AMERICAN DELIRIUM SOCIETY

OVERVIEW

Delirium Assessment, Prevention, and Treatment

OVERVIEW: DELIRIUM ASSESSMENT PREVENTION AND TREATMENT

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DSM-5-TR Criteria & Delirium Facts

DSM-5-TR Criteria for Delirium (paraphrased)

APA, 2022

- Disturbance in attention (impaired ability to direct, focus, sustain, or shift attention) and awareness.
- Delirium develops over a short period of time, typically hours to days. There is a change in baseline attention and awareness that tends to fluctuate throughout the day.
- There is also at least one additional disturbance in cognition, such as in memory, orientation, language, and perception.
- The disturbance is not better explained by another pre-existing, established, or evolving neurocognitive disorder.
- There must also be evidence that the delirium is due to a direct physiological effect of another medical condition, substance intoxication or withdrawal, or exposure to a toxin, or to multiple etiologies.

Delirium Facts

- Delirium is common, occurring in 20% of hospitalized and post acute patients
- Delirium is under recognized, with about 60% missed
- Delirium is different from dementia. It is a ***sudden change from baseline*** characterized chiefly by ***inattention***
- Hypoactive delirium is more common and associated with worse outcomes than hyperactive delirium
- Delirium is harmful in the short and long term and associated with greater risk of mortality, permanent cognitive impairment, future dementia, falls, skin breakdown, prolonged hospitalization, hospital readmission, higher levels of care, and costs
- Up to 40% of delirium is caused by mis-steps taken by the health care team (actions or lack of action) and therefore preventable
- Some risk factors for delirium are modifiable, including immobility, dehydration, inadequate nutrition, teethers, deliriogenic meds, sleep disruption, and sensory loss
- Use of evidence-based strategies can improve outcomes such as less delirium, fewer complications, and reduced mortality.

Recognition of Delirium

Hyperactive 2%

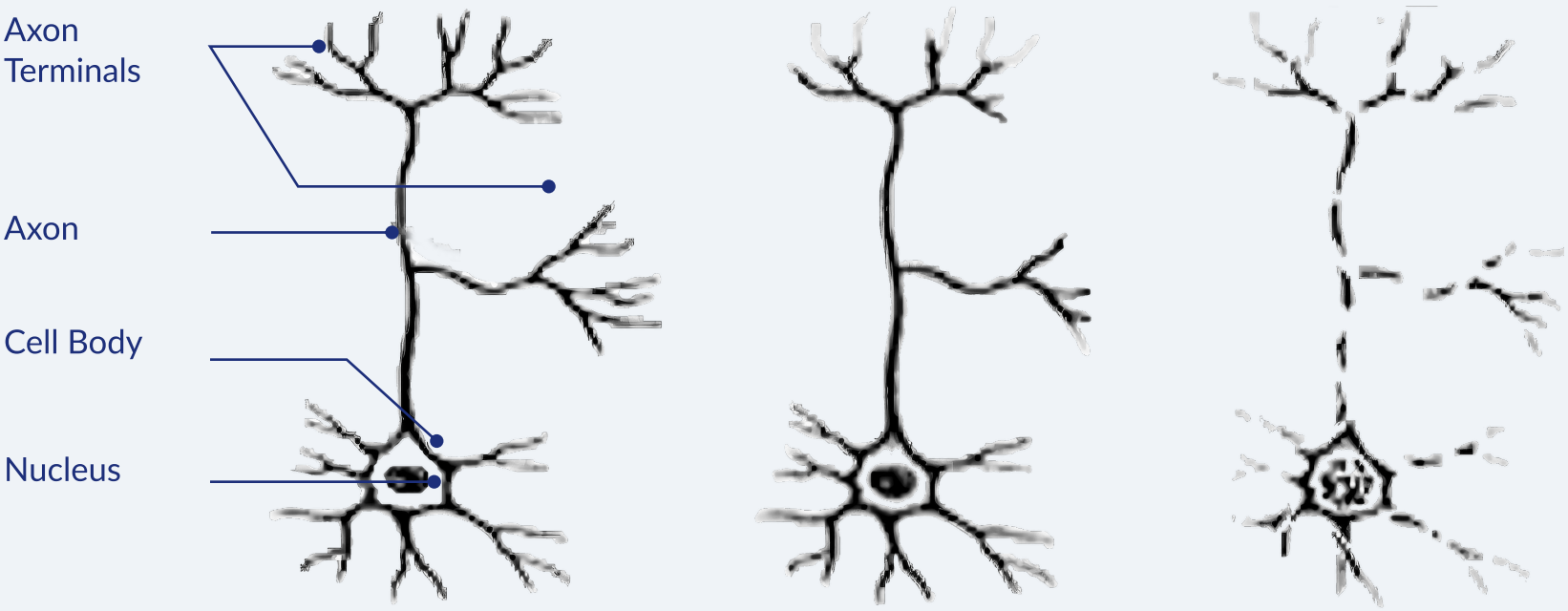
Hypoactive 44%

Mixed 54%

Why do we care ?

IN DELIRIUM, CRITICAL PARTS OF THE BRAIN'S FUNCTIONING ARE FAILING

- Delirium is an indicator that brain cells may be dying
- Similar to death of cardiac cells during a heart attack



Normal Nerve Cell

Nerve Cell with Damaged Terminals

Cell Death

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Theories of Delirium

Theories of Delirium Pathophysiology

Maldonado,2018,Int J Geriatr Psych

- Little is known of the exact pathophysiology
- Multiple pathways can lead to the end result of delirium, which is often accompanied by toxicity to the brain itself

Candidate theories of delirium

- Neuronal Aging Theory
- Neurotransmitter Theory
- Neuroinflammatory Theory
- Cellular Signal Theory
- Diurnal Dysregulation Theory
- Physiological Stress Theory
- Oxidative Stress Theory

Theories of Delirium

Neuronal Aging Theory

The aging brain has “less reserve” to call upon when needed

Neurotransmitter Theory

Reduced cholinergic function, excessive release of dopamine, norepinephrine, and glutamate, and altered serotonergic and γ-aminobutyric activity

Neuroinflammatory Theory

Increase in cytokines, immunuglobulins, signaling proteins, increase lactate in the CSF; cell death (necroptosis or apoptosis); ATP shuts down and kills brain cells

Cellular Signaling Theory

Incorrect signaling of cells leads to improper activation, overexpression, dysfunction of intracellular metabolism and cell death

Diurnal Dysregulation Theory

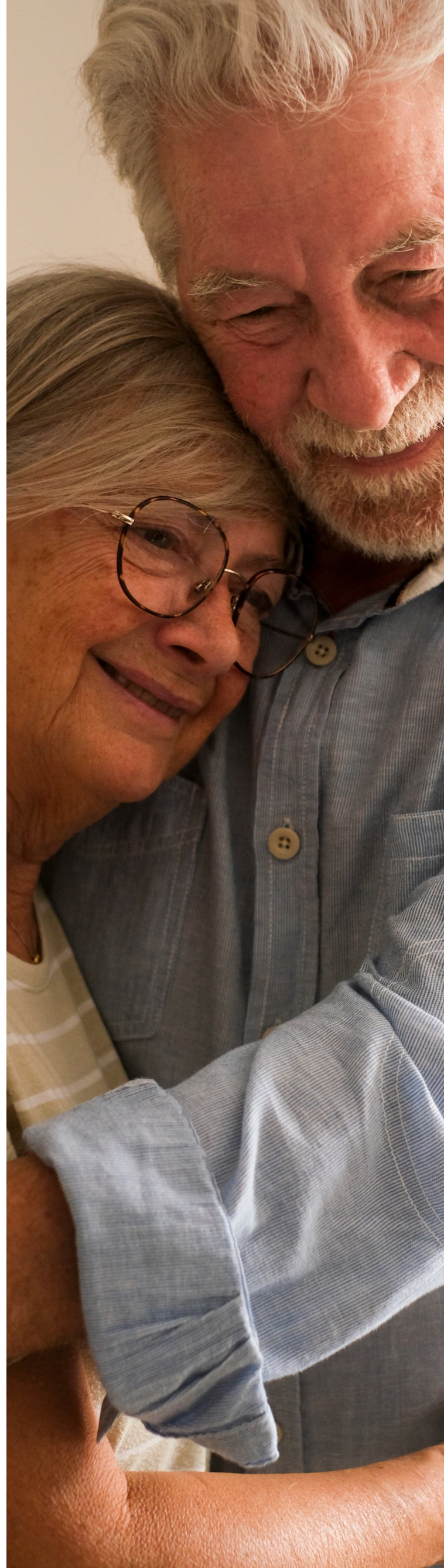
Older adults and ICU patients may have lower levels of melatonin. ICU patients have < one hour/day of REM sleep, even on propofol (Watson, 2008; *Critical Care Medicine*). Also, if tryptophan is not metabolized to melatonin, it can causes inflammation.

Physiological Stress Theory

Stress response fails to “shut off” as it should, leading to an increase in glucocorticoids and cognitive change.

Oxidative Stress Theory

Decreased oxidative metabolism in the brain causes delirium. Janz (2010) studied 7 patients who had delirium in the ICU and subsequently died and received a brain autopsy during the same hospitalization. Hypoxic ischemic injury in multiple locations of the brain was a common finding.



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Delirium is Common

Delirium Occurs In:

- One in five hospitalized patients *Ryan et al, 2013, British Medical Journal Open*
- Up to 28% **after elective orthopedic surgery**
- Up to 38% **hip fracture** patients before surgery
- Up to 53% **after hip fracture surgery**
- Up to 57% **after cardiac surgery**
- Up to 71% of patients with **sepsis**
- Up to 80% of patients in **ICUs**
- Up to 85% in **advanced cancer**

Therefore, “Prove your patient is NOT delirious”

Predisposing vs Precipitating Factors

RISK FACTORS

Vulnerability

- Frailty
- Age
- Severity of illness
- Pre-existing dementia
- History of delirium
- Substance dependence

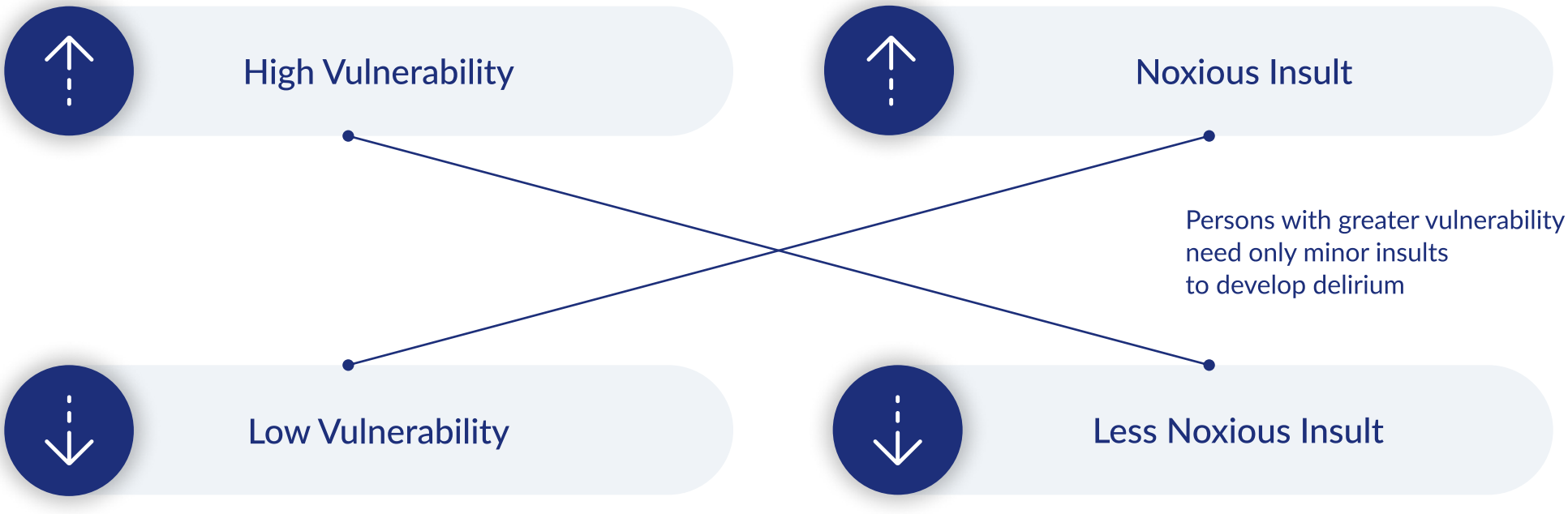
Marcantonio et al, 2011, Annals of Internal Medicine

Modifiable Insults

- Polypharmacy
- Restraints
- Urinary catheter
- Untreated pain
- Malnutrition
- Dehydration
- Sensory impairment
- Excessive or under stimulation
- Lack of sleep
- Immobility

Quantifiable Risk

Inouye & Charpentier, 1996 , JAMA



Adverse Patient Outcomes Associated With Delirium

- ***Increased mortality*** during and up to 2 years post hospitalization *Witlox, 2010, JAMA*
- ***Persistent delirium*** *Cole et al, 2009, Age and Ageing*
- ***Post ICU cognitive syndrome*** (including persistent cognitive deficits) *Girard et al, 2010, Critical Care Medicine*
- ***Increased speed of cognitive loss*** in persons with baseline dementia *Fong et al, 2009, Neurology*
- Higher probability of developing ***dementia*** in the future *Davis, 2012, Brain*
- ***PTSD*** in patients/ distress for families *Parker 2015, Critical Care Medicine*
- Complications including ***falls, injuries, skin breakdown, deconditioning, malnutrition, dehydration***
- Inability to return to prior ***functional level*** (physical, cognitive, social)
- Increased risk for future ***delirium***

Delirium is very costly to the health care system

- Hospital costs of delirium are estimated to be greater than $8 billion annually
  - Hospital stay is longer (21 vs. 9 days)
  - Complications include falls, injuries, skin breakdown, deconditioning, malnutrition, dehydration.
  - Higher rate of readmission within 30 days
- Post-hospital costs related to rehabilitation, institutionalization, and home care are greater than $100 billion annually
- Delirium during hospitalization is associated with greater need for facility level care:
  - At hospital discharge (**47%** vs. 18%)
  - At 6 months after hospital discharge (**43%** vs. 8%)
  - At 15 months after hospital discharge (**33%** vs. 11%)

Leslie & Inouye, 2011, J Am Geriatr Soc

How can we improve patient outcomes and cut costs?

- **GOAL #1:** Prevent delirium whenever possible (30-40% of cases are preventable) *Inouye, 2006, N Engl J Med; Siddiqi et al, 2006, Age Ageing*
- **GOAL #2:** Early recognition and treatment of underlying cause(s)
- **GOAL #3:** Decrease the severity and duration of delirium through evidence-based practice

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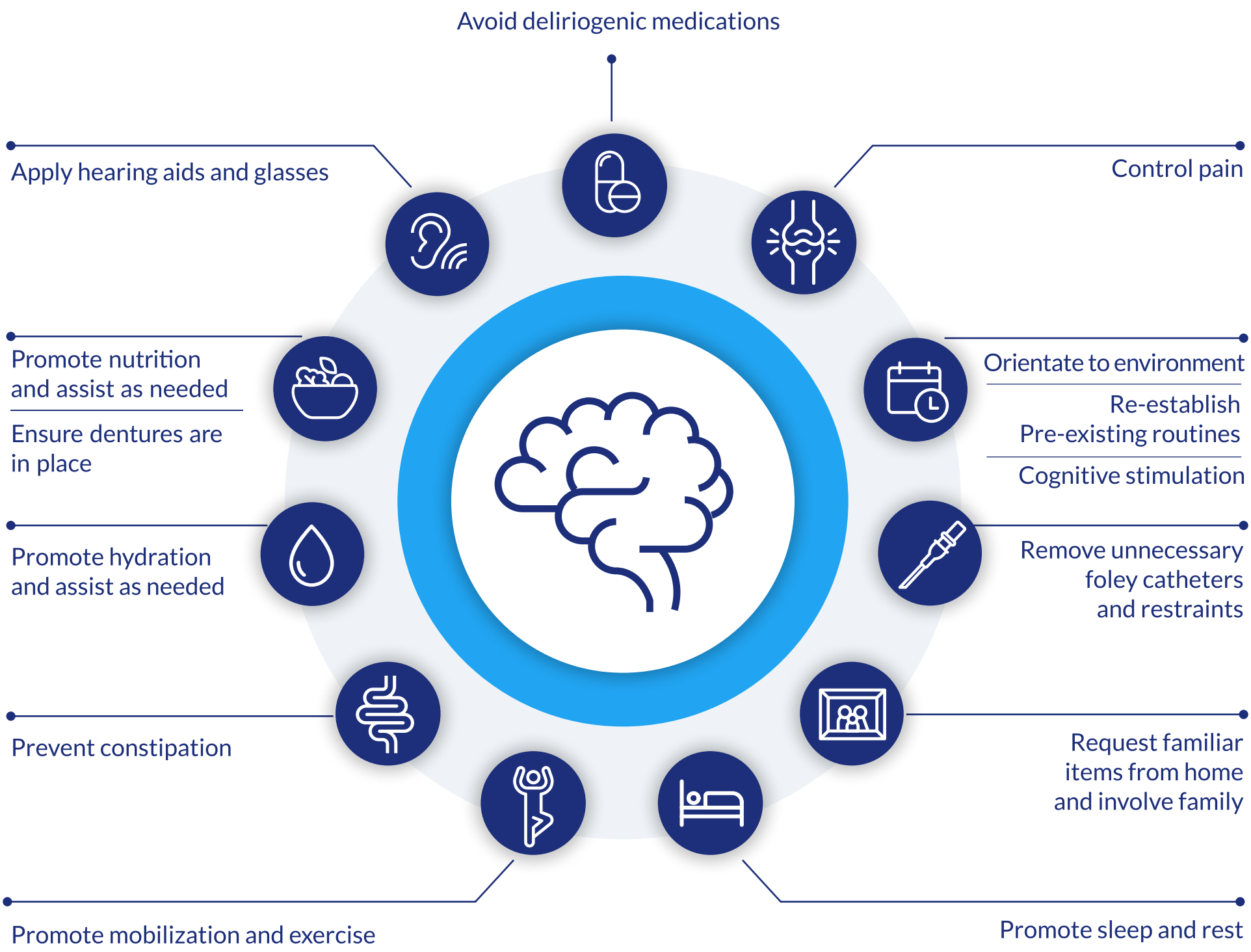
Goal #1: Prevent Delirium Whenever Possible

Preventative Strategies

- Cognitive stimulation
- Orientation devices (clocks or calendars)
- Sleep hygiene
- Early mobilization
- Removal/avoidance of medical devices
- Correction of sensory deficits
- Promotion of normal elimination patterns
- Early correction of dehydration and metabolic abnormalities
- Avoiding high risk meds

Synopsis of the National Institute for Health and Clinical Excellence Guideline for Prevention of Delirium,2011 Annals of Internal Medicine; Inouye et al, 2009, N Engl J Med.; Hshieh, 2015, JAMA; Australian Commission on Safety & Quality in Health Care,2016, Delirium Clinical Care Standard



Preventative Strategies

ABCDEF (ICU LIBERATION) BUNDLE FOR CRITICALLY ILL PATIENTS

ABCDEF Bundle decreases the risk of death & delirium

- **A**ssess, prevent and manage pain
- **B**oth SAT and SBT
- **C**hoice of analgesia and sedation
- **D**elirium monitoring/management
- **E**arly mobility and Exercise
- **F**amily engagement and empowerment

Ely, 2017, Critical Care Medicine ICU Liberation Pun et al, 2019, Critical Care Medicine ICU Liberation

AVOID, LIMIT, OR DISGUISE MEDICAL DEVICES

Devices (Examples)

- Catheters
- Lines
- Leads
- Tethers

If patient is disrupting the device:

1. Evaluate if it can be removed
2. If not, consider a disguise or distraction
3. Restraints can cause harm and increase agitation

Disguises (Examples)

- Pajama pants
- Long sleeve shirts
- Skin sleeves
- Elbow length gloves
- Dummy IV port taped to the hand
- Unhooked EKG wires for fiddling
- Rolled washcloths, squishy balls or small stuffed animals to hold
- Abdominal binder placed backward
- Busy apron

PHARMACOLOGY

- Many medications can cause delirium
- Medications can be used inappropriately to treat/ manage the symptoms of delirium resulting in:
  - Prolonged delirium
  - Falls
  - Dysphagia
  - Oversedation
  - QTC prolongation

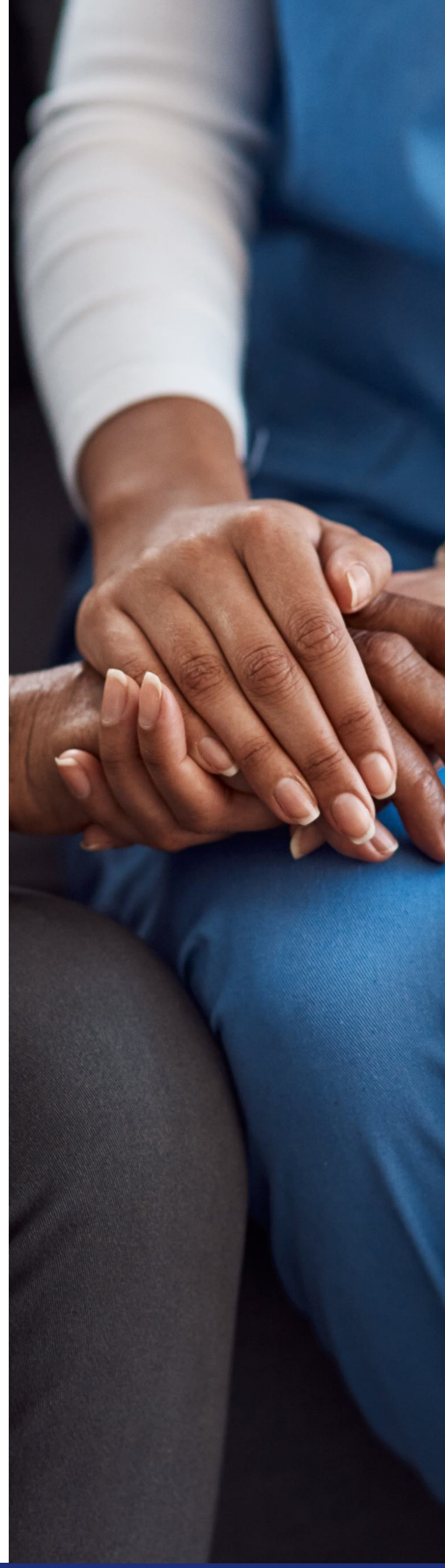
AVOID POTENTIALLY INAPPROPRIATE MEDICATIONS (PIMS) KNOWN TO BE DELIRIOGENIC IN HIGH RISK POPULATIONS

Beers Criteria , 2023, AGS

- Anticholinergics
- Antipsychotics
- Benzodiazepines
- Corticosteroids
- H2 receptors antagonists
  - Cimetidine
  - Famotidine
  - Nizatidine
- Benzodiazepine receptor agonist hypnotics (z-drugs)
  - Eszopiclone
  - Zaleplon
  - Zolpidem
- Opioids

AVOID STOPPING THESE CLASSES OF MEDICATIONS/SUBSTANCES ABRUPTLY TO AVOID CAUSING A WITHDRAWL RELATED DELIRIUM

- Benzodiazepines
- Opioids/narcotics
- Selective serotonin reuptake inhibitors (“SSRIs”)
- Steroids
- Antiepileptics
- Antipsychotics
- Sedative-hypnotics
- Acetylcholinesterase inhibitors
- Alcohol
- Nicotine



Can medication prevent delirium? **NO**

- Antipsychotics do not prevent delirium *Neufeld et al, 2016, JAGS*
- Single dose ketamine intra-operatively does not prevent delirium *Avidan et al, 2017, Lancet*
- Use of statin as a protective measure is unclear, more research needed
- Despite early evidence that ramelteon might prevent delirium, subsequent studies have cast doubt on its delirium preventing effect *Hatta et al, 2014 JAMA Psych; Dang et al. 2023, JACLP*
- IV dexmedetomidine has shown promise in preventing delirium among critically ill patients *Skrobik et al. 2018, AJRCCM*

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Goal #2: Early Recognition and Treatment of the Underlying Cause

Goal #2: Early Recognition and Treatment of the Underlying Cause

- Early identification of presence of delirium with use of a validated screening tool
- Accurate diagnosis of the etiology/ies
- Prompt treatment of the underlying causes
- Delayed recognition of delirium and treatment of the source leads to worse outcomes

Delirium Screening

- Screening is appropriate for ill or injured patients of all ages in all healthcare settings
- There are a variety of validated delirium screening tools
- All clinical staff should be competent to perform the delirium screening tool that is in place for your clinical area and patient population
- Delirium screening should occur in the hospital setting at least every 12 hours and as needed with any change in clinical status.
- Delirium rates will increase when a delirium screening tool is implemented due to improved recognition
- A new positive delirium screen should trigger an immediate response from the health care team (reporter can use Delirium ISBAR format)

Baseline Mental Status

- Most delirium screening tools include the comparison of the patient's current mental status to baseline mental status.
- Baseline mental status is the patient's cognitive abilities when not ill or injured. Many patients are not at baseline mental status upon arrival to your facility (ED, hospital unit, post-acute facility), as delirium may already be present.
- If the patient is currently experiencing cognitive impairment, determine and document baseline mental status with the assistance of family/friend or history from the medical record. This baseline becomes the reference for cognitive assessments going forward.

Delirium is a Medical Emergency

It may be thought of as the brain analog to the:

- "Heart Attack" of Cardiology
- "Pulmonary Embolism" of Pulmonary
- "Sepsis" of Infectious Disease
- "Perforated Bowel" of GI
- "Diabetic Coma" of Endocrine
- "Hot Joint" of Rheumatology
- "Prostate Cancer" of Urology

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Diagnostic Process

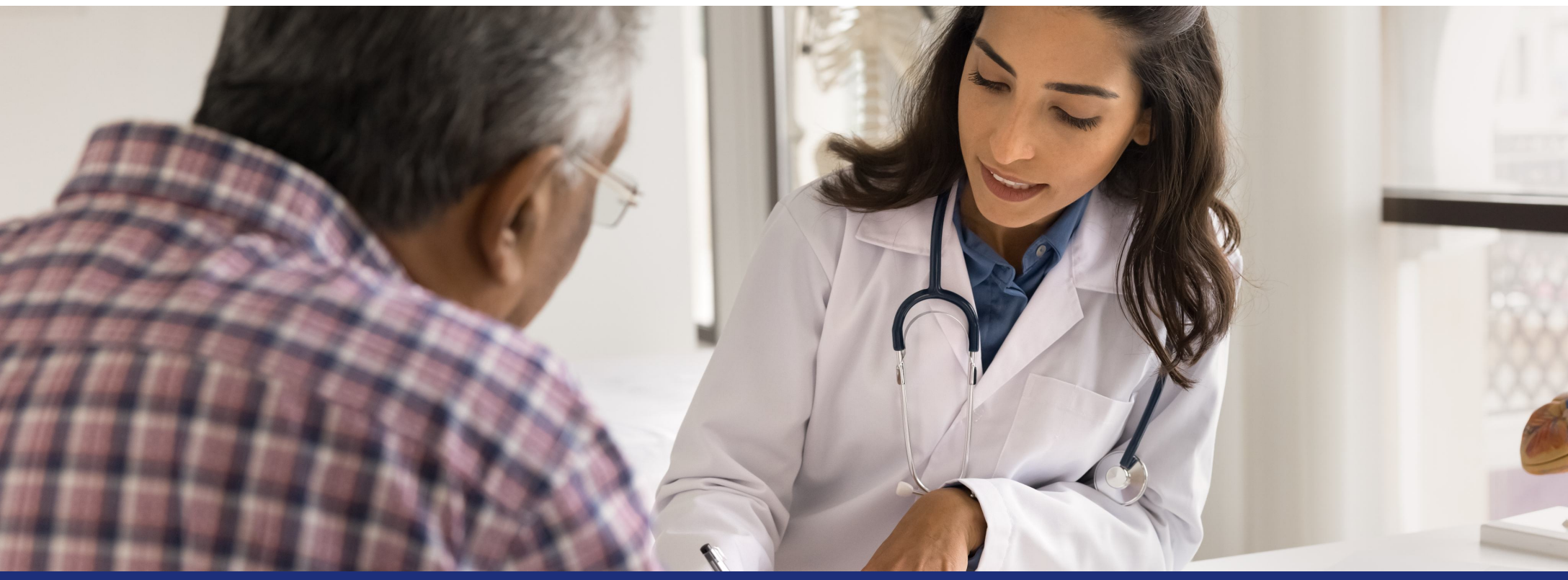
Diagnostic Process

- History
- Physical exam
- Appropriate diagnostics (lab work; imaging)
- Medication review (include OTC)
- Determine potential underlying causes
- Differential diagnosis

- Refer to Delphi Delirium Algorithms for Patients in Hospital Wards, in Intensive Care Units, after Cardiac Surgery
- Also see Delphi Delirium Algorithm Reference Cards for alternative and less common diagnoses

Determining the Underlying Etiology of Delirium

- **D**rugs
- **E**yes, ears, environment, emotional
- **L**iver failure, low phosphate states (heart attack, pulmonary embolism, anemia, or stroke)
- **I**nfection, immobility
- **R**estraints, respiratory, retention (of urine or stool)
- **I**njury, ictal state
- **U**nfamiliar surroundings, under-hydration, under-nutrition
- **M**etabolic abnormalities



Interprofessional Team Collaboration

(PROVIDER, NURSE, PHARMACIST, REHAB THERAPISTS, OTHERS)

- Activate Delirium Order Set in EHR
  - Diagnostics
  - Nonpharmacologic interventions
  - Medications for hyperactive/mixed delirious patients (only if necessary)
- Document delirium/acute encephalopathy in EHR (Delirium Provider Note)
- Team to dialogue (nurse, pharmacist, rehab therapist, nutritionist, social work, volunteer) to discuss plan of care
- Discuss with family and involve them in care as appropriate. Provide education Delirium Guide for Patients and Families, Pediatric Delirium Guide for Patients and Families
- Refer to Delphi Delirium Algorithms for Patients in Hospital Wards, in Intensive Care Units, after Cardiac Surgery for guidance

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Goal #3: Decrease the Severity and Duration of Delirium Through Evidence-based Practice

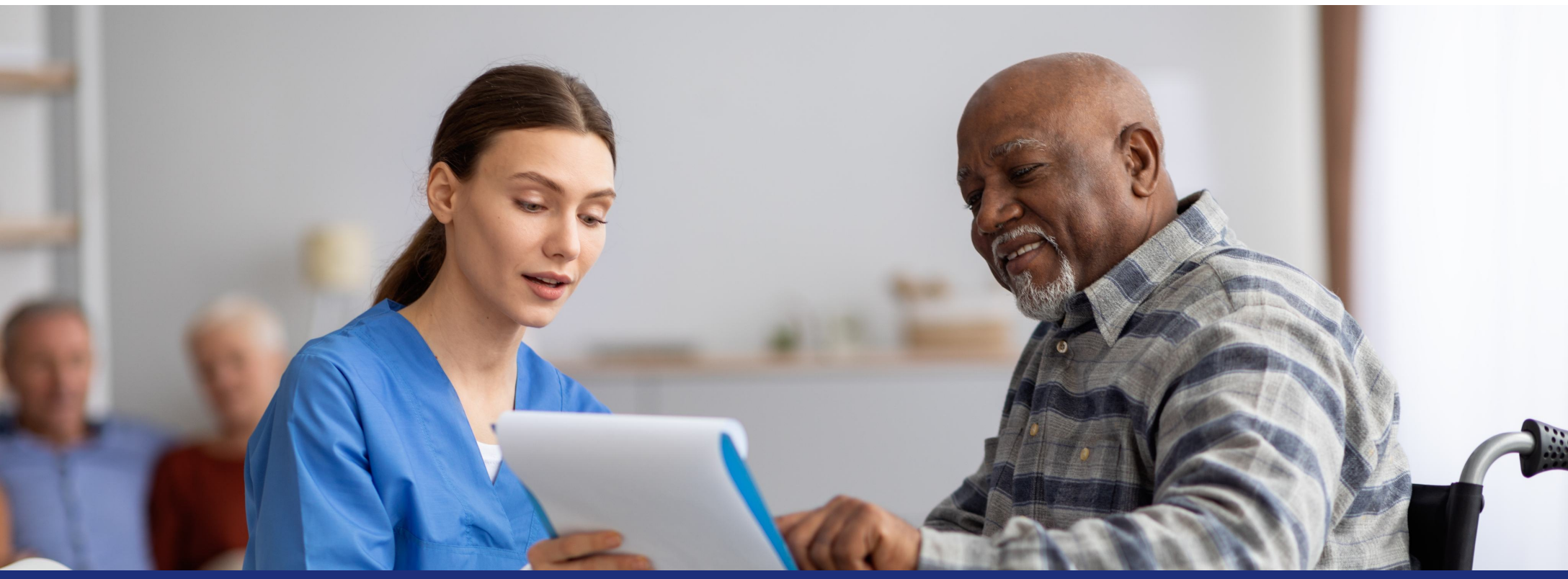
Use of Evidence

Target treatment and management strategies to:

- Address the neuropsychiatric disturbances of delirium such as:
  - Agitation
  - Lethargy
  - Paranoia
  - Emotional distress
- Prevent/minimize iatrogenic conditions:
  - Falls
  - Dehydration
  - Malnutrition
  - Hospital acquired pressure ulcers (HAPU)
  - Deconditioning
  - Infection

Where's the Evidence?

- Current evidence does not support the routine use of medications to prevent or treat delirium
- Nonpharmacological measures should be implemented to support patient strengths and compensate for temporary losses. Many studies have demonstrated positive outcomes (delirium prevention/decreased distress in patients experiencing delirium) from the implementation of a multi-component, individualized set of nonpharmacological interventions.
- Selected patients with severe neuropsychiatric disturbances of delirium may benefit from short term, low dose medication therapy, including antipsychotics.



Nonpharmacological Intervention

THE T-A-D-A APPROACH

- **T**olerate: Patient who might be doing things out of character
- **A**nticipate: Patient may be scared when family leaves
- **D**on't **A**gitate: Help patient to get out of bed to meet his need if restless, instead of insisting he lie back down

The response of the staff can "make or break" the situation

Flaherty, 2011

SLEEP ENHANCEMENT/REST/RELAXATION

- Minimize night-time interruptions (vital signs, blood draws) by bundling care
- Shades up during day
- Dim lights at night
- Noise control
- White noise/nature sounds
- Personalized music
- Massage
- Reiki
- Imagery
- Meditation
- Eye shields
- Ear plugs
- Aromatherapy

SENSORY ENHANCEMENT

- Eye glasses
- Hearing aids/amplification
- Virtual reality glasses
- Costume jewelry
- Sand
- Putty/clay
- Squishy balls
- Snow globe
- Bubble tubes

ORIENTATION/COGNITIVE STIMULATION

- Clocks
- Calendars
- Schedules/routines
- Computerized activities
- Reminiscing (visual prompts)
- Card games
- Adult coloring
- Art therapy
- Word search
- Crosswords
- Chess/checkers
- Jigsaw puzzles
- Pipe tree
- Play musical instruments

MOBILIZATION

- Safe mobilization with appropriate:
  - Assistance/supervision
  - Device
  - Distance
- Mobilization includes:
  - Ambulation
  - Bed exercise
  - Chair exercise

PHYSICAL AND EMOTIONAL COMFORT

- Environmental temperature control
- Positioning
- Massage
- Reiki
- Stuffed animal
- Doll therapy
- Pet therapy
- Family photos (tablet slideshow)
- Familiar items
- Soothing scenes

MAXIMIZING NUTRITION/HYDRATION/ELIMINATION

- Ensure food consistent with ability and preference
- Consider giving medications with supplement drinks
- Assist with meals as needed
- Provide fluids at each encounter
- Up in chair for meals
- Congregate dining (when possible)
- Monitor for urinary retention and constipation
- Eliminate in normal position (standing with urinal for men; toilet or commode)
- Toileting regimen for bowel and bladder

What medications are used to alleviate severe neuropsychiatric disturbances of delirium?

- Patients experiencing extreme distress due to delirium (anxiety, fearfulness, hallucinations, delusions) and may be harmful to self or others may benefit from SHORT TERM use of LOW DOSE haloperidol or atypical antipsychotics *Devlin et al, 2018, Society of Critical Care Medicine*
- Benzodiazepines are generally contraindicated except in terminal delirium, in those using benzos regularly or patients in withdrawal
- Haloperidol, olanzapine and risperidone are contraindicated in persons with Parkinson's disease or Lewy body dementia
- Valproic acid IV or PO 250 mg every 12 hours may be an alternative to antipsychotics. Some evidence of benefit, needs further research *Crowley et al, 2018, Crit Care Med*
- Dexmedetomidine IV may benefit patients unable to wean off mechanical ventilation by decreasing agitation *Reade et al, 2016, JAMA*
- Be sure medications are discontinued after symptoms subside

Discharge Transition From Hospital to Post-acute Care

Provider

- Document course and cause of delirium (if known)
- Document degree of resolution
- Discontinue unnecessary meds
- Document delirium/ acute encephalopathy
- Document follow-up for unresolved delirium
- Document on discharge summary

Nurse

- Document successful strategies
- Discuss ongoing needs
- Discharge with one time use distractors
- Discuss follow-up with family
- Document individualized care needs on W10 and on electronic discharge instructor sheet

Summary

1. Prevention is best and often possible
2. Focus prevention strategies on at risk patients
3. Screen for delirium
4. Act promptly if delirium occurs
5. Pursue differential diagnosis of underlying cause
6. Safety measures- T-A-D-A
7. Preserve function
8. Implement personalized nonpharmacologic measures

9. Medication considered for severe distress or danger, monitoring closely for effect

10. Avoid complications that can worsen the delirium

11. Well planned transition

12. Engage family as partners

13. Purposeful dialogue across the continuum