

# Antibiotics, Delirium, and UTIs: Separating Fact from Myth

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# PRESENTER DISCLOSURE



Presenter: Pil Joo

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None

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None

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None

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None

# DISCLOSURE OF FINANC



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# LEARNING OBJECTIVES

1. **Examine the current state of evidence** regarding the relationship between delirium, asymptomatic bacteriuria, and urinary tract infections.
2. **Develop a structured approach** to evaluating older patients with delirium, identifying when a diagnosis of UTI should be considered.
3. **Implement alternative strategies** to assess contributing factors to delirium without routinely ordering urinary tests.

# QUIZ

- You are called about your 90-year-old male patient in a long-term care home. He has dementia but last few days more agitated and confused. There is no fever. Nurses tells you that urine smells bad. She dipped the urine and it “lights up like a Christmas tree.” Otherwise he is fine and no other obvious symptoms are reported.
- Does he have UTI? (Yes/Possibly/No)
- Would you prescribe antibiotic? (Yes/No)

# CASE 1

- 94F from a retirement home. Presents with progressive confusion and weakness over many weeks/months.
- 1 week prior to admission, RH “dipped the urine” and it was positive. Subsequently sent to ER, started on Keflex. ER note indicates “no symptoms”
- Now worse confusion, 2-person assist and admitted.
- Develops diarrhea on day 2 of admission. C. diff positive.

# PROBLEM – ANTIMICROBIAL RESISTANCE

- 2021 report on antimicrobial resistance
  - Direct cause for 1.14M deaths worldwide
  - Associated with 5M deaths
- Antibiotic overuse causes antimicrobial resistance.

# PROBLEM – DELIRIUM IS COMMON

- 10% of ED visits<sup>1</sup>.
- 20-40% of admitted older adults<sup>2</sup>.

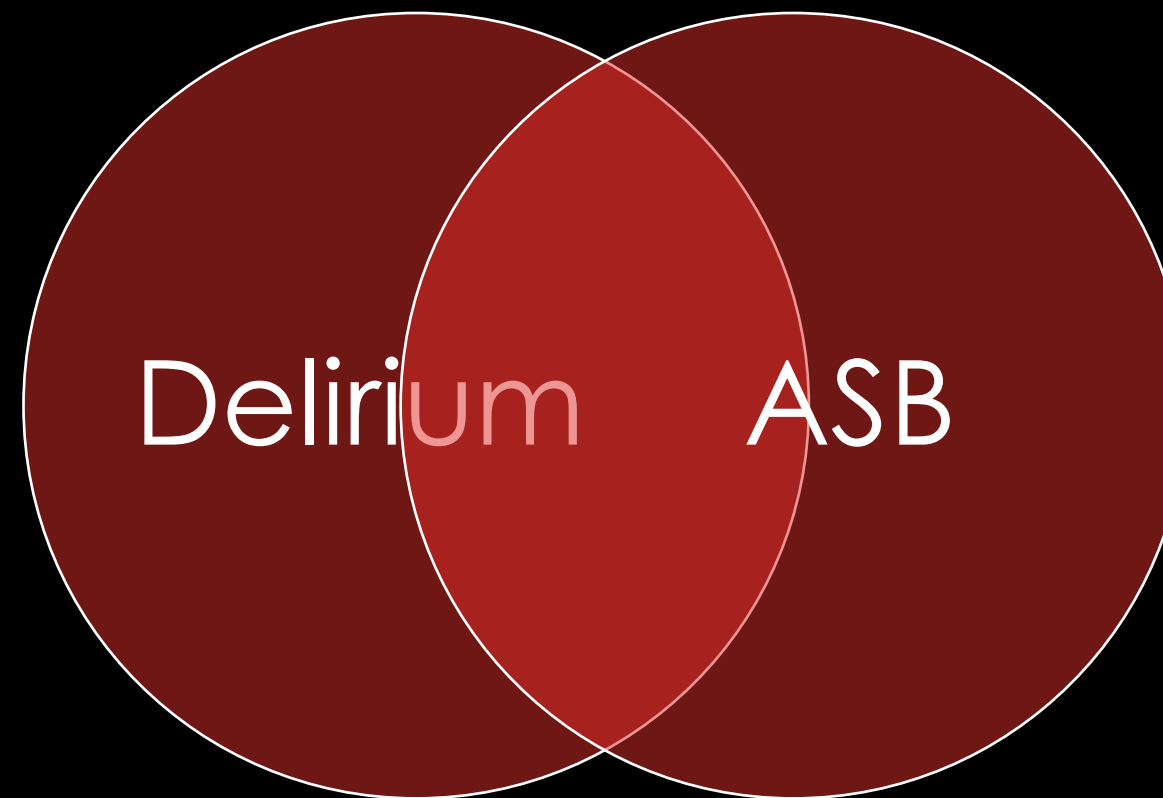
1. Elie M, Rousseau F, Cole M, Primeau F, McCusker J, Bellavance F. Prevalence and detection of delirium in elderly emergency department patients. *CMAJ*. 2000; 163(8): 977-81.

2 Fick DM, Agostini JV, Inouye SK: Delirium superimposed on dementia: a systematic review. *J Am Geriatr Soc*. 2002, 50: 1723-1732. [10.1046/j.1532-5415.2002.50468.x](https://doi.org/10.1046/j.1532-5415.2002.50468.x).

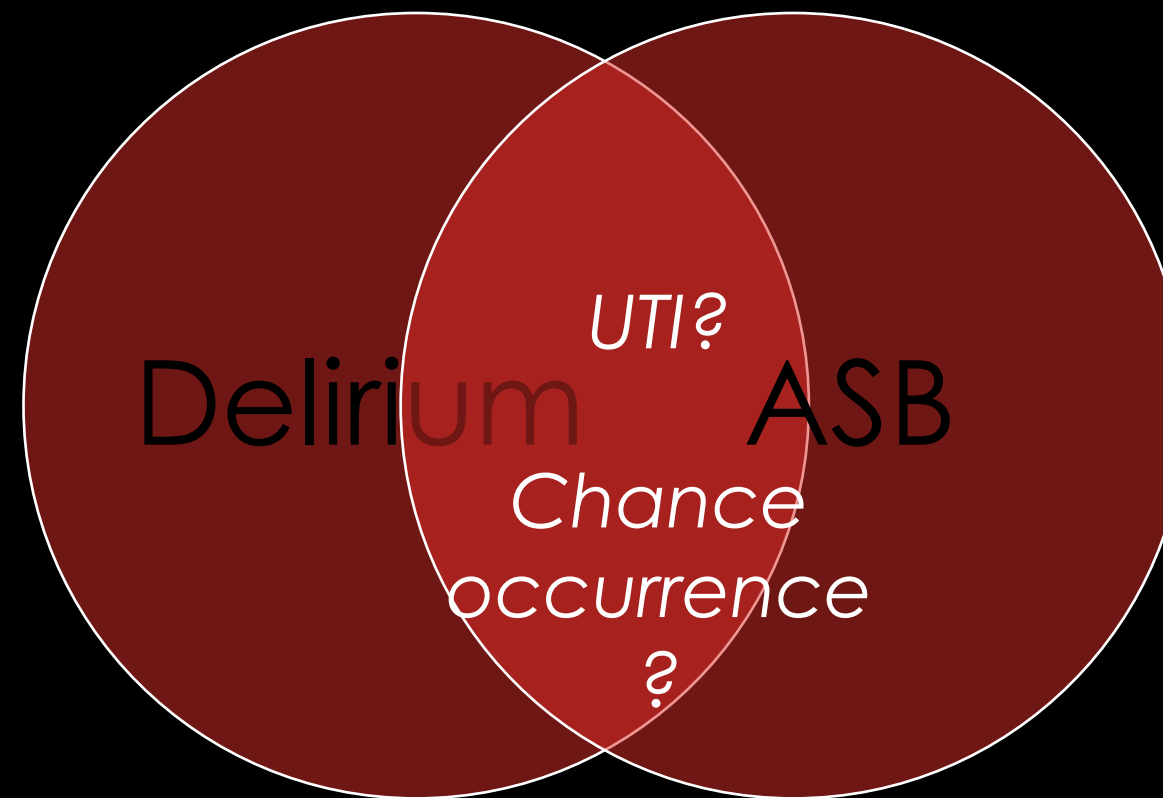
# PROBLEM – ASB IS COMMON

- Asymptomatic bacteriuria (ASB): Isolation of bacteria in the urine in the absence of genitourinary or systemic symptoms (dysuria, urinary frequency, urgency, fever, etc.)
- Present up to 25-50% of older adults.
- Higher if institutionalized or have more comorbidities.
- The only ASB population that needs to be treated
  - prior to urologic procedure
  - pregnant women
- No evidence of screening or treating ASB in older adults.

PROBLEM – TWO COMMON THINGS  
ALSO HAPPEN COMMONLY TOGETHER




# PROBLEM – TWO COMMON THINGS ALSO HAPPEN COMMONLY TOGETHER



# WHAT WE KNOW SO FAR

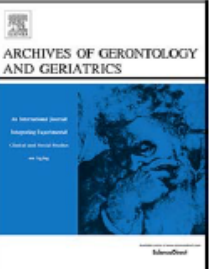
- observational studies:
  - Dasgupta et. al: from London On. 2017.
  - 343 delirious inpatients
  - Treatment of ASB associated with poor functional recovery (including death, institutionalization)
  - Slowing of delirium resolution?



Contents lists available at [ScienceDirect](#)

Archives of Gerontology and Geriatrics

journal homepage: [www.elsevier.com/locate/archger](http://www.elsevier.com/locate/archger)



Treatment of asymptomatic UTI in older delirious medical in-patients: A prospective cohort study


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<sup>d</sup> Department of Pathology and Laboratory Medicine, Division of Microbiology, Western University, Canada



# WHAT WE KNOW SO FAR

- observational studies:
  - Pinnell et al. (2021): Health record review of The Ottawa Hospital's ED
  - 499 older patients presenting with confusion
  - Abx associated with admission and high death rates

## ORIGINAL RESEARCH

### Urinary Tract Infection Investigation and Treatment in Older Adults Presenting to the Emergency Department with Confusion: a Health Record Review of Local Practice Patterns



Rhiannan A. M. Pinnell, BSc<sup>1</sup>, Tim Ramsay, PhD<sup>2</sup>, Han Wang, MD<sup>3</sup>, Pil Joo, MDCM<sup>2,3</sup>

<sup>1</sup>Faculty of Medicine, University of Ottawa, Ottawa, ON; <sup>2</sup>Ottawa Hospital Research Institute, Ottawa, ON;

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<https://doi.org/10.5770/cgj.24.518>

TABLE 5.  
Association of antibiotic treatment and complications after adjusting for age and sex

	<i>All Patients (N=499) OR [95% CI]</i>	<i>Asymptomatic Subgroup<sup>a</sup> (N=342) OR [95% CI]</i>
Admission	2.9 [2.0-4.3]	2.7 [1.5-4.9]
30-day return visit <sup>b</sup>	1.25 [0.6-2.7]	0.7 [0.1-2.3]
30-day mortality	4.0 [1.6-10.8]	3.8 [1.1-12.2]
6-month mortality	2.8 [1.4-5.8]	2.7 [1.03-6.6]

<sup>a</sup>Asymptomatic subgroup = patients with no urinary symptoms, fever or other infectious diagnosis.

<sup>b</sup>Among those not admitted.

# WHAT WE KNOW SO FAR

- observational studies:
  - Joo et al. (2022): Older inpatients screened positive for delirium and positive urinalysis at The Ottawa Hospital
  - 150 patients
  - No clear evidence that abx changes delirium resolution rate

Joo et al. *BMC Geriatrics* (2022) 22:916  
<https://doi.org/10.1186/s12877-022-03549-8>

BMC Geriatrics

RESEARCH Open Access

Effect of inpatient antibiotic treatment among older adults with delirium found with a positive urinalysis: a health record review

Pil Joo<sup>1,2\*</sup>, Lars Grant<sup>3</sup>, Tim Ramsay<sup>2,4</sup>, Caroline Nott<sup>2,5</sup>, Rosemary Zvonar<sup>2,6</sup>, Jason Jia<sup>5</sup>, Krishan Yadav<sup>2,4,7</sup>, Eisi Mollanji<sup>8</sup>, William He<sup>8</sup> and Debra Eagles<sup>2,4,7</sup>

Check for updates

# WHAT WE KNOW SO FAR

- Systematic review:
  - Balogun et al. (2014): Unclear if UTI and delirium is linked. Too few studies with major design flaws (unclear definition of both)
  - Mayne et al. (2019): Unclear if UTI and delirium are associated. Poor definition for UTI, inadequate control.
  - Stall et al.(2024): No evidence that abx treatment improves delirium outcomes.

# WHAT WE KNOW SO FAR

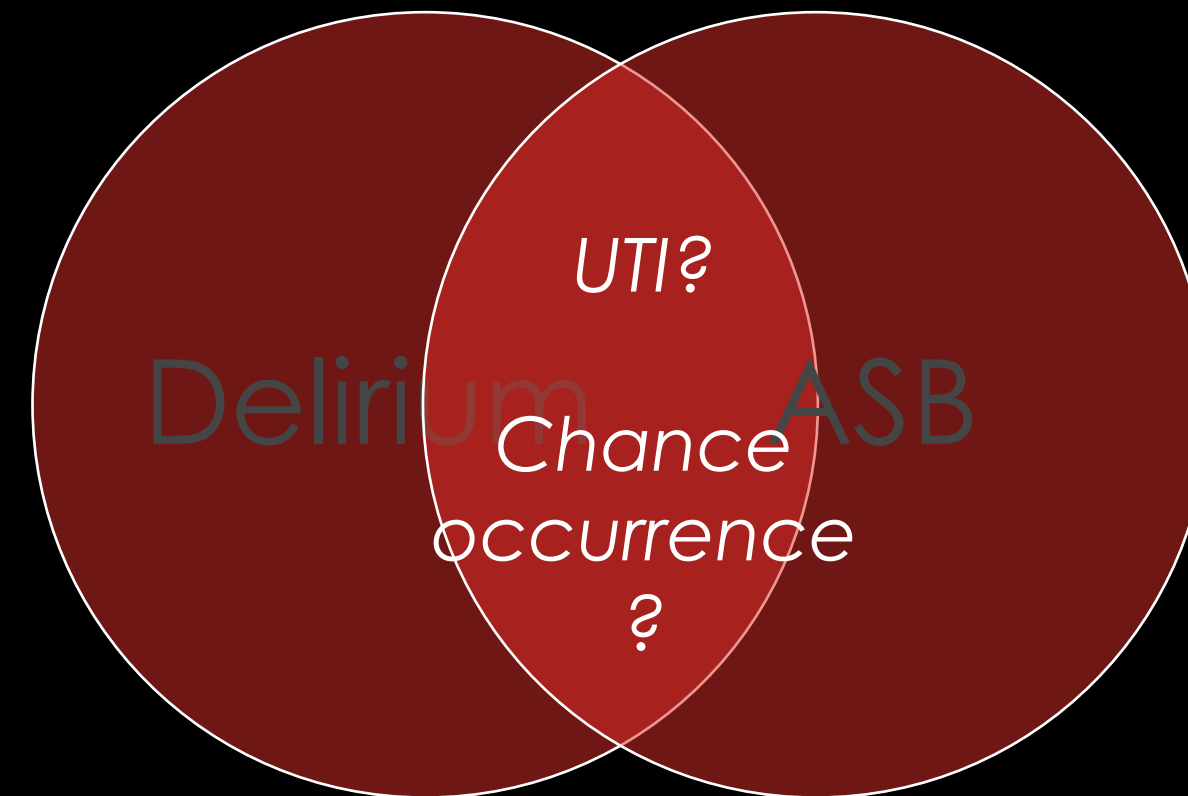
- Systematic review outlier:
  - Kritinski et al. (2021): Association between ASB and delirium is unclear. But “there is association between UTI and delirium”.
  - However, as pointed out by other SRs, problem with definition of UTI.
  - Most studies defined UTI as “record in medical charts,” i.e. “someone thought the patient had UTI”

Gual, 2018<sup>41</sup>

case-control study	<i>UTI</i> : record in medical charts <i>Delirium</i> : record in medical charts <i>UTI</i> : positive microbiological urine tests and presence of UTI symptoms <i>AB</i> : positive microbiological urine tests and absence of UTI symptoms
Prospective cohort study	<i>Delirium</i> : CAM <i>UTI</i> : record in medical charts
Prospective cohort study	<i>Delirium</i> : DSM-III-R criteria <i>UTI</i> : record in medical charts
Prospective cohort study	<i>Delirium</i> : ICD-10 research criteria <i>UTI</i> : record in medical charts
Retrospective cohort study	<i>Delirium</i> : record in medical charts <i>UTI</i> : record in medical charts
Prospective cohort study	<i>Delirium</i> : CAM <i>UTI</i> : record in medical charts
Control group from an RCT considered as a prospective cohort	<i>Delirium</i> : DSM-IV criteria <i>UTI</i> : record in medical charts
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Retrospective cohort study	<i>Delirium</i> : CAM <i>UTI</i> : record in medical charts
Prospective cohort study	<i>Delirium</i> : DSM-IV criteria <i>UTI</i> : record in medical charts

# WHAT WE KNOW SO FAR

- Summary:
  - No literature supports links between UTI/ASB and delirium.
  - No literature has shown benefit of abx treatment for delirium and otherwise ASB
  - On the other hand, no literature has shown conclusively the opposite either.



# WHAT DOES THE GUIDELINES SAY?

- Association of Medical Microbiology and Infectious Disease Canada (AMMI)

## Symptom-Free Pee: LET IT BE

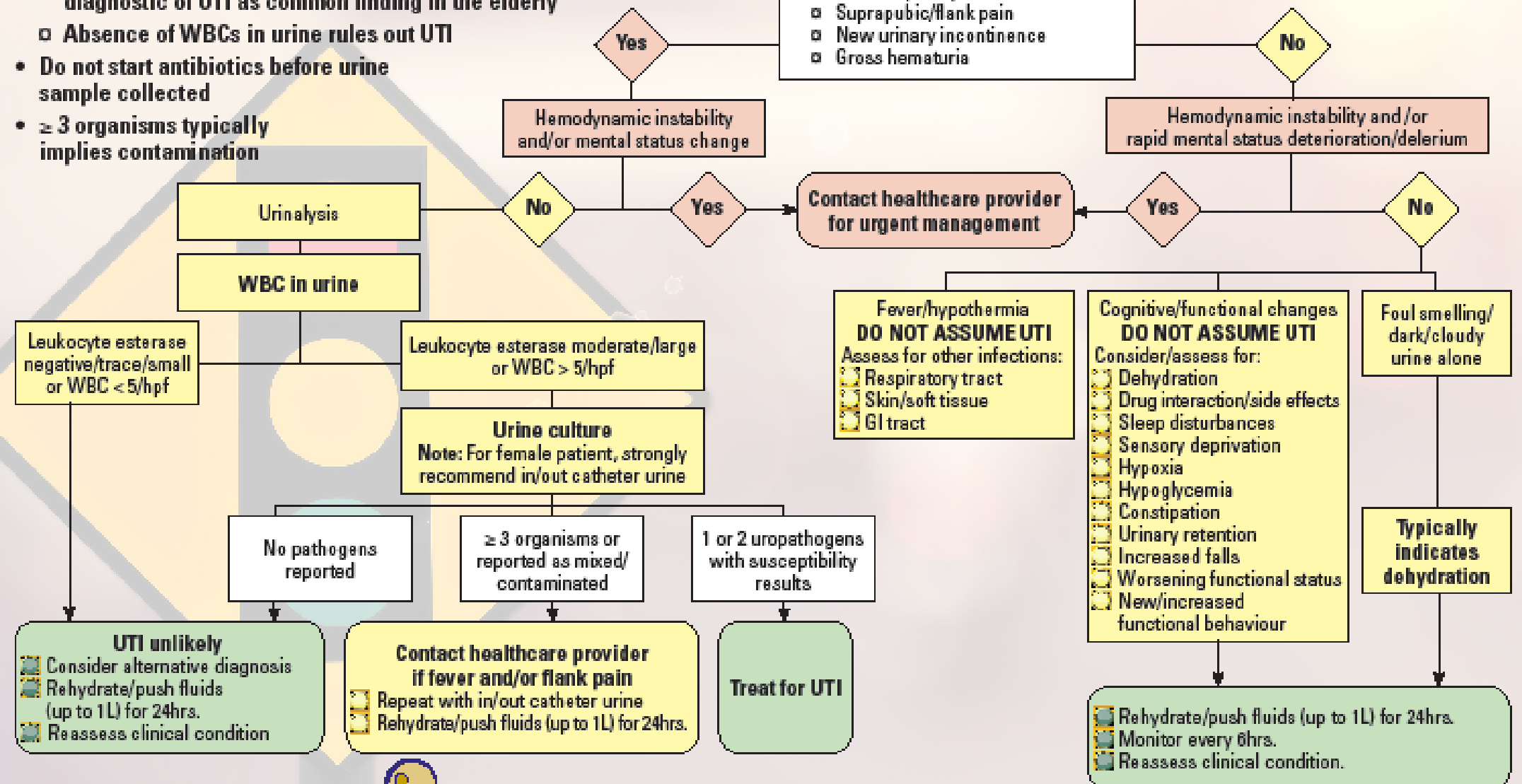
### Diagnosis of Suspected Urinary Tract Infection (UTI) in Non-Catheterized Residents of Long-term Care Facilities

#### PRACTICE POINTS:

- UTI is a clinical diagnosis, not a laboratory diagnosis
- Dipsticks not recommended - poor diagnostic accuracy
- Urinalysis:
  - Presence of bacteria/nitrites and/or WBC not diagnostic of UTI as common finding in the elderly
  - Absence of WBCs in urine rules out UTI
- Do not start antibiotics before urine sample collected
- $\geq 3$  organisms typically implies contamination

#### TYPICAL URINARY TRACT INFECTION SIGNS/SYMPTOMS:

- Acute dysuria and/or
- 2 or more of the following:
  - Fever
  - New urgency (or marked increase)
  - New frequency (or marked increase)
  - Suprapubic/flank pain
  - New urinary incontinence
  - Gross hematuria



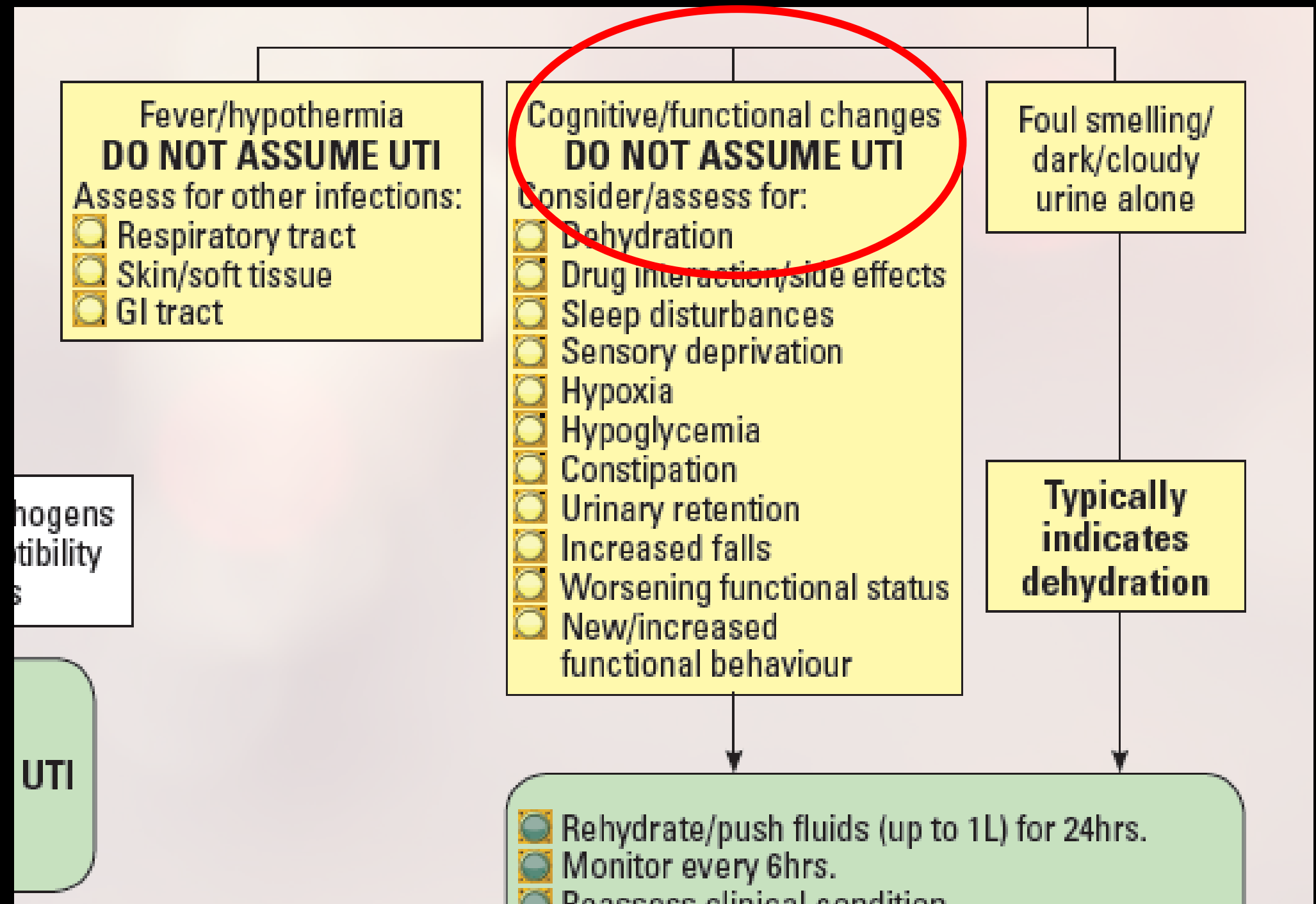
For more directions and guidance:



www.ammi.ca | #SymptomFreeLetItBe

# WHAT DOES THE GUIDELINES SAY?

- Association of Medical Microbiology and Infectious Disease Canada (AMMI)



# WHAT DOES THE GUIDELINES SAY?

- Infectious Disease Society of America (IDSA)

## V. In an Older, Functionally or Cognitively Impaired Patient, Which Nonlocalizing Symptoms Distinguish ASB From Symptomatic UTI?

### *Recommendations*

1. In older patients with functional and/or cognitive impairment with bacteriuria and delirium (acute mental status change, confusion) and without local genitourinary symptoms or other systemic signs of infection (eg, fever or hemodynamic instability), we recommend assessment for other causes and careful observation rather than antimicrobial treatment (*strong recommendation, very low-quality evidence*).
2. In older patients with functional and/or cognitive impairment with bacteriuria and without local genitourinary symptoms or other systemic signs of infection (fever, hemodynamic instability) who experience a fall, we recommend assessment for other causes and careful observation rather than antimicrobial treatment of bacteriuria (*strong recommendation, very low-quality evidence*). **Values and preferences:** This

# WHAT DOES THE GUIDELINES SAY?

- Choosing wisely

## Twelve Tests and Treatments to Question

by

Canadian Geriatrics Society

Last updated: April 2025

**1**

**Don't use antimicrobials to treat bacteriuria in older adults unless specific urinary tract symptoms are present.**



# WHAT DOES THE GUIDELINES SAY?

- Choosing wisely – patient pamphlet

**Antibiotics usually don't help when there are no UTI symptoms.**

Older people often have some bacteria in their urine. This does not mean they have a UTI. But health care providers may find the bacteria in a routine test and give antibiotics anyway.

**The antibiotic does not help these patients.**

- It does not prevent UTIs.
- It does not help bladder control.
- It does not help memory problems or balance.

Most older people should not be tested or treated for a UTI unless they have UTI symptoms. And if you do have a UTI and get treated, you usually don't need another test to find out if you are cured. You should also not be tested 'just in case' there is a UTI.

You should only get tested or treated if UTI symptoms come back.

# WHAT DOES THE GUIDELINES SAY?

- Choosing wisely – patient pamphlet

**Antibiotics usually don't help when there are no UTI symptoms.**

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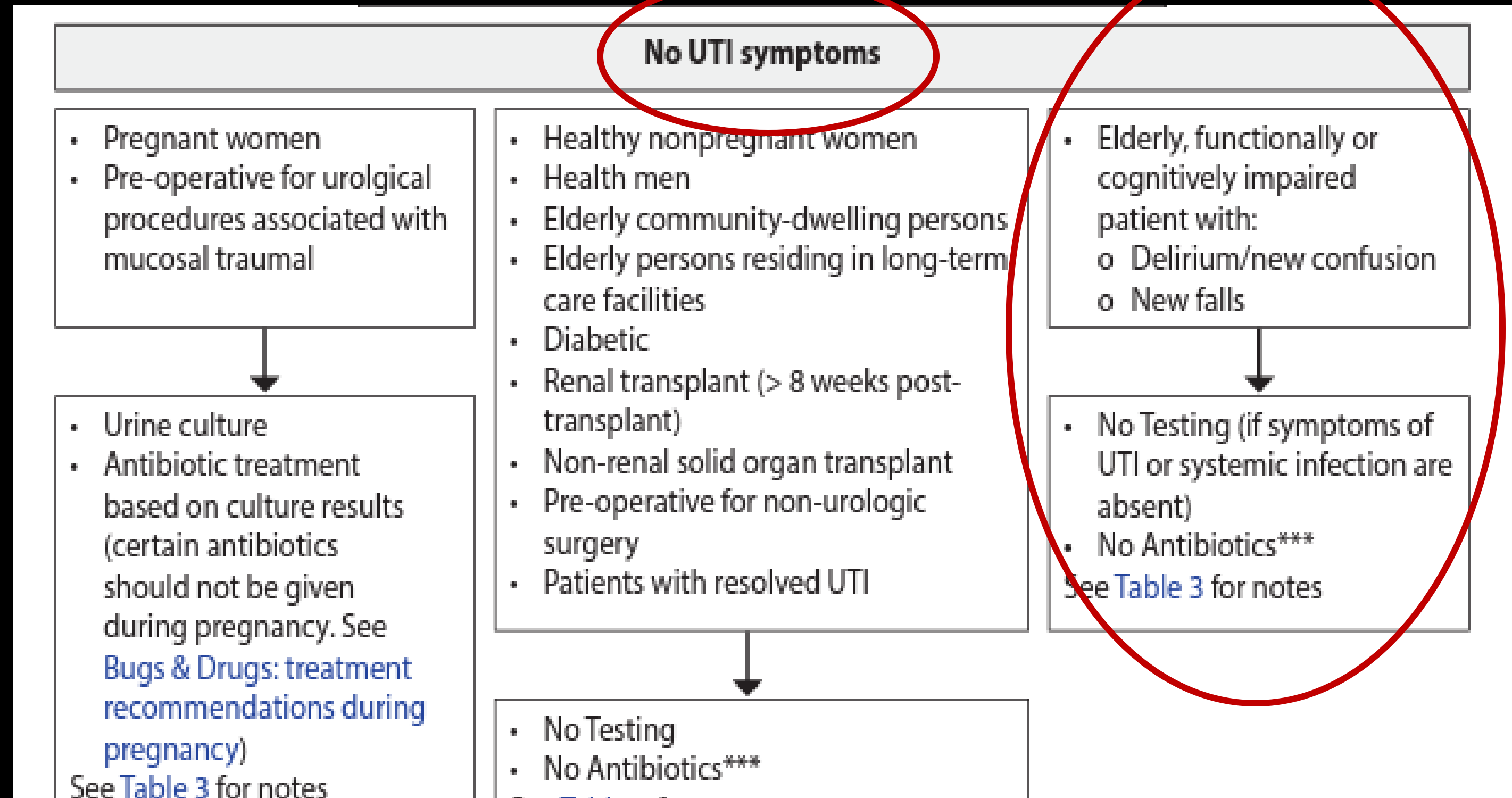
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# WHAT DOES THE GUIDELINES SAY?

- British Columbia



# WHAT DO FAMILY DOCS SAY?

## AUTHORS

Jennifer Young, MD CCFP-EM, Darren Pasay, B.Sc.Pharm, G Michael Allan, MD CCFP

TOOLS FOR PRACTICE #335 | March 6, 2023



## Asymptomatic bacteriuria in the elderly: Don't drug the bugs?

### CLINICAL QUESTION

In elderly, does asymptomatic bacteriuria (ASB) cause altered mental state and will treating ASB improve clinical outcomes?

# WHAT DO FAMILY DOCS SAY?

## AUTHORS

Jennifer Young, MD CCFP-EM, Darren Pasay, B.Sc.Pharm, G Michael Allan, MD CCFP

TOOLS FOR PRACTICE #335 | March 6, 2023



## Asymptomatic bacteriuria in the elderly: Don't drug the bugs?

### CLINICAL QUESTION

In elderly, does asymptomatic bacteriuria (ASB) cause altered mental state and will treating ASB improve clinical outcomes?

### BOTTOM LINE

Due to important evidence limitations, it is not confirmed that ASB, or even Urinary Tract Infection (UTI), is clearly associated with altered mental state. Treating ASB does not improve clinical outcomes (including altered mental state) but may increase adverse events from 1% to 7%. In elderly patients with ASB and altered mental state, antibiotics should be avoided without clear signs/symptoms of infection.

# WHAT WE DO CURRENTLY

- Lague et al. 2021
- Survey of 297 Canadian physicians
  - Emergency
  - Family Medicine
  - Internal Medicine
  - Geriatrics

Canadian Journal of Emergency Medicine  
<https://doi.org/10.1007/s43678-021-00148-1>

ORIGINAL RESEARCH



## Investigation and treatment of asymptomatic bacteriuria in older patients with delirium: a cross-sectional survey of Canadian physicians

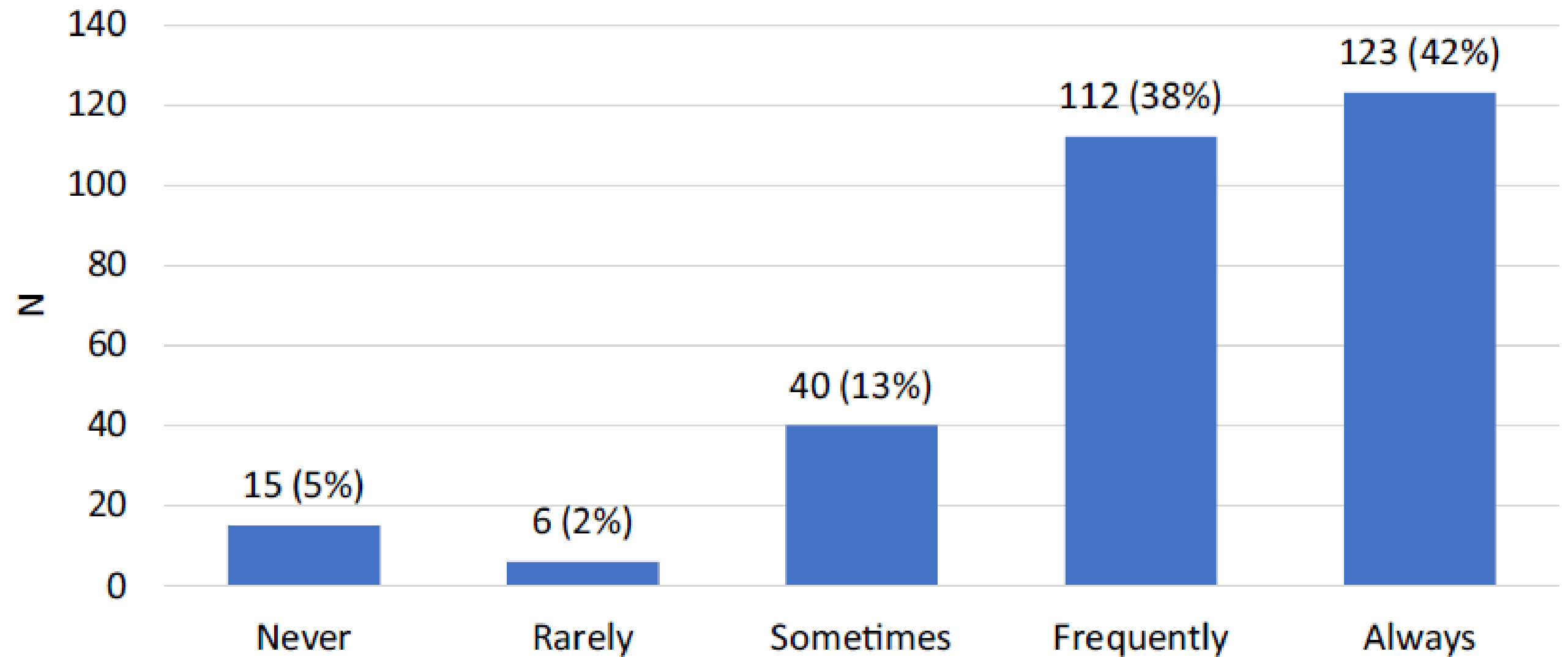
Antoine Laguë<sup>1,2,3</sup> · Valérie Boucher<sup>1,2,3,4</sup> · Pil Joo<sup>5,6,7</sup> · Krishan Yadav<sup>6,7</sup> · Charles Morasse<sup>3</sup> · Marcel Émond<sup>1,2,3,4</sup> 

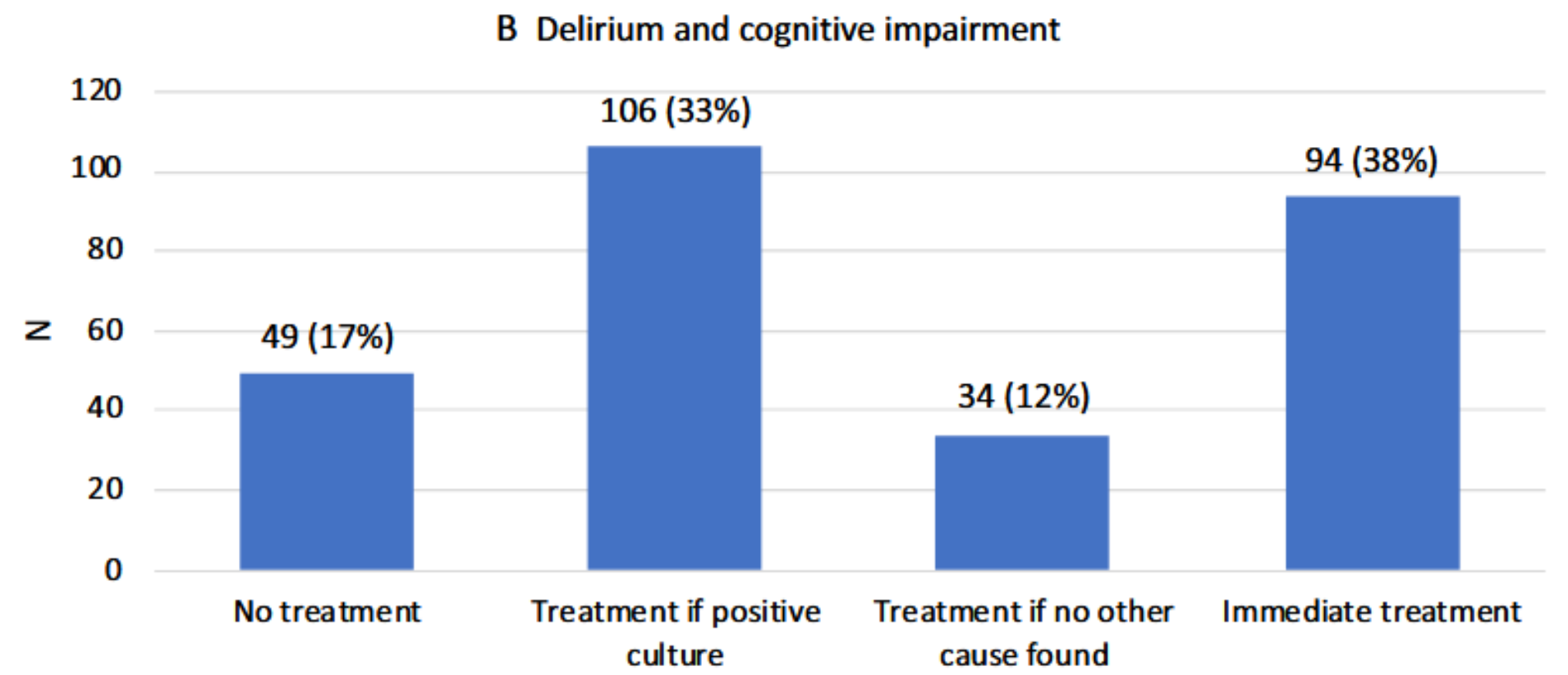
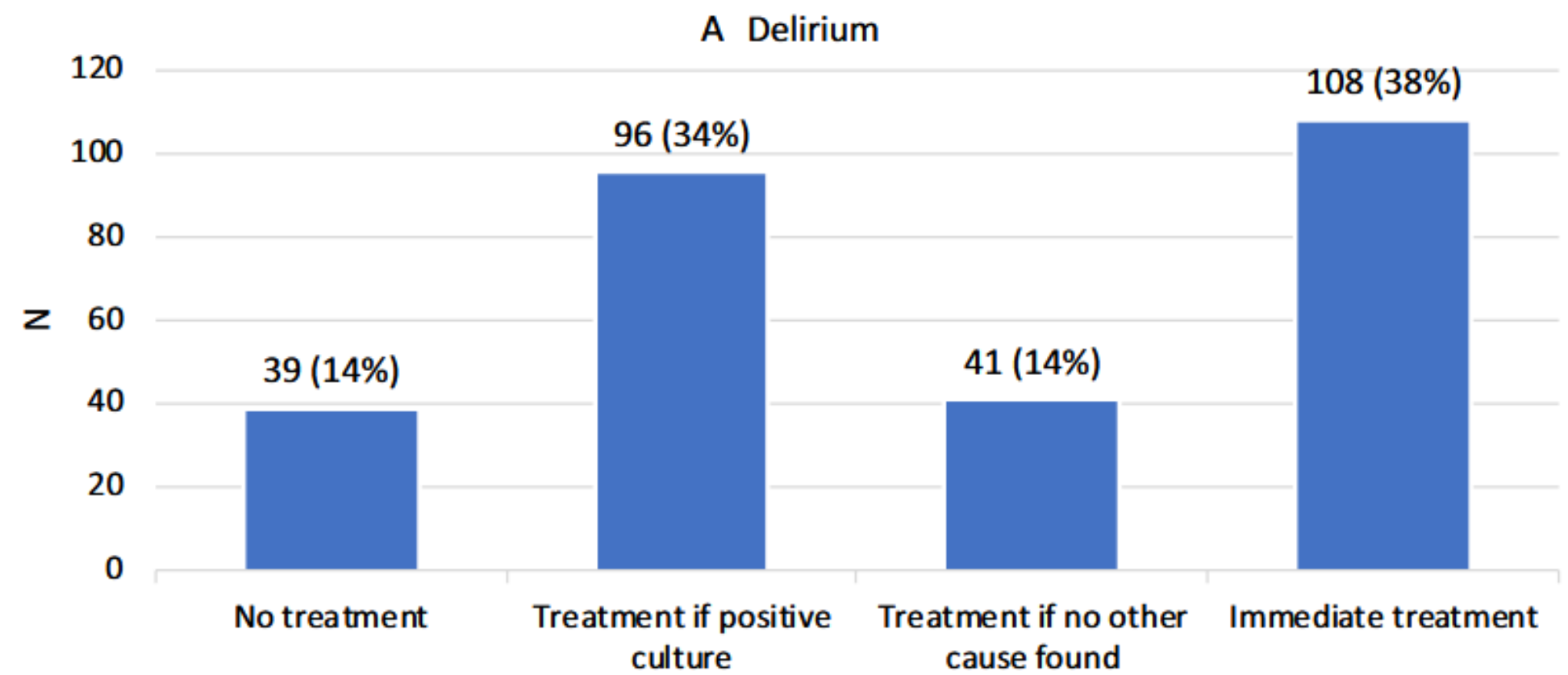
Received: 11 January 2021 / Accepted: 11 May 2021

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# WHAT WE DO CURRENTLY

Fig. 1 Assessment with urine dipstick or urinalysis in delirious patients ( $N=296$ )





**Fig. 2** Decision for treating bacteriuria in afebrile patients without urinary symptoms in (A) delirious patient and (B) patient in delirium but known for cognitive impairment

# APPROACH TO DELIRIUM - DIMS/DIMES

- DIMS/DIMES
  - Drugs
  - Infections
  - Metabolic
  - Environment
  - Structural

# APPROACH TO DELIRIUM - DIMS/DIMES

- DIMS/DIMES
  - Drugs: benzos, anticholinergics, opioids, intoxication
  - Infections
  - Metabolic
  - Environment
  - Structural

# APPROACH TO DELIRIUM - DIMS/DIMES

- DIMS/DIMES
  - Drugs
  - Infections: Sepsis. Pneumonia? UTI? – but make sure not blaming incidental findings!
  - Metabolic
  - Environment
  - Structural

# UTI? WHAT MAKES IT A UTI?

- Must have two things:
  - Urinary or systemic symptoms: dysuria, frequency, urgency, suprapubic pain, fever, (signs of sepsis)
  - Positive urinary findings: Technically positive urinalysis. But positive leukocyte and/or nitrite can be used as substitute. (unfortunately, sensitivity and specificity are low...)

# UTI? WHAT MAKES IT A UTI?

- Positive urine dip/culture by themselves do not make the diagnosis of UTI.
- Positive urine tests in the absence of urinary or systemic symptoms may be due to
  - Poor collection technique
  - Asymptomatic bacteriuria
- How was that urine sample taken?



# UTI? WHAT MAKES IT A UTI?

- Expect positive urinalysis/culture in old people, especially in retirement home or long-term care. (up to 50%)
- Or... flip a coin.



# UTI? WHAT MAKES IT A UTI?

- What if urine culture comes back positive?
  - Are/were there symptoms?
  - If not, still NOT a UTI.
- My patient is so confused. He/she cannot give me history.
  - Don't assume UTI if the patient cannot give history.
  - Seek collateral history.
  - We don't assume a person had a TIA and treat as, because they are confused.

# APPROACH TO DELIRIUM - DIMS/DIMES

- DIMS/DIMES
  - Drugs
  - Infections
  - Metabolic: hypoxia, hypercarbia, hyper/hypoglycemia, electrolytes, renal/hepatic/thyroid dysfunction
  - Environment
  - Structural

# APPROACH TO DELIRIUM - DIMS/DIMES

- DIMS/DIMES
  - Drugs
  - Infections
  - Metabolic
  - Environment: stable surrounding
  - Structural

# APPROACH TO DELIRIUM - DIMS/DIMES

- DIMS/DIMES
  - Drugs
  - Infections
  - Metabolic
  - Environment
  - Structural: Neurologic (stroke, ICH), cardiopulmonary (MI, AECOPD)

# APPROACH TO DELIRIUM - DIMS/DIMES

- DIMS/DIMES
  - Drugs
  - Infections
  - Metabolic
  - Environment
  - Structural
- But! Is the “fishing expedition” warranted??
- Probably not
- Use proper history/physical and targeted testing given pre-test probabilities

# APPROACH TO DELIRIUM - CUPID

- Constipation
- Urinary retention
- Pain
- Insomnia
- Drugs
- Dehydration

# APPROACH TO DELIRIUM - CUPID

- Constipation
  - Nursing flowsheet can be helpful
  - PEG 3350 daily/BID
  - Enema/Bisacodyl PRN
- Urinary retention
- Pain
- Insomnia
- Drugs
- Dehydration

# APPROACH TO DELIRIUM - CUPID

- Constipation
- Urinary retention – consider bladder scan
- Pain
- Insomnia
- Drugs
- Dehydration

# APPROACH TO DELIRIUM - CUPID

- Constipation
- Urinary retention
- Pain – Too much pain? Too much opioid?
- Insomnia
- Drugs
- Dehydration

# APPROACH TO DELIRIUM - CUPID

- Constipation
- Urinary retention
- Pain
- Insomnia
  - collateral, nursing flowsheet.
  - Suspect if daytime somnolence
  - Trazodone scheduled @ 2000, 2200 (hold if asleep)
- Drugs
- Dehydration

# APPROACH TO DELIRIUM - CUPID

- Constipation
- Urinary retention
- Pain
- Insomnia
- Drugs - Deprescribe! You can do it!
  - Benzos/narcotics/psychoactives
  - PPIs, “bone health meds”
  - Statins/ASAs/Antihypertensives
  - Prostate meds when they have chronic Foley
- Dehydration

# APPROACH TO DELIRIUM - CUPID

- Constipation
- Urinary retention
- Pain
- Insomnia
- Drugs
- Dehydration – Often overlooked. Can your patient with dementia reach for water if thirsty?

# OR IS IT EVEN DELIRIUM??

- Acute changes (hours to days) in cognition that cannot be explained by pre-existing cognitive conditions (e.g dementia)
- If the change is in weeks to months, this is more likely from other problems. Suspect dementia or its progression.
- Consider using brief CAM to screen.

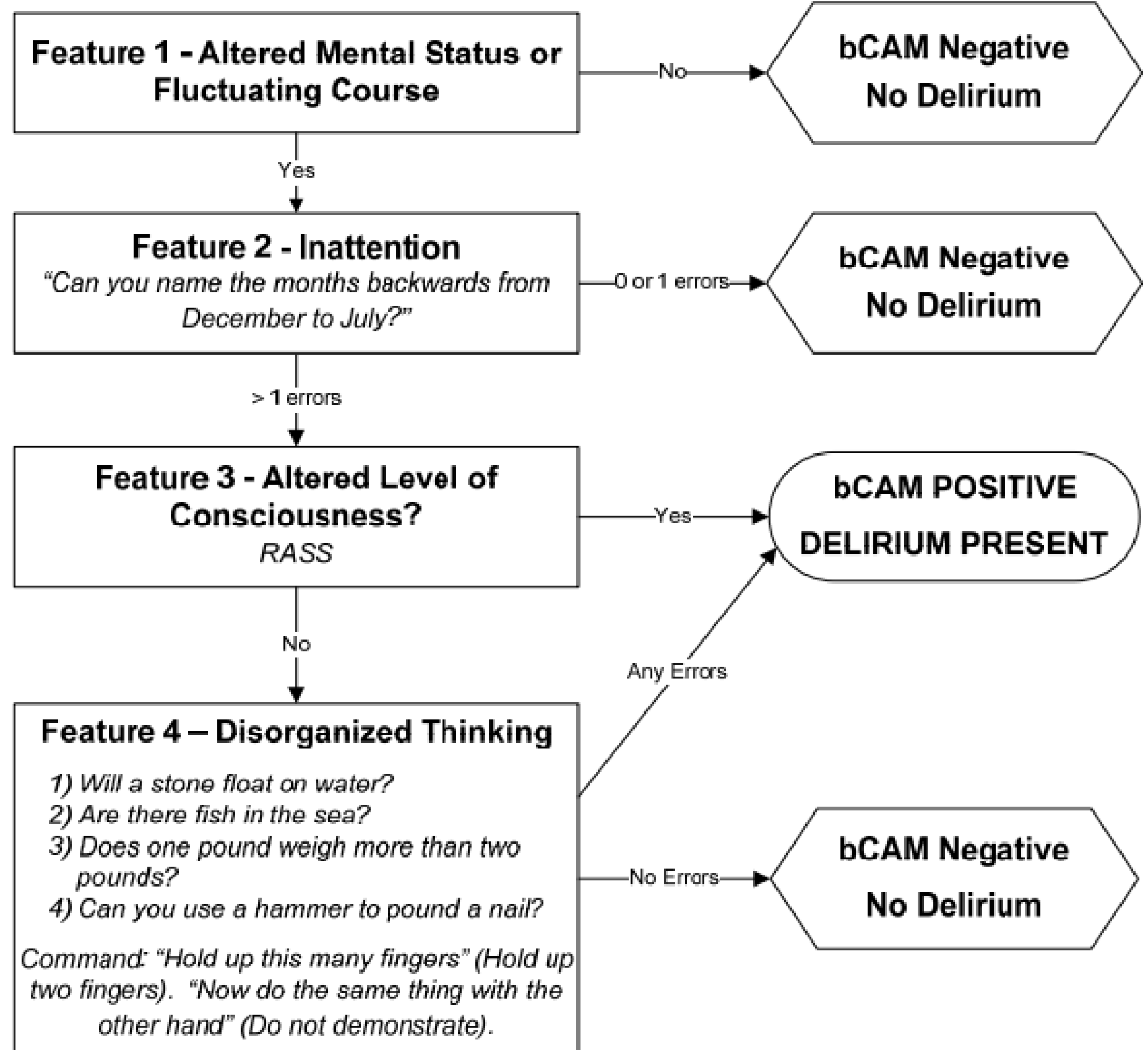


Figure 2. The Brief Confusion Assessment Method algorithm allows for early stoppage.

# BPSD REGIMEN EXAMPLE

- Basic:
  - Trazodone 25mg at 2000, and 2200 (“hold if asleep”, do not rely on PRNs)
  - Trazodone 6/12.5/25mg q6h PO PRN, 1<sup>st</sup> line for agitation
  - Risperidone 0.125/0.25mg q6h PO PRN, 2<sup>nd</sup> line for agitation
  - Haldol/Loxapine IM PRN, 3<sup>rd</sup> line for agitation
- Add as needed:
  - Trazodone daytime scheduled (e.g. 6/12.5/25mg at 0700, 1200, 1700)
  - Risperidone 0.125/0.25mg bid scheduled (Quetiapine is an alternative)
  - Night time Risperidone/Quetiapine
  - Night time Mirtazapine

## CASE 2

- 88F from a nursing home known for dementia. More confused and punching care personnel.
- Urine dip shows 2+ leukocytes. “Found with UTI” in ED, started on ceftriaxone and admitted. But ED note indicated “no urinary symptoms.”
- Other investigations nil acute. (CBC, lytes, create, TSH, Vit B12, CT-head)
- Ceftriaxone stopped. Blood work stopped. Vital signs reduced to once a day. Foley and IV line removed. Unnecessary POCT glucose stopped.
- BPSD regimen started. Daily check for CUPID. On-going deprescription (so far, statin, PPI, ASA, Vit D, two antihypertensives, citalopram stopped or tapered.)
- After 7 days, CAM –ve. Ready to go back to LTC.

# THANK YOU!

# FMMF

Family Medicine Forum  
Forum en médecine familiale



# PLEASE FILL OUT YOUR SESSION EVALUATION NOW

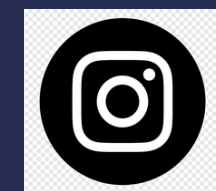
## EVALUATION NOW



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