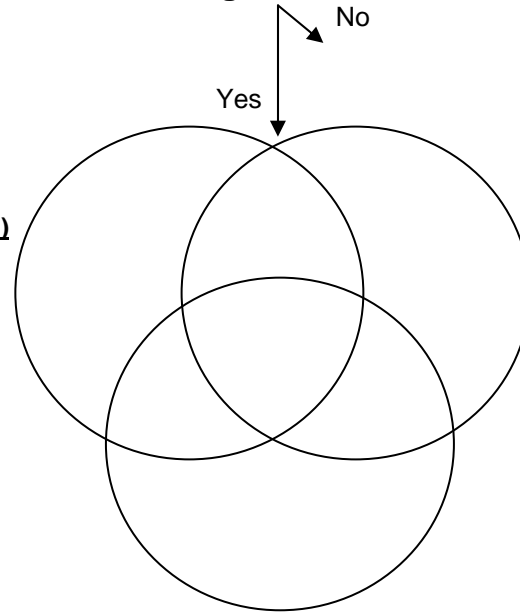
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# Dementia vs. Mild Cognitive Impairment (MCI)

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- Avoid making a definitive diagnosis of dementia if the patient has a significant depression or delirium that could be mimicking a dementia.
- Avoid cholinesterase inhibitors while patient is recovering from a delirium
- Advise families that the history suggests an underlying dementia and link them to the Alzheimer Society so they can learn about the signs of dementia and can observe for these while they are awaiting 2 – 3 month follow-up for a dementia assessment





# Mild Cognitive Impairment (MCI)

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- Do not meet all of 4 upcoming criteria (next slide)
  - Function preserved
  - Single cognitive domain
- Relatively good cognitive score (score should match function or ask why not)
- 10% - 15% progress to Dementia annually for total of 65%
  - Follow with annual MMSE or MOCA



# Dementia

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- Once again employ the DSM criteria – look for a deficit in each of the following categories (**5 As** + function + progression) base on history, physical examination, cognitive testing:
  1. Amnnesia
  2. Aphasia, Apraxia, Agnosia, And Executive dysfunction
  3. Progressive
  4. Impacts on social and / or occupational functioning



# Amnesia

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- If family look at you quizzically when you are asking questions about memory (“mom remembers things from 20 years ago so I do not see why you are asking about memory”), stop and inform them that you interested in short-term memory for things that happened an hour or day ago. Inform them that with memory problems that progress, the initial problem is “putting new memories in” (encoding – more true of Alzheimer’s) while old memories are stable and retained.



# Amnnesia

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- Look for changes from baseline
  - Repeating questions or stories
  - Losing items (keys, purse ...)
  - Forgetting details of important events
  - Trouble recalling names
  - Mixing up relatives and friends
  - Increased use of compensatory strategies (lists, calendars, memory cues)



# Aphasia (expressive)

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- Ask if patient has word finding problems ('words on the tip of their tongue')
  - Word searching
  - Mixing up languages
  - Losing last language learned first
  - Patterns
    - Sudden loss then stable or improving suggests stroke, bleed
    - Progressive word –finding problems (more frequent and more severe / noticeable) suggests Alzheimer's
    - Severe and more pronounced than memory problems suggests stroke, bleed, Semantic Dementia, Primary Progressive Aphasia
- Later develop reading and writing difficulty



# Apraxia

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- Difficulty executing a motor task despite intact motor and sensory function
  - May notice during dressing post examination
  - On exam can ask patient to show how to:
    - Comb hair
    - Brush teeth
    - Cut paper with a scissor
  - Sometimes difficult to differentiate from executive dysfunction (use of stove, TV, remote...)



# Agnosia

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- Difficulty identifying objects despite an intact sensory function
  - Difficulty recognizing family members or close friends
    - Differentiate this from difficulty recalling names. In agnosias they cannot recall the person's role in their life.



# And Executive Dysfunction

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- Instrumental Activities of daily Living (IADLs)
  - change from baseline due to cognition
  - S Shopping
  - H Housekeeping / Hobbies
  - A Accounting / finances
  - F Food preparation
  - T Telephone / Tool use  
Transportation (Driving)





# And Executive Dysfunction

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- ADLs (lose after IADLs)
  - D Dressing
  - E Eating
  - A Ambulation
  - T Transfers
  - H Hygiene



# And Executive Dysfunction

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- Driving
  - Think of this as a 'super-IADL'
  - The only IADL that can result in death if patient is too slow (driving is unforgiving – there may not be a second chance to do the task right)
  - If patient has problems with lower level IADLs due to cognition then have to consider fitness-to-drive
  - CMA guidelines: If patient has problems with 2 or more lower level IADLs due to cognition then likely have a moderate dementia and should stop driving



# Psychotic Symptoms (delusions, hallucinations)

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- First rule out delirium.
- If due to the dementia then only treat if extremely upsetting to patient, leading to significant social disruption
- Do not treat for comfort of caregivers – teach them how to cope.
- If forced to use antipsychotics keep in mind that symptoms can wax and wane so should periodically try to wean off (every 6 months)
  - Warn family (and patient if can comprehend) of the low risk of stroke, MI, death and DOCUMENT the discussions / informed consent in chart (with date and names of participants)



# Delusions

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- > 50% of persons with AD experience simplistic persecutory delusions
  - People stealing from them (may be reinforced by hiding money and not recalling where hid money)
  - Spousal infidelity (may be reinforced by visits from CCAC, Psychogeriatrics)
- If delusions are complex then consider a psychiatric disorder (bipolar disease, psychotic depression ..)



# Hallucinations

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- Decide if these are true hallucinations – is anyone ever present when they occur?
- DDX
  - Charles bonnet hallucinations due to decreased vision or hearing
  - Misperceptions (see or hear things at night)
- New onset
  - Consider delirium
- Long-standing
  - Consider psychiatric disorder (bipolar disease, psychotic depression ..) or Lewy Body Disease
    - Avoid neuroleptics in Lewy Body Disease as can precipitate significant parkinsonism with falls & trauma

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DOB: \_\_\_\_\_

Is the person Cognitively Declining?

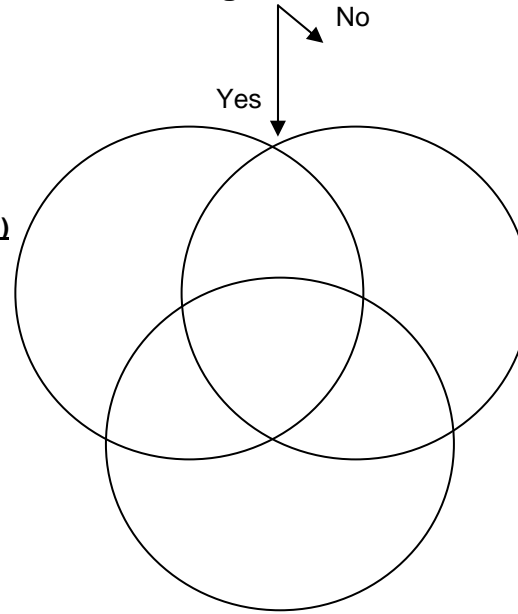
No

Yes

**CIRCLE POSITIVE FINDINGS**

**Dementia vs. mild cognitive impairment (MCI)**

- 1. Amnesia
- 2. Aphasia, apraxia, agnosia, executive dysfunction (SHAFT)
- 1. Progressive
- 2. Impacts on function



**Depression**

- M** – Persistent low **M**ood
- S** – New **S**leep disturbance
- I** – decreased **I**nterest
- G** – **G**uilty thoughts (multiple Regrets)
- E** – decreased **E**nergy
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- Somatization
- Increased alcohol use

**Delirium**

Fluctuation (hourly and unpredictable), Hallucinations, Drowsiness, Sudden onset, slow mentation

**MCI**  
(Does not meet all 4 criteria)

**Dementia**  
(Meets all of criteria 1 – 4)

**Lewy-Body vs. Parkinson's Dementia**

Parkinsonism, hallucination, fluctuation, decreased visuospatial

**Normal Pressure Hydrocephalus**

Brain, bladder, Balance

**Alzheimer**

Progressive decreased short-term memory  
Decreased word-finding  
Decreased insight

**Vascular**

Arterial disease  
Neuro imagine  
Risk factors

Mixed

**Frontotemporal**

Behaviour – frontal lobe  
Language – semantic dementia, primary progressive aphasia

**Other**

- 1. CJD +++ rapid with balance and swallowing change
- 2. Brain Injury



# Alzheimer disease

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- Progressive short-term memory loss
  - Encoding problem so cues do not help
- MAY present with progressively more frequent / noticeable word-finding changes. When present this is highly suggestive of AD
- Limited insight – not fully aware of presence of memory loss and impact on function



# Vascular dementia

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- 3 levels of evidence
  - Neuroimaging performed in the course of the dementia demonstrating cerebrovascular disease (more than mild microangiopathic ischemia) significant enough and in locations to account for deficits (i.e. not pure motor areas)
  - Established arterial disease (stroke, carotid stenosis, CAD, RAS, PVD) – consider the arterial tree as a single organ. If these are present will treat vascular risk factors
  - Vascular risk factors.





# Vascular dementia

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- Presentation not suggestive of AD
  - Good insight
  - Early apraxia / agnosia with ischemia in relevant regions
  - Retrieval rather than encoding problem – memory loss responds to cues
  - Step-wise decline?
    - Beware of False Negatives – many cannot recall stepwise decline
    - Beware of False Positives – recurrent deliriums with incomplete recovery can give AD a saw toothed pattern that looks like a step-wise decline. **Search for neurological changes suggestive of stroke that occurred during period of decline**
- Do not use the term 'vascular dementia' with patients – they do not know what this means. Call it '**Stroke dementia**'.



# Mixed dementia (AD + vascular)

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- **Moving ratio concept.**
  - When you first see patient they may be 99% vascular and 1% AD (so look like pure vascular)
  - A few years later the ratio will shift and they will be < 50% vascular and > 50% AD. This does not mean you were wrong when you first saw them. The AD component required more time to 'declare itself' so follow your vascular dementia patients carefully.



# Lewy Body dementia

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- McKeith et al. neurology 1996; 47: 1113-1124
  - Dementia occurring at the same time as mild parkinsonian features
  - Long-standing Hallucinations (visual, auditory)
  - Long-standing Fluctuation (cognition, attention, alertness)
- Supportive features
  - Vivid nightmares due to changes in REM sleep (lack of muscle paralysis – kick, punch and run in sleep)
  - Neuroleptic sensitivity
  - Cognitive profile (memory responds to cuing, early executive dysfunction, early visuospatial dysfunction – driving skills)



# Parkinson's Dementia

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- Common in patients who have passed through the 5 – 10 year 'honeymoon period' (motor symptoms only) of Parkinson's disease
- Similar cognitive profile to Lewy body Disease
  - memory responds to cuing, early executive dysfunction, early visuospatial dysfunction (driving skills)
- Emre et al. Clinical diagnostic criteria for dementia associated with Parkinson's disease.
  - Movement Disorders 2007; 22(12): 1689-1707



# Frontotemporal Lobar Degeneration (FTLD)

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- Behavioural type
  - Classic Frontal Lobe dementia with early loss of executive function (relevant to driving)
    - Earlier onset
    - Presenting symptoms can be positive (impulsiveness, anger control problems) or negative (withdrawal – looks depressed). More commonly referred to Psychiatry.
    - Test well (MMSE 30/30) but function more poorly than screens (that do not test executive function well) would suggest
      - Neuropsychology helpful in diagnosis



# Frontotemporal Lobar Degeneration

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- Language types
  - Semantic dementia
  - PPA: Primary (non-fluent) Progressive Aphasia
- Severe early expressive aphasia with no obvious cause on neuroimaging
  - Test poorly (MMSE 5/30 - because testing is language based) but function much better than test results would predict
    - Neuropsychology and Speech-language Pathology helpful in diagnosis



# Normal Pressure Hydrocephalous (NPH)

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- AD is a cortical dementia
- NPH can look more like subcortical dementias (e.g. subcortical vascular, LBD, Parkinson's dementia ...)
- **3Bs** – **B**rain (cognition), **B**alance (falls), **B**ladder (incontinence)
- Diagnosis with CSF Flow study or LP drain (Do not accept simple LP with fluid withdrawal as prone to False Negative results)

# Day Hospitals: Cognition PLUS

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- **Impairment of function – safety risks**
- Need **Interdisciplinary team** (Occupational Therapy, Social Work, Physiotherapy ...)
  - Near falls, falls
  - Medication errors
  - Malnutrition
  - Fire risk
  - **Inability to manage chronic medical issues (DM, CHF COPD, Parkinson's, CAD, Renal Disease...)**
  - Driving (only if there are other issues to deal with – we have insufficient resources to see patients solely for driving)
- **The Unacknowledged Pioneers in ED / ALC Prevention**



# Avoid the ‘Dementia Domino Effect’

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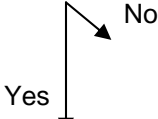
- Cognition is required to allow patients to safely manage their chronic medical conditions.
- When people develop dementia they are more prone to loss of control of chronic medical conditions (e.g. Diabetes, Heart Failure, COPD, Coronary Artery Disease, Renal Disease ....) ... when these spiral out of control they may lead to an avoidable hospitalization
  - often with a very slowly resolving delirium which prolongs the hospitalization.

# RGPEO Dementia Assessment Tool

Patient's Name: \_\_\_\_\_

DOB: \_\_\_\_\_

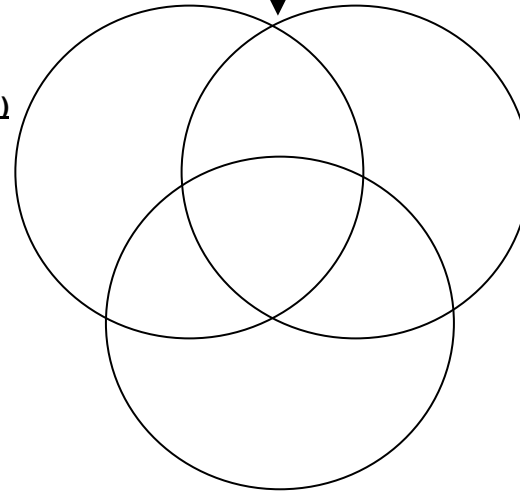
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