Delirium
Pearls and Pitfalls

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Disclosure Statement

- NO affiliations with or involvement in any organization or entity with any financial interest related to the subject matter or materials discussed in this presentation.

- I just want to make the world a better place.

Delirium in 20 min

- Understand the basic pathophysiology
- Understand the relationship between frailty and delirium
- Know how to identify it
- Know how to find the cause
- Know that management is treating the cause
- Know that prevention works

Pathophysiology

- Direct Brain Insults:
  - Deprive energy (hypoxia, hypoglycemia)
  - Metabolic abnormalities
  - Trauma
  - Hemorrhage
  - Altered neurotransmitter levels (by drugs)

Pathophysiology

- Indirect brain insults via
  - Stress response (e.g. cortisol)
  - Sickness behaviour
  - Exaggerated inflammatory responses within the brain due to dementia

- Regardless of the cause, **cholinergic deficit** is a major contributor to cognitive symptoms.

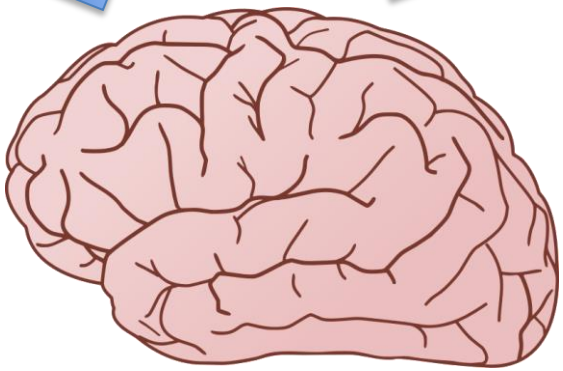
Adaptive Responses to Stress/Illness

Stress Hormones
(e.g. Cortisol)

Inflammatory Mediators
(e.g. Cytokines, Prostaglandins)

↑Vigilance
↓Cognition

Sickness Behaviour
Malaise, fatigue,
Anorexia, ↓Cognition



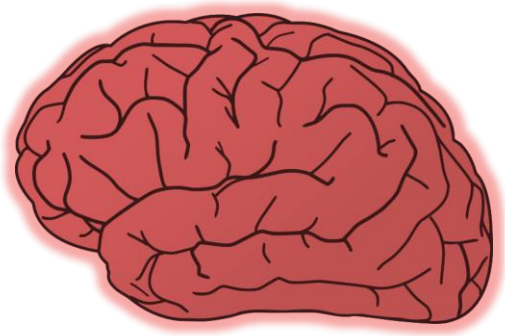
Exaggerated/Aberrant Responses

Stress Hormones
(e.g. Cortisol)

Inflammatory Mediators
(e.g. Cytokines, Prostaglandins)

Hypervigilance
Confusion

Sickness Behaviour
Malaise, fatigue,
Anorexia, ↓Cognition
(not balanced by existing cognitive reserve)



Vulnerable Brain

HyPERactive Delirium?

HyPOactive Delirium?

Key Points

- Anything that can induce either direct or indirect insult on the brain can cause delirium.
- The more vulnerable the brain, the less noxious the insult must be.
- Delirium is organ failure.
- Organ failure is **always a bad sign**.[citation needed]

Delirium is a medical emergency and warrants a rapid response.

DIAGNOSIS OF DELIRIUM

How To Tell Your Geriatric Patient Is Sick…

- Traditional vital signs (BP, HR, O_2 Sats, RR) are not so useful in frail patients
  - When these go bad, it's usually *too late*
- More useful 'vital signs' in frail patients give advanced warning of impending system failure (*atypical presentation of illness*):
  - Mobility (falls)
  - Function (loss of autonomy)
  - **Cognition (Delirium)**

Detecting Delirium

- Most important thing is to **look for delirium**
- Confusion in elderly is easy to ignore
  - Signal lost in the noise
  - False assumption of chronicity

- **Hyperactive delirium** is easy to notice
- **Hypoactive delirium** is hard to notice

Detecting Delirium - The CAM

1. Acute onset and Fluctuating Course, AND
2. Difficulty Focusing Attention, AND EITHER
3. Disorganized Thinking, OR
4. Altered level of Alertness

Sens 95%
Spec 90%

https://www.hospitalelderlifeprogram.org/

SHORT CONFUSION ASSESSMENT METHOD (SHORT CAM) WORKSHEET

Note: This worksheet can used as an alternative to the Short CAM Questionnaire. Testing of orientation and sustained attention is recommended prior to scoring, such as digit spans, days of week, or months of year backwards. This page can only be used to identify delirium cases. Please note it cannot be used to score severity using the CAM-S scoring system.

EVALUATOR: DATE:

I. ACUTE ONSET AND FLUCTUATING COURSE

a) Is there evidence of an acute change in mental status from the patient's baseline? No ____ Yes _____

b) Did the (abnormal) behavior fluctuate during the day, that is tend to come and go or increase and decrease in severity? No _____ Yes _____

II. INATTENTION

Did the patient have difficulty focusing attention, for example, being easily distractible or having difficulty keeping track of what was being said? No _____ Yes _____

BOX 1

III. DISORGANIZED THINKING

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? No _____ Yes _____

IV. ALTERED LEVEL OF CONSCIOUSNESS

Overall, how would you rate the patient's level of consciousness?

-- Alert (normal)

-- Vigilant (hyperalert)
-- Lethargic (drowsy, easily aroused)
-- Stupor (difficult to arouse)
-- Coma (unarousable)

Do any checks appear in the box above? No _____ Yes _____

BOX 2

If Inattention and at least one other item in Box 1 are checked and at least one item in Box 2 is checked a diagnosis of delirium is suggested.

https://www.hospitalelderlifeprogram.org/

4AT

RAPID ASSESSMENT TEST FOR DELIRIUM

FREE!

- [1] **Alertness**
  - Normal=0; Abnormal=4
- [2] **AMT4** (Age, DOB, place, current year)
  - No mistake=0; 1 mistake=1; 2+ or untestable=2
- [3] **Attention**: Months of year backwards
  - 7 or more=0; <7 or refuses= 1; untestable=2
- [4] **Acute** change (<2w) or fluctuating course
  - No=0; Yes=4
- Total 4+ possible delirium
- *If [4] incomplete, **inconclusive**

Sens 90%
Spec 85%

www.the4AT.com

4AT

(label)

Patient name:

Date of birth:

Patient number:

Assessment test for delirium & cognitive impairment

Date: **Time:**

Tester:

CIRCLE

[1] ALERTNESS

This includes patients who may be markedly drowsy (eg. difficult to rouse and/or obviously sleepy during assessment) or agitated/hyperactive. Observe the patient. If asleep, attempt to wake with speech or gentle touch on shoulder. Ask the patient to state their name and address to assist rating.

Normal (fully alert, but not agitated, throughout assessment)	**0**
Mild sleepiness for <10 seconds after waking, then normal	**0**
Clearly abnormal	**4**

[2] AMT4

Age, date of birth, place (name of the hospital or building), current year.

No mistakes	**0**
1 mistake	**1**
2 or more mistakes/untestable	**2**

[3] ATTENTION

Ask the patient: "Please tell me the months of the year in backwards order, starting at December."
To assist initial understanding one prompt of "what is the month before December?" is permitted.

Months of the year backwards	Achieves 7 months or more correctly	**0**
	Starts but scores <7 months / refuses to start	**1**
	Untestable (cannot start because unwell, drowsy, inattentive)	**2**

[4] ACUTE CHANGE OR FLUCTUATING COURSE

Evidence of significant change or fluctuation in: alertness, cognition, other mental function (eg. paranoia, hallucinations) arising over the last 2 weeks and still evident in last 24hrs

No	**0**
Yes	**4**

4 or above: possible delirium +/- cognitive impairment
1-3: possible cognitive impairment
0: delirium or severe cognitive impairment unlikely (but delirium still possible if [4] information incomplete)

4AT SCORE ☐

GUIDANCE NOTES Version 1.2. Information and download: **www.the4AT.com**

The 4AT is a screening instrument designed for rapid initial assessment of delirium and cognitive impairment. A score of 4 or more *suggests* delirium but is not diagnostic: more detailed assessment of mental status may be required to reach a diagnosis. A score of 1-3 suggests cognitive impairment and more detailed cognitive testing and informant history-taking are required. A score of 0 does not definitively exclude delirium or cognitive impairment: more detailed testing may be required depending on the clinical context. Items 1-3 are rated *solely on observation of the patient at the time of assessment.* Item 4 requires information from one or more source(s), eg. your own knowledge of the patient, other staff who know the patient (eg. ward nurses), GP letter, case notes, carers. The tester should take account of communication difficulties (hearing impairment, dysphasia, lack of common language) when carrying out the test and interpreting the score.

Alertness: Altered level of alertness is very likely to be delirium in general hospital settings. If the patient shows significant altered alertness during the bedside assessment, score 4 for this item. **AMT4 (Abbreviated Mental Test - 4):** This score can be extracted from items in the AMT10 if the latter is done immediately before. **Acute Change or Fluctuating Course:** Fluctuation can occur without delirium in some cases of dementia, but marked fluctuation usually indicates delirium. To help elicit any hallucinations and/or paranoid thoughts ask the patient questions such as, "Are you concerned about anything going on here?"; "Do you feel frightened by anything or anyone?"; "Have you been seeing or hearing anything unusual?"

www.the4AT.com

Key Points

- Constant vigilance!
- There are quick, valid, free delirium assessment tools available.
- The pattern of confusion is not so important.
- Collateral History is the most important thing.

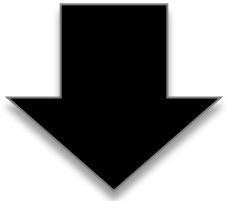
Unexplained confusion is Delirium until proven otherwise!

FINDING THE CAUSE

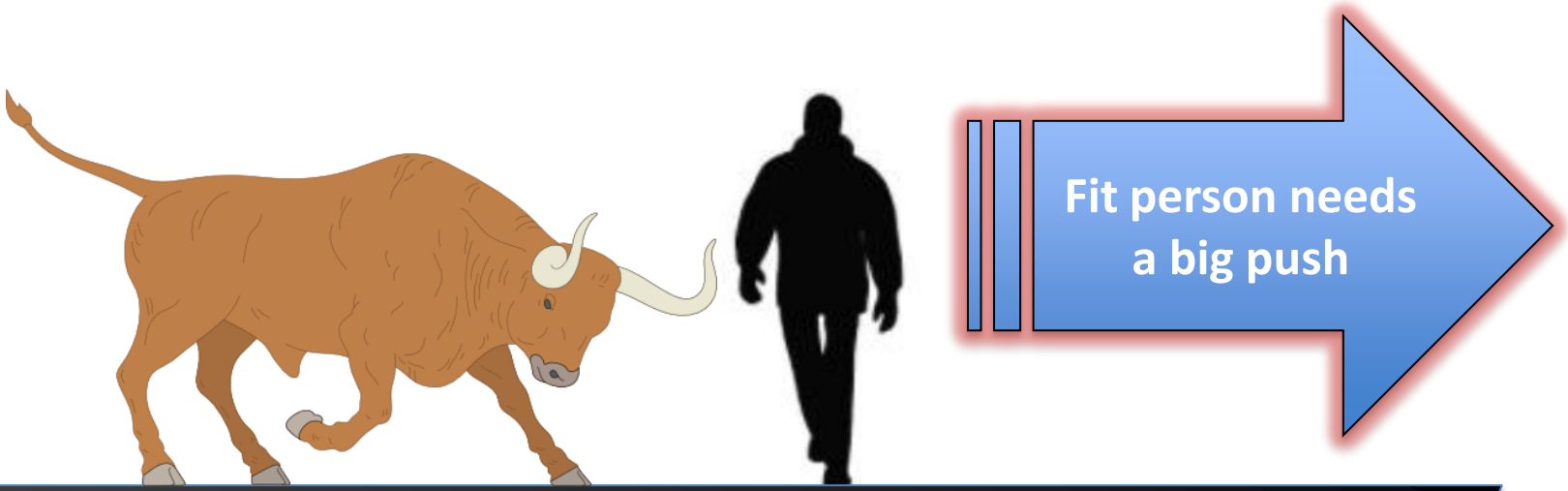
Predisposing Factors

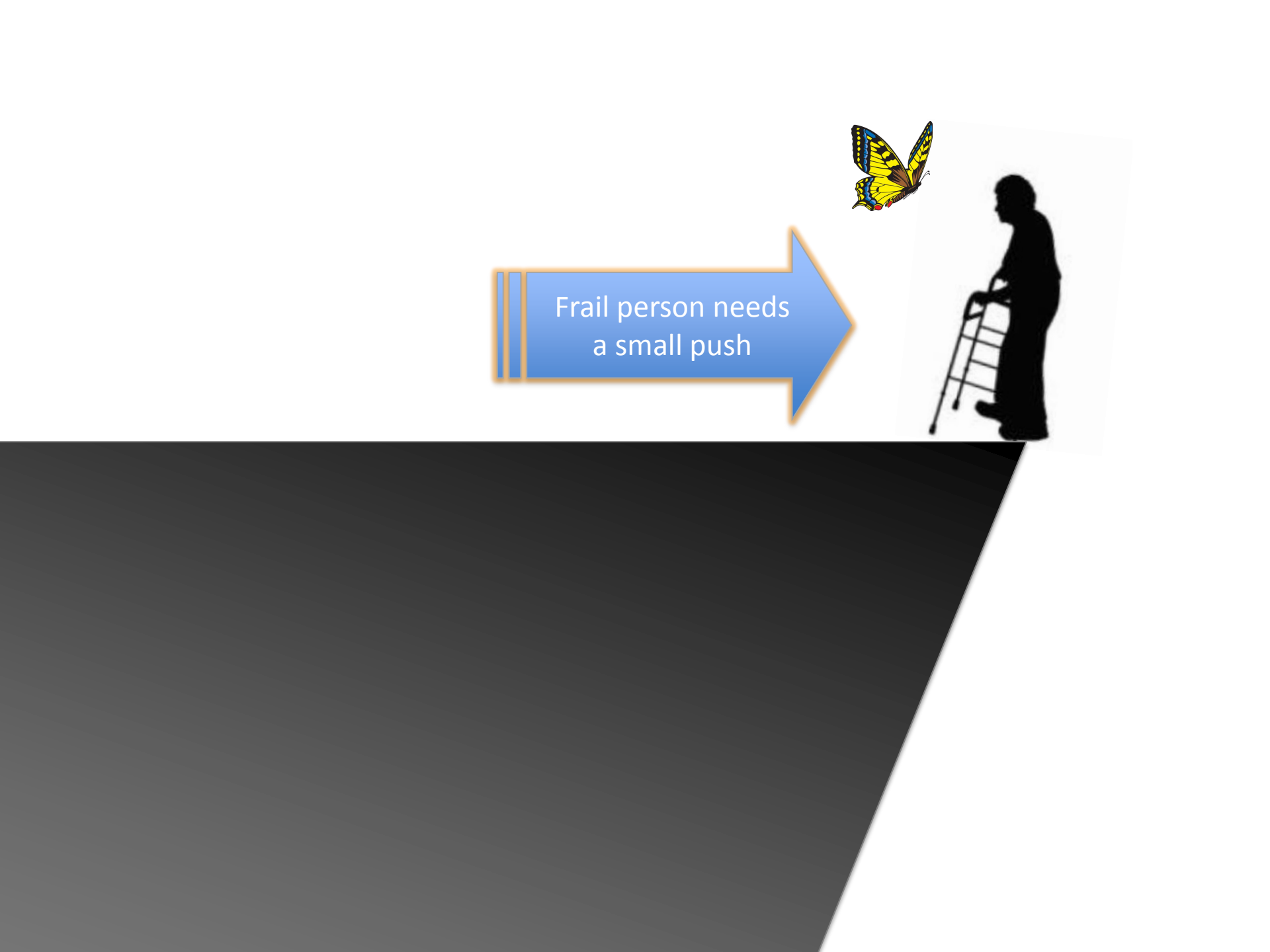
+

Precipitating Factors



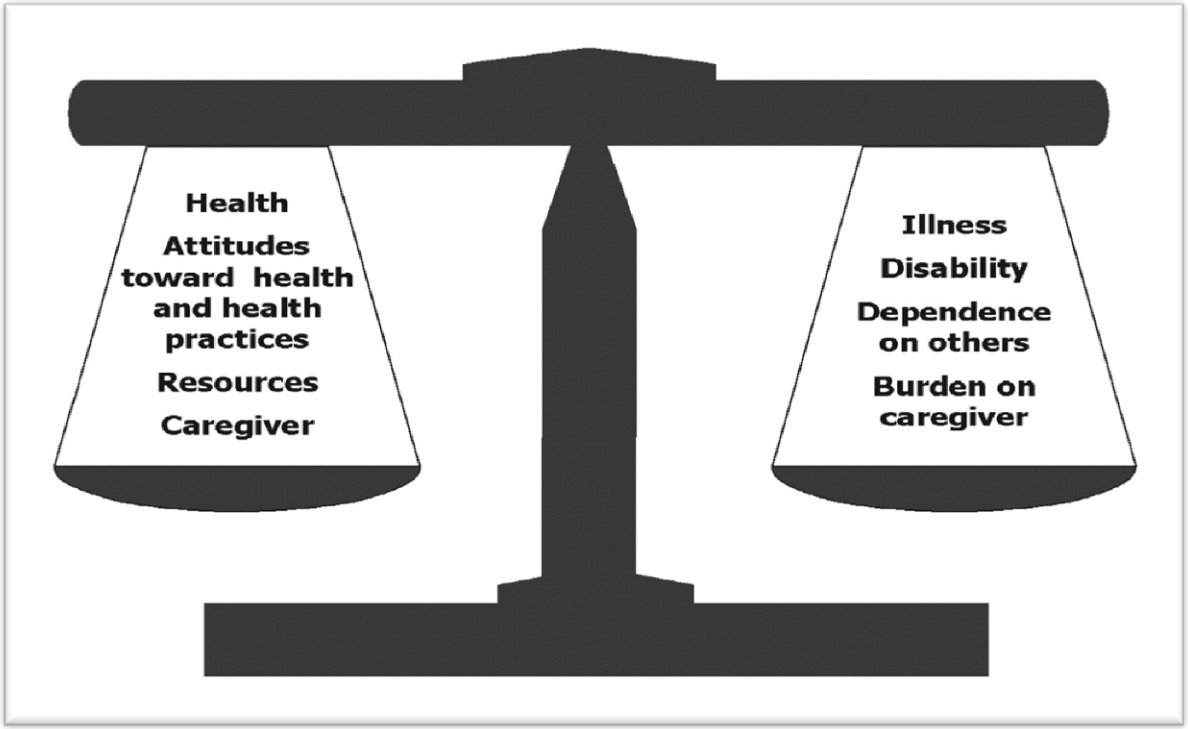
Delirium


Fit person needs
a big push


Frail person needs
a small push

Predisposing Factors

- Essentially: Frailty
  - Accumulation of deficits
- Meds, Meds, Meds
- Dementia



Precipitating Factor(s)

- **Treatment of delirium is treatment of the cause**

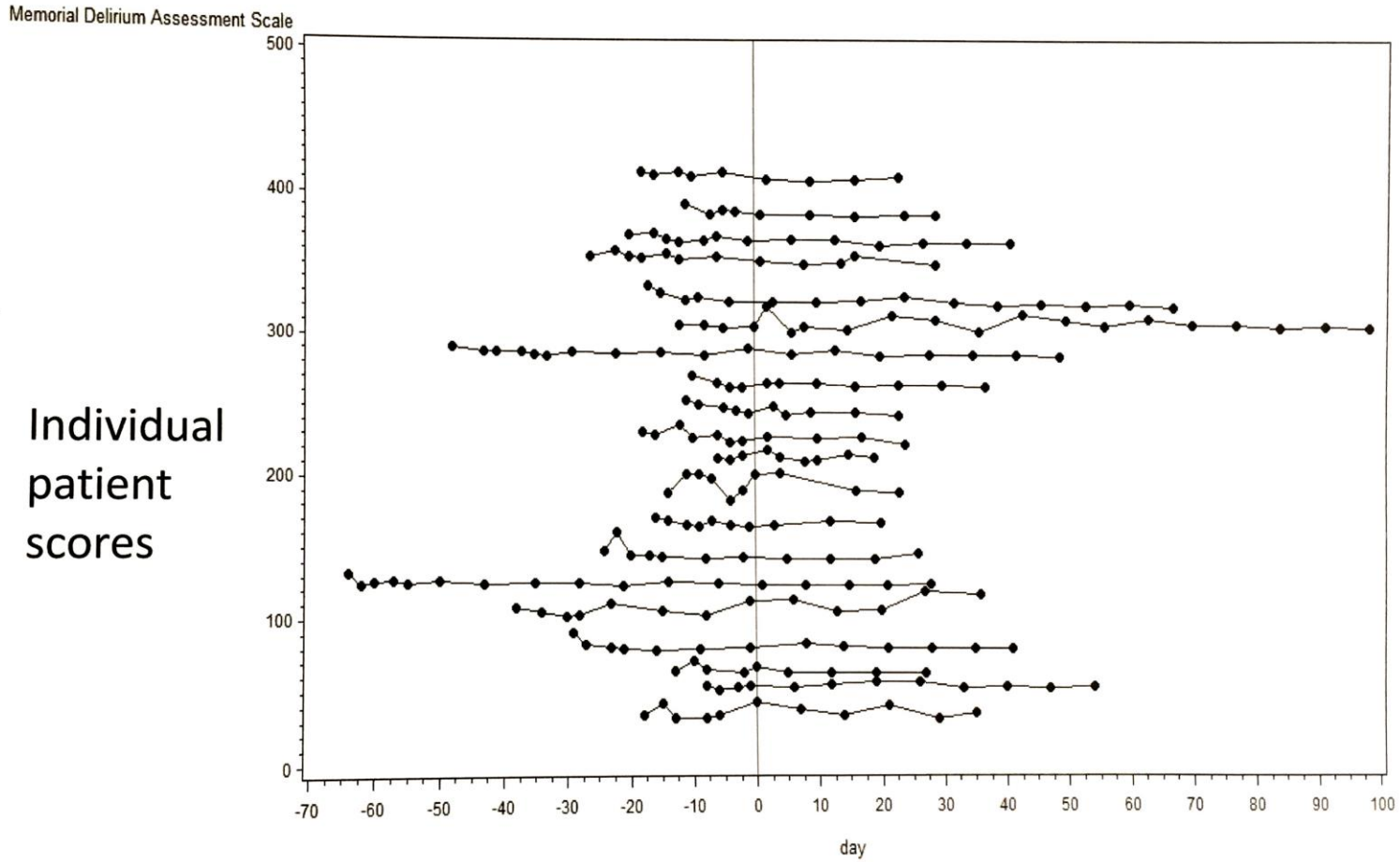
Cause?	Always check	Sometimes check
Meds, Meds, Meds!	Med Review!	
Infection	CXR, Urine	Blood Cultures, other
Heart Disease	ECG, Troponin, CXR	
Metabolic	Lytes, Ca, Mg, CBC, TSH, glucose, liver, renal	ABG
Some Combination		
Something else	Surgery?	CT Head, Xrays for #, CIWA-Ar…

It's (probably) not the urine!

- UTI can **definitely** cause a delirium
- But, asymptomatic bacteriuria **cannot**
- Rates of asymptomatic bacteriuria are high
  - Community Elderly: 10-20%
  - Institutionalized Elderly: 25-50%
- So, **high** likelihood of positive urine studies in a delirium workup
- "Dangerously Complacent" to accept a positive urine culture as a cause for delirium

McKenzie et al. Am J Med 2014 127(4) 255-7

Delirium symptom (MDAS) scores before and after asymptomatic UTI treatment



Day 0 represents the day asymptomatic UTI was treated with antibiotics. Higher MDAS scores indicate higher delirium symptom burden. Mean slope before and after ASB treated = -0.28 vs. = -0.04 respectively. Difference in slopes = 0.23 (p= 0.009), suggesting an increase in delirium symptoms after asymptomatic UTI treatment

Dasgupta et al. Poster. CGS ASM April 21, 2017

When is it a UTI?

McGeer Criteria for UTI in LTC

- Positive culture, **plus**
- Acute dysuria or GU Pain, **or**
- Fever or leukocytosis, **or**
- 2 or more of
  - CVA pain
  - suprapubic tenderness
  - New or worse incont/urgency/frequency

Stone et al, Inf Cont Hosp Epi, 2012;33:10 p965

What do I do?

- I still check urine routinely
- If symptoms of UTI & +Culture
  - Treat the UTI
- If no GU symptoms & +Culture
  - Keep looking
- No other cause found & +Culture
  - Treat but remain vigilant

Don’t forget the ‘small factors’…

- Sleep deprivation
- Pain
- Discomfort
- Sensory deprivation
- Boredom
- Overstimulation
- Constipation
- Urinary retention
- Cumulative anticholinergic burden

Drugs you may not realize are anticholinergic

- All the antihistamines
- Opiates
- Cyclobenzaprine
- All Antipsychotics
- Paroxetine
- Ranitidine
- Tramadol
- Lasix
- Colchicine

- **All the bladder antispasmodics**
- **All TCAs**
- **Atarax**
- **Gravol**
- **Benadryl**
- **Benztropine**

Key Points

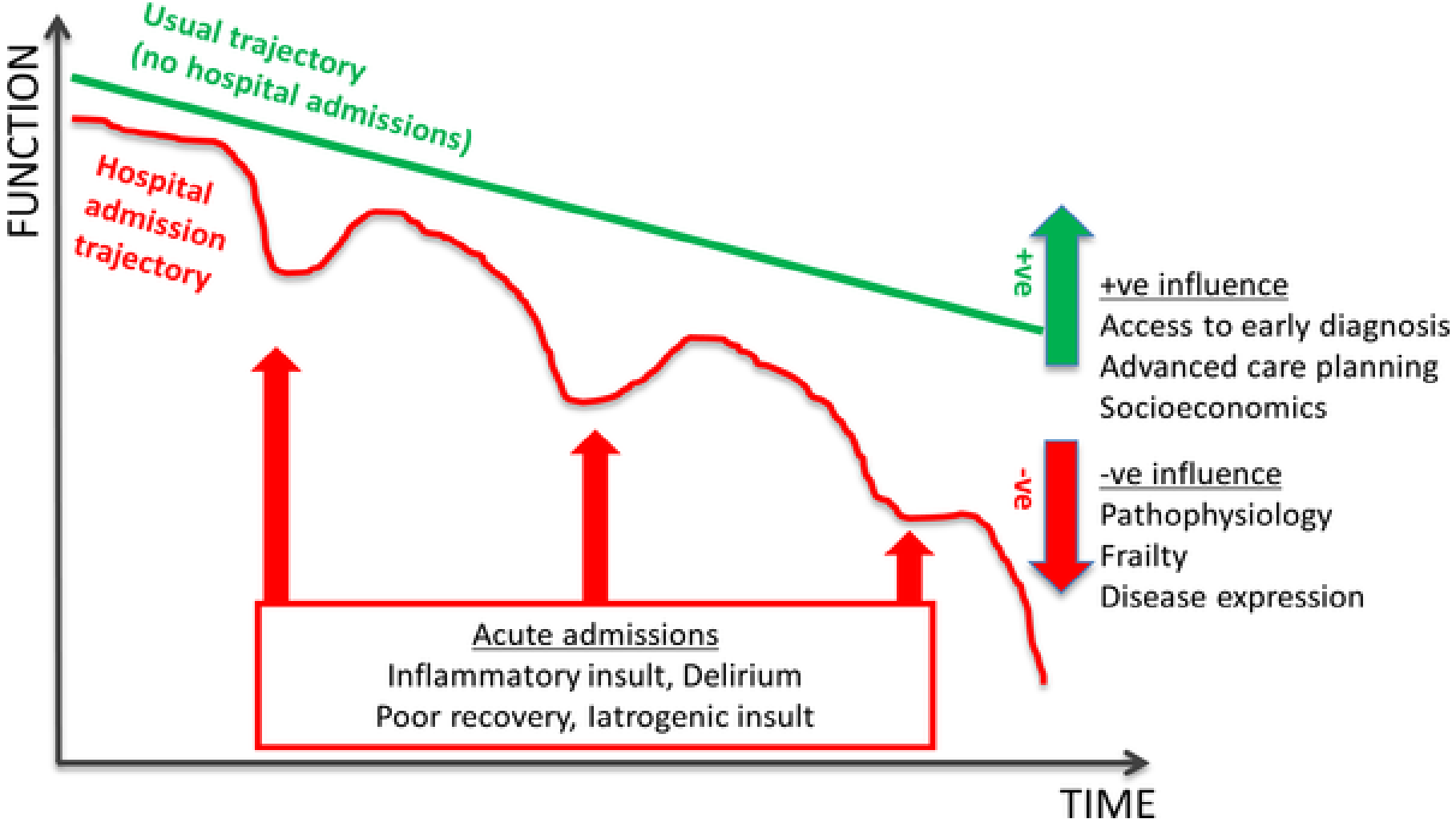
- Constant Vigilance!
- Never underestimate anything as a potential cause for delirium in a frail patient.
- Be comprehensive in your history, exam and workup. You're a detective.
- Multifactorial in many cases.
- It's probably not the positive culture.

Prognosis

- Poorer delirium outcomes associated with:
  - duration of the delirium episode
  - hypoactive motor subtype
  - delirium severity
  - pre-existing dementia or depression
- Missed delirium in ER carried significantly higher mortality rate than diagnosed delirium in ER. (maybe hypoactive carries greater risk?)

Jackson et al. Int J Geriatr Psychiatry. 2016 Apr;31(4):392-9

Fig 1. Schematic representation of dementia disease trajectory over time influenced by hospital admission.



Jackson TA, Gladman JRF, Harwood RH, MacLullich AMJ, Sampson EL, et al. (2017) Challenges and opportunities in understanding dementia and delirium in the acute hospital. PLOS Medicine 14(3): e1002247. https://doi.org/10.1371/journal.pmed.1002247
http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002247

PREVENTION OF DELIRIUM

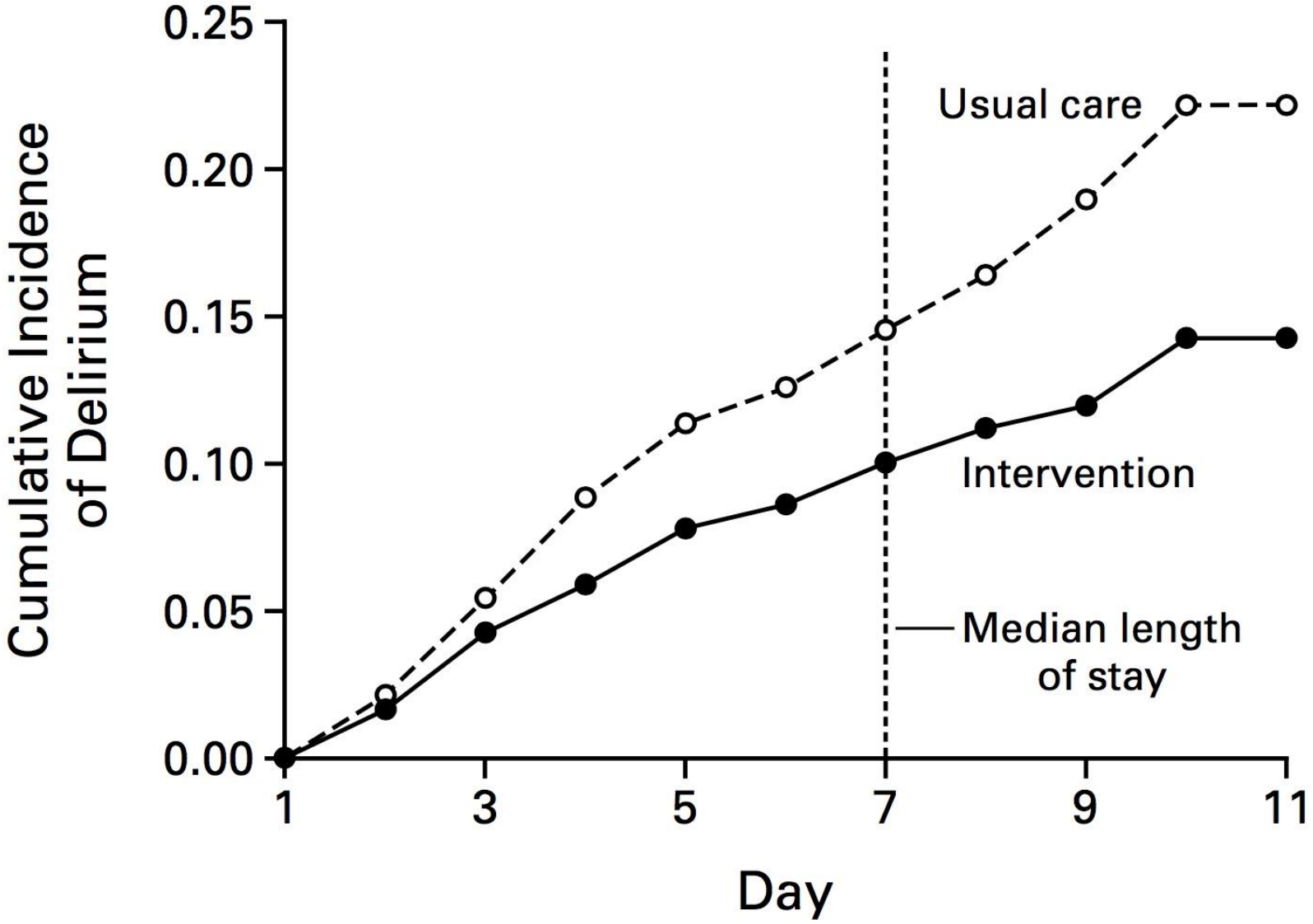
The New England
Journal of Medicine

VOLUME 340 MARCH 4, 1999 NUMBER 9

A MULTICOMPONENT INTERVENTION TO PREVENT DELIRIUM IN HOSPITALIZED OLDER PATIENTS

SHARON K. INOUYE, M.D., M.P.H., SIDNEY T. BOGARDUS, JR., M.D., PETER A. CHARPENTIER, M.P.H., LINDA LEO-SUMMERS, M.P.H., DENISE ACAMPORA, M.P.H., THEODORE R. HOLFORD, PH.D., AND LEO M. COONEY, JR., M.D.

Nonpharm therapies targeting **Cognitive Impairment, Sleep Deprivation, Immobility, Hearing Impairment, Visual Impairment** and **Dehydration** resulted in **40% reduction** in incident delirium in acute medical inpatients



Inouye et al. NEJM 1999;340:9

A little math…

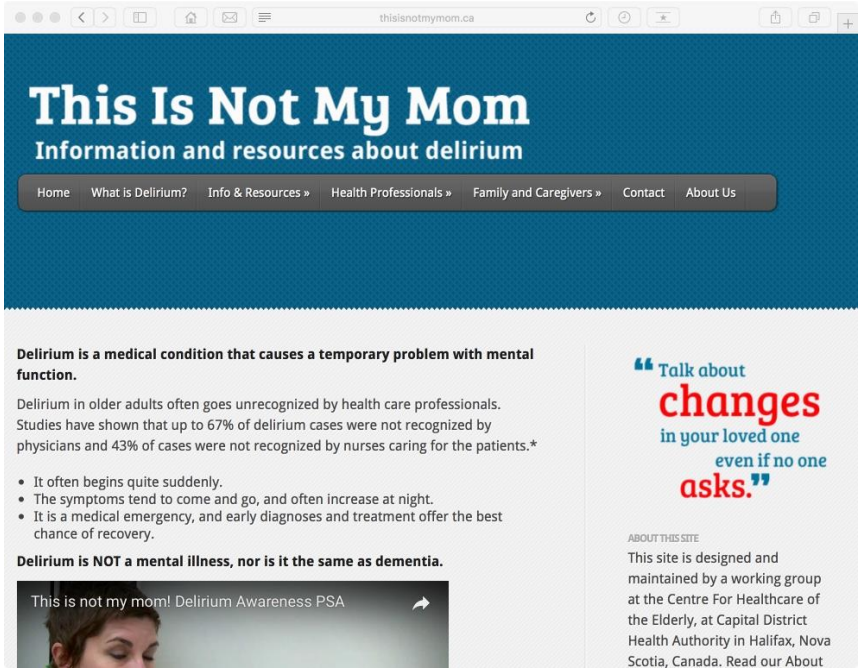
- Median stay was 7 days
- Incidence of delirium on ward was 15% in control group, so on a 30 bed ward, assuming 2/3 were frail [Juma et al, CMAJ 2016], that's 3/20 patients.
- Intervention cut incidence to 10%, or 2/20, so that's 1 case of delirium per week prevented.
- DVT Prophylaxis in hospital prevents 1 DVT* per 33 patients treated.
  - *mostly asymptomatic, NNT unknown for symptomatic VTE, (~200 for PE)

Summary

1. ANY precipitant can cause delirium, depending on the predisposition (frailty) of the patient.
2. Workup should be prompt and thorough
3. Beware of getting distracted by positive urine studies
4. Delirium can be prevented, and we should do a better job of it.

http://thisisnotmymom.ca

Capital Health



QUESTIONS?