

Delirium Clinical Pathway Emergency Department and Inpatient Care

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Objectives of the Pathway

- Define delirium and understand the causes of delirium in pediatric patients
- Describe strategies to prevent delirium
- Demonstrate how to use and interpret the Cornell Assessment of Pediatric Delirium (CAPD) to screen for delirium
- Review important components of the new Prevention part of the Clinical Pathway
- Review important components of the Delirium Evaluation and Management part of the Clinical Pathway and order set

What is Delirium?

- Acute-onset neuropsychiatric syndrome characterized by disturbances of cognition, attention, consciousness or perception that is potentially life-threatening
 - **Secondary to a medical etiology (not an isolated psychiatric condition)**
 - Can occur as a result of underlying illness, hospitalization, medications or trauma
- Treatment requires inter-professional collaboration between primary physicians, specialists, nursing, and family
 - Early recognition and treatment may prevent adverse outcomes

Why do we care?

- Delirium is a high risk diagnosis, serving as a sign of acute brain dysfunction and a marker for potential significant clinical decompensation
- **All** hospitalized patients are at risk of developing delirium
- Often under-recognized in children:
 - Affects 10-44% of hospitalized children and up to 30% of PICU patients (Bettencourt 2017, Traube 2014, Traube 2017, Smith 2013)
 - Signs may be very subtle

Clinical Presentation of Delirium

- Acute onset (hours-days)
- Waxing/waning course with lucid intervals
- Sleep/wake cycle disruption (often reversed)
- Disturbed consciousness
- Neurocognitive deficits
- Perception, hyper/hypoactivity, mood/affect
- Direct physiological consequence of medical/organic etiology

Table 1. Manifestations of Delirium at Various Life Stages		
Life Stage	Hypoactive Delirium	Hyperactive Delirium
Infants	Unable to fixate on faces Primitive reflexes only Lethargy Little movement when awake, with movement being non-purposeful Not crying when hungry	Unable to fixate on faces Primitive reflexes only Irritability Non-purposeful movements, shaking head Inconsolable, restless Minimal calm awake time
Children	Unable to communicate needs Confusion Decreased coordination Unable to participate in play Non-purposeful actions Not answering questions quickly or appropriately Lethargy Averting eyes or staring Increased effort to sit up and walk around	Unable to communicate needs Confusion Unable to participate in play Non-purposeful actions Not answering questions quickly or appropriately Irritability Inconsolable, restless Unable to make eye contact In hospital, attempting to remove intravenous and monitoring lines
Adolescents/adults	Disoriented Inattentive Impairment of sleep-wake cycle Emotional disturbance Falling asleep inappropriately	Disoriented Inattentive Impairment of sleep-wake cycle Emotional disturbance Irritable, agitated

Clinical Presentation of Psychiatric Illness

- **Psychosis:**
 - Presence of hallucinations, delusional thoughts
- **Mania:**
 - Elated mood, increased energy, rapid speech, grandiosity, decreased need for sleep, impulsivity, flight of ideas, distractibility
- **Depression:**
 - Depressed mood, anhedonia, change in sleep/energy/concentration, guilt, suicidal ideation

Some symptoms overlap with delirium, but....

Delirium vs. Psychiatric Illness

Primary psychiatric illness does not have...

- Acute onset
- Fluctuating course
- Disorientation
- Disturbed consciousness
- Memory/language/visuospatial impairment
- Confusion, inattention

Types of Delirium

Delirium in children can present as hypoactive, hyperactive or mixed type

Table 1. Manifestations of Delirium at Various Life Stages		
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Adolescents/adults	Disoriented Inattentive Impairment of sleep-wake cycle Emotional disturbance Falling asleep inappropriately	Disoriented Inattentive Impairment of sleep-wake cycle Emotional disturbance Irritable, agitated

Burke H, Jiang S, Stern TA. Assessment and management of delirium in pediatric patients. *Prim Care Companion CNS Disord*. 2023;25(1):22f03257.

This table may be found in Appendix C of the Delirium Clinical Pathway

Potential Causes of Delirium

- Infection (intracranial or systemic)
 - Fever
 - Sepsis
- Drug intoxication
- Drug withdrawal
- Medications
 - Opioids, Benzodiazepines
 - Anti-histamines
 - Corticosteroids
- Metabolic/Endocrine disturbance
 - Electrolyte abnormality
 - Hypoglycemia
- Traumatic Brain Injury
- Seizures
- Hypoxia
- Neoplasm
- Cerebrovascular event
- Autoimmune encephalitis
- Organ dysfunction/Insufficiency
- Hospitalization (Environment)
 - Sleep/wake cycle disruption
 - Prolonged immobilization
 - Unfamiliar surroundings, sensory loss
 - Unmanaged painful stimuli

Independent Risk Factors for Developing Delirium

- Age < 2yo
- Developmental delay
- Illness severity
- Prior coma
- Mechanical ventilation
- Receiving benzodiazepines or anticholinergics

Traube 2017, Silver 2015

Complications of Delirium

- Increased:
 - Length of stay
 - Safety events (i.e. pulling lines, falls)
 - Morbidity and mortality
 - Cost of hospitalization
 - Use of restraints and sedatives

(Traube 2017, Traube 2016, Turkel 2017)
- Reported long term neuro-developmental and behavioral consequences, including development of PTSD following hospitalization (Brummel 2014)

Delirium Clinical Pathway

- This pathway can help guide prevention as well as appropriate medical evaluation and management for patients with recognized delirium
 - There is a high clinical suspicion for delirium if a patient has any one of the following features:
 - Acute mental status change
 - Acute onset hallucinations/delusions
 - Confusion or impaired memory
 - Alteration in attention or arousal
 - New catatonic features

There are 2 parts to the Delirium Clinical Pathway:

1. Delirium Prevention

- This part of the pathway is focused on reducing occurrence of delirium in hospitalized patients and guides targeted screening

2. Delirium Evaluation and Management

- This part of the pathway guides work-up and management of delirium symptoms and is broken down as follows:
 - Delirium Evaluation: Primary Steps
 - Delirium Evaluation: Secondary Steps
 - Delirium Management

DELIRIUM PREVENTION

CLINICAL PATHWAY: Delirium Prevention

THIS PATHWAY
SERVES AS A GUIDE
AND DOES NOT
REPLACE CLINICAL
JUDGMENT.

Inclusion Criteria: Patients admitted to the medical-surgical floors

Inclusion Criteria: Patients admitted to the medical-surgical floors
Exclusion Criteria: Patients located in the NICU, ambulatory and perioperative areas, infusion patients, PICU. If in PICU, follow PICU protocol for screening and prevention.

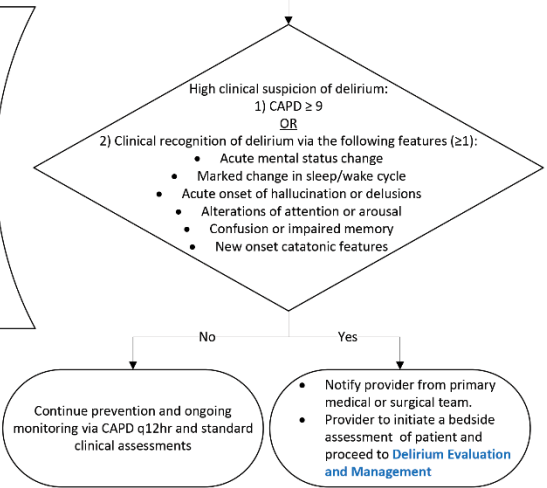
The first page of the pathway addresses delirium prevention

This part of the clinical pathway is intended only for patients on the medical-surgical floors

Environmental Considerations: <ul style="list-style-type: none">• Provide orienting environment (proper use of Whiteboard, clearly visible clocks)• Promote healthy sleep• Ensure early mobility and exercise and consult PT, OT and SLP if patient is not at functional baseline• Encourage family involvement and developmentally appropriate engagement	Medication Considerations: <ul style="list-style-type: none">• Re-evaluation/confirmation of home medications• Assess, prevent, and manage pain• Assess sedative medication need and effectiveness, wean as able• Monitor and prevent withdrawal• Minimize polypharmacy and delirigenic medications as appropriate*	and document in medical record for the following patient groups (Please utilize Appendix B: Developmental Anchors for completing the CAPD for children < 2 years old or with developmental disability): <ul style="list-style-type: none">▪ Transferring out of PICU; post-operative▪ Presenting with altered mental status, status epilepticus, loss of consciousness, meningitis/encephalitis, toxin ingestion/poisoning/overdose, trauma▪ Diagnosed with Multi-Inflammatory Syndrome in Children (MIS-C), Kawasaki disease, sepsis/septic shock, sickle cell acute pain crisis, neurosurgical shunt infection, neurosurgical shunt malfunction▪ Taking benzodiazepines or opioids in the past 3 days <p>Consider screening for delirium for the following patient groups who are at high risk for delirium [Note: must add "at risk for delirium" to patient's problem list in Care Navigator to initiate routine screening]</p> <ul style="list-style-type: none">▪ On <u>multiple</u> delirigenic medications (not including benzodiazepines or opioids which require automatic screening)**▪ Acutely ill patients not identified by above criteria▪ Prolonged hospitalization▪ Developmental delay/intellectual disability
--	--	--

*Delirigenic Medications:

- Benzodiazepines and barbiturates
- Opioids
- Anti-cholinergics (e.g. atropine, diphenhydramine)
- Anti-convulsants (e.g. carbamazepine, phenytoin)
- Anti-depressants (e.g. tricyclics, SSRIs)
- Anti-emetics (e.g. promethazine)
- Anti-microbials and anti-virals (e.g. fluoroquinolones)
- Corticosteroids
- H2 receptor blockers (e.g. ranitidine, famotidine)
- Metoclopramide
- Muscle relaxants



NEXT PAGE



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DELIRIUM PREVENTION

Prevention is key!

Universal preventative strategies should be taken for ALL patients on med-surg

Proactive measures to prevent delirium include both environmental and medication considerations

CLINICAL PATHWAY: Delirium Prevention

Universal Preventive Strategies

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Exclusion Criteria: Patients located in the NICU, ambulatory and perioperative areas, infusion patients, PICU. If in PICU, follow PICU protocol for screening and prevention.

Environmental Considerations:

- Provide orienting environment (proper use of Whiteboard, clearly visible clocks)
- Promote healthy sleep
- Ensure early mobility and exercise and consult PT, OT and SLP if patient is not at functional baseline
- Encourage family involvement and developmentally appropriate engagement

Medication Considerations:

- Re-evaluation/confirmation of home medications
- Assess, prevent, and manage pain
- Assess sedative medication need and effectiveness, wean as able
- Monitor and prevent withdrawal
- Minimize polypharmacy and deliriogenic medications as appropriate*

*Deliriogenic Medications:

- Benzodiazepines and barbiturates
- Opioids
- Anti-cholinergics (e.g. atropine, diphenhydramine)
- Anti-convulsants (e.g. carbamazepine, phenytoin)
- Anti-depressants (e.g. tricyclics, SSRIs)
- Anti-emetics (e.g. promethazine)
- Anti-microbials and anti-virals (e.g. fluoroquinolones)
- Corticosteroids
- H2 receptor blockers (e.g. ranitidine, famotidine)
- Metoclopramide
- Muscle relaxants

No

Yes

Continue prevention and ongoing monitoring via CAPD q12hr and standard clinical assessments

- Notify provider from primary medical or surgical team.
- Provider to initiate a bedside assessment of patient and proceed to [Delirium Evaluation and Management](#)

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DELIRIUM PREVENTION

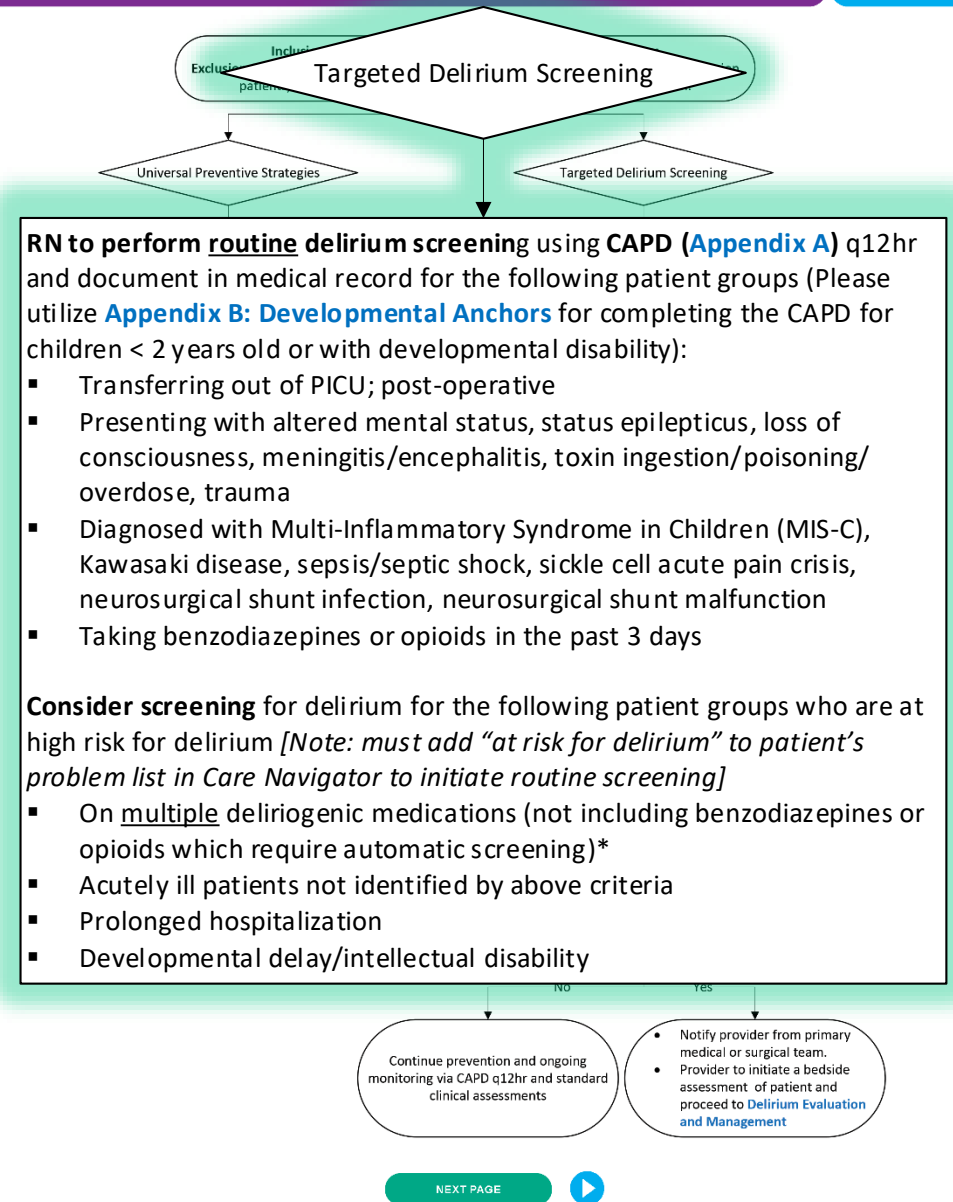
Targeted screening for delirium is **opt in** for certain groups of patients who are at known higher risk for delirium:

These diagnoses/patients will be automatically undergo delirium screening

The groups listed under “Consider screening” will require adding “at risk for delirium” (ICD-10 Z91.89) to problem list OR ordering of the delirium pathway order set, which will be reviewed in upcoming slides

CLINICAL PATHWAY: Delirium Prevention

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DELIRIUM PREVENTION

CAPD Screening Tool (Appendix A):

- Validated for patients 0-21 yrs
- Easy to use
- Can trend over time
- Based on developmental anchor points for patients <2 years old or developmentally delayed
- Detects hypoactive and hyperactive forms of delirium

In developmentally normal children, CAPD sensitivity 92% and specificity 86.5%
In developmentally delayed children, CAPD sensitivity 96% and specificity 51%

Of note, can also screen clinically, by ≥1 features

CAPD score ≥ 9 is a positive screen

If a patient screens positive, please move onto the **Delirium Evaluation and Management** part of the clinical pathway

CLINICAL PATHWAY: Delirium Prevention

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CLINICAL PATHWAY:
Delirium
Appendix A: Cornell Assessment of Pediatric Delirium (CAPD) Score

- Inclusion Criteria:
Exclusion Criteria: Patients with pre-existing delirium, patients, PICU patients, etc.
- High clinical suspicion of delirium:
1) CAPD ≥ 9
OR
2) Clinical recognition of delirium via the following features (≥1):
- Acute mental status change
 - Marked change in sleep/wake cycle
 - Acute onset of hallucination or delusions
 - Alterations of attention or arousal
 - Confusion or impaired memory
 - New onset catatonic features

Appendix A:

Cornell Assessment of Pediatric Delirium (CAPD) Score – Revised

Figure 1. Cornell Assessment of Pediatric Delirium (CAPD) revised

RASS Score ____ (if -4 or -5 do not proceed)

Please answer the following questions based on your interactions with the patient over the course of your shift:

	Never	Rarely	Sometimes	Often	Always	Score
1. Does the child make eye contact with the caregiver?	4	3	2	1	0	
2. Are the child's actions purposeful?						
3. Is the child aware of his/her surroundings?						
4. Does the child communicate needs and wants?						
	Never	Rarely	Sometimes	Often	Always	
	0	1	2	3	4	
5. Is the child restless?						
6. Is the child inconsolable?						
7. Is the child underactive—very little movement while awake?						
8. Does it take the child a long time to respond to interactions?						
						TOTAL

To aid in CAPD scoring, please see [Appendix B: Developmental Anchors](#) to reference features of normal development and [Appendix C: Delirium Manifestations by Age](#) for characteristics of delirium based on age.

- Notify provider from primary medical or surgical team.
- Provider to initiate a bedside assessment of patient and proceed to **Delirium Evaluation and Management**

- High clinical suspicion of delirium:
1) CAPD ≥ 9
OR
2) Clinical recognition of delirium via the following features (≥1):
- Acute mental status change
 - Marked change in sleep/wake cycle
 - Acute onset of hallucination or delusions
 - Alterations of attention or arousal
 - Confusion or impaired memory
 - New onset catatonic features

- No
- Yes
- Notify provider from primary medical or surgical team.
 - Provider to initiate a bedside assessment of patient and proceed to **Delirium Evaluation and Management**

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DELIRIUM PREVENTION

CAPD uses Developmental Anchor Points (Appendix B)

- Anchor points are a reference for normative behaviors based on age/developmental level
- Used for patients < 2 years of age (and/or of that developmental level)
- Observable behaviors as they would be seen in hospital setting
- Adjusted for alterations by “sick behavior,” pain, anxiety, and developmental delay

*** Use caregivers to help understand what is normal behavior for a patient!**

CLINICAL PATHWAY: Delirium Appendix B: Developmental Anchors

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Appendix B:
Developmental Anchors

	NB	4 weeks	6 weeks	8 weeks	28 weeks	1 year	2 years
1. Does the child make eye contact with the caregiver?	Fixates on face	Holds gaze briefly Follows 90 degrees	Holds gaze	Follows moving object/caregiver past midline, regards examiner's hand holding object, focused attention	Holds gaze. Prefers primary parent. Looks at speaker.	Holds gaze. Prefers primary parent. Looks at speaker.	Holds gaze. Prefers primary parent. Looks at speaker
2. Are the child's actions purposeful?	Moves head to side, dominated by primitive reflexes	Reaches (with some discoordination)	Reaches	Symmetric movements, will passively grasp handed object	Reaches with coordinated smooth movement	Reaches and manipulates objects, tries to change position, if mobile may try to get up.	Reaches and manipulates objects, tries to change position, if mobile may try to get up and walk
3. Is the child aware of his/her surroundings?	Calm awake time	Awake alert time Turns to primary caretaker's voice May turn to smell of primary care taker	Increasing awake alert time Turns to primary caretaker's voice May turn to smell of primary care taker	Facial brightening or smile in response to nodding head, frown to bell, coos	Strongly prefers mother, then other familiars. Differentiates between novel and familiar objects	Prefers primary parent, then other familiars, upset when separated from preferred care takers. Comforted by familiar objects especially favorite blanket or stuffed animal	Prefers primary parent, then other familiars, upset when separated from preferred care takers. Comforted by familiar objects, especially favorite blanket or stuffed animal
4. Does the child communicate needs and wants?	Cries when hungry or uncomfortable	Cries when hungry or uncomfortable	Cries when hungry or uncomfortable	Cries when hungry or uncomfortable	Vocalizes/indicates about needs, e.g., hunger, discomfort, curiosity in objects, or surroundings	Uses single words or signs	3 to 4 word sentences, or signs. May indicate toilet needs, calls self or me
5. Is the child restless?	No sustained awake alert state	No sustained calm state	No sustained calm state	No sustained awake alert state	No sustained calm state	No sustained calm state	No sustained calm state
6. Is the child inconsolable?	Not soothed by parental rocking, singing, feeding, comforting actions	Not soothed by parental rocking, singing, feeding, comforting actions	Not soothed by parental rocking, singing, feeding, comforting actions	Not soothed by parental rocking, singing, comforting actions	Not soothed by usual methods, e.g., singing, holding, talking	Not soothed by usual methods, e.g., singing, holding, talking, reading	Not soothed by usual methods, e.g., singing, holding, talking, reading (may tantrum, but can organize)
7. Is the child underactive—very little movement while awake?	Little if any flexed and then relaxed state with primitive reflexes (Child should be sleeping comfortably most of the time)	Little if any reaching, kicking, grasping (still may be somewhat disordinated)	Little if any reaching, kicking, grasping (may begin to be more coordinated)	Little if any purposive grasping, control of head and arm movements, such as pushing things that are noxious away	Little if any reaching, grasping, moving around in bed, pushing things away	Little if any play, efforts to sit up, pull up, and if mobile crawl or walk around	Little if any more elaborate play, efforts to sit up and move around, and if able to stand, walk, or jump
8. Does it take the child a long time to respond to interactions?	Not making sounds or reflexes active as expected (grasp, suck, Moro)	Not making sounds or reflexes active as expected (grasp, suck, Moro)	Not kicking or crying with noxious stimuli	Not cooing, smiling, or focusing gaze in response to interactions	Not babbling or smiling/laughing in social interactions (or even actively rejecting an interaction)	Not following simple directions. If verbal, not engaging in simple dialogue with words or jargon	Not following 1–2 step simple commands. If verbal, not engaging in more complex dialogue



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CAPD: Documenting in the chart

- CAPD Screening Tool is a screening tool based on these 8 questions, answered based on observed patient behaviors over the course of the shift and reflective of their current developmental level
- Scoring will be completed by nursing twice daily, ideally towards the end of their shift
- Providers may be asked by nursing to help answer some questions in the tool that they are having trouble evaluating (can be completed in a team approach for a patient that is difficult to assess)
- Parents may also be a resource to help answer these questions based on parents observation, comparing to baseline behaviors

Alternatively, the Vanderbilt Assessment for Delirium in Infants and Children (VADIC) may be used by Psychiatry/Psychology

Flowsheet Pop-Up

Inpatient, Delirium4 Age: 20 months Sex: M Bed: 302

Time taken: 1024 10/26/2018 Show: ☒ Row Info ☒ Last Filed ☒ All Choices

+ Add Row + Add Group + Add LDA Values By Create Note

▼ Neuro

CAP-D Developmental Level 2 Years + 1 Year 28 Weeks 8 Weeks 6 Weeks 4 Weeks Newborn
2 Years + taken 1 month ago
[Developmental Anchors \(Complete chart\)](#)

▼ Cornell Assessment for Pediatric Delirium *2 Year*

Does the child make eye contact with the caregiver? ☐ 0=Always 1=Often 2=Sometimes 3=Rarely 4=Never
Anchor for 2yo: Holds gaze. Prefers primary parent. Looks at speaker.
For older, developmentally appropriate patients, utilize assessment questions as presented.

Are the child's actions purposeful? ☐ 0=Always 1=Often 2=Sometimes 3=Rarely 4=Never
Anchor for 2yo: Reaches and manipulates objects, tries to change position, if mobile may try to get up and walk.
For older, developmentally appropriate patients, utilize assessment questions as presented.

Is the child aware of his/her surroundings? ☐ 0=Always 1=Often 2=Sometimes 3=Rarely 4=Never
Anchor for 2yo: Prefers primary parent, then other familiars, upset when separated from preferred care takers. Comforted by familiar objects especially favorite blanket or stuffed animal.
For older, developmentally appropriate patients, utilize assessment questions as presented.

Does the child communicate needs and wants? ☐ 0=Always 1=Often 2=Sometimes 3=Rarely 4=Never
Anchor for 2yo: 3-4 word sentences, or signs. May indicate toilet needs, calls self or me.
For older, developmentally appropriate patients, utilize assessment questions as presented.

Is the child restless? ☐ 0=Never 1=Rarely 2=Sometimes 3=Often 4=Always
Anchor for 2yo: No sustained calm state.
For older, developmentally appropriate patients, utilize assessment questions as presented.

Is the child inconsolable? ☐ 0=Never 1=Rarely 2=Sometimes 3=Often 4=Always
Anchor for 2yo: Not soothed by usual methods eg. singing, holding, talking, reading (May tantrum, but can organize).
For older, developmentally appropriate patients, utilize assessment questions as presented.

Is the child underactive? (very little movement while awake) ☐ 0=Never 1=Rarely 2=Sometimes 3=Often 4=Always
Anchor for 2yo: Little if any more elaborate play, efforts to sit up and move around, and if able to stand, walk, or jump.
For older, developmentally appropriate patients, utilize assessment questions as presented.

Does it take the child a long time to respond to interactions? ☐ 0=Never 1=Rarely 2=Sometimes 3=Often 4=Always
Anchor for 2yo: Not following 1-2 step simple commands. If verbal, not engaging in more complex dialogue.
For older, developmentally appropriate patients, utilize assessment questions as presented.

Calculated Delirium Score (CAPD):

Accept Accept and New Cancel

DELIRIUM EVALUATION: PRIMARY STEPS

CLINICAL PATHWAY:

Delirium Evaluation Primary Steps

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JUDGMENT.

Applies to
patients in
ED and
Med-Surg

It is important to identify potential etiologies of delirium first, and administer disease specific management

If a specific etiology for delirium is not identified on initial assessment, further lab and imaging studies are recommended

If etiology is known, may proceed to
Delirium Evaluation: Secondary Steps

Inclusion Criteria: Any patient in the Emergency Department or Inpatient Med/Surg Units with the following:

- Acute mental status change characterized by disorientation, impaired memory, alteration of attention or arousal, catatonia; OR
- Suspicion of delirium based on [Cornell Assessment of Pediatric Delirium \(CAPD\) Score \(Appendix A\)](#) or [Vanderbilt Assessment for Delirium in Infants and Children \(VADIC\) Assessment Tool \(Appendix D\)](#)

Exclusion Criteria: Patient located in the NICU, ambulatory and perioperative areas, infusion patients, PICU. If in PICU, follow PICU protocol for screening and prevention.

Inclusion Criteria: Any patient in the Emergency Department or Inpatient Med/Surg Units with the following:

- Acute mental status change characterized by disorientation, impaired memory, alteration of attention or arousal, catatonia; OR
- Suspicion of delirium based on [Cornell Assessment of Pediatric Delirium \(CAPD\) Score \(Appendix A\)](#) or [Vanderbilt Assessment for Delirium in Infants and Children \(VADIC\) Assessment Tool \(Appendix D\)](#)

Exclusion Criteria: Patient located in the NICU, ambulatory and perioperative areas, infusion patients, PICU. If in PICU, follow PICU

Etiologies to consider:
CNS infection, fever, sepsis/end organ dysfunction (see [Sepsis Pathway](#)), Multi-system Inflammatory Syndrome in Children (see [MIS-C Pathway](#)), hypoxemia, hypoglycemia, electrolyte abnormality, CNS abnormality, intoxication, autoimmune encephalitis, SLE, vasculitis, drug withdrawal, metabolic disease, neoplasm

- STAT head CT without contrast

*If febrile and considering CNS infection**

Specific
etiology known?

NO

YES

Treat suspected etiology as appropriate and continue to [Delirium Evaluation and Management: Secondary Steps](#)

- ≥ 52 weeks PMA¹/about ≥ 3 months old – 11 years old: 70 mg/kg/day div q6hr (max 3 g/day)
- ≥ 12 yrs old: 60 mg/kg/day div q8hr (max 3 g/day)

¹PMA (Post-Menstrual Age) = gestational age + postnatal age

Initial Workup:

Labs:

- iStat chem 10, CBC, CRP, ESR, ammonia, PT/PTT/INR, TSH, free T4, VBG or CBG, AST, ALT, EtOH level and urine toxicology screen (as appropriate)

Imaging:

- STAT head CT without contrast

*If febrile and considering CNS infection**

Any of the following?

- Ongoing delirium
- Further workup, evaluation, and treatment required
- Medical etiology identified, admission criteria met for that diagnosis

NO

YES

For Psych

and support

and establish

working

pathway

Proceed to [Secondary Steps](#) algorithm

- If in Emergency Department, consider need for hospital admission to med-surg versus PICU



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DELIRIUM EVALUATION: PRIMARY STEPS

If patient is **febrile**, blood and urine cultures should be obtained, and an LP is strongly recommended

When performing the LP, please send as much CSF possible to the lab to be saved for potential future studies.

- * Ideally a minimum of 3.5 ml of CSF should be saved, but as much as 6 ml may be needed for some panels
- * Please call the lab to confirm CSF is being held

CLINICAL PATHWAY:

Delirium Evaluation Primary Steps

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Initial Workup:

Labs:

- iStat chem 10, CBC, CRP, ESR, ammonia, PT/PTT/INR, TSH, free T4, VBG or CBG, AST, ALT, EtOH level and urine toxicology screen (as appropriate)

Imaging:

- STAT head CT without contrast

*If febrile and considering CNS infection**

* If febrile and considering CNS infection:

- Consult Infectious Diseases
- Blood and urine cultures
- Obtain LP: opening pressure, cell count with differential, protein, glucose, gram stain and culture, HSV PCR. *Call lab to hold CSF for further studies (ideally 3.5 mL).*
- Begin empiric IV antimicrobials listed below:
 - Ceftriaxone IV 100 mg/kg/day q12hr (max 2,000 mg/dose) x36 hours AND
 - Acyclovir IV until CSF HSV studies negative
 - <3 months of age: 60 mg/kg/day div q8hr
 - 3 months of age - <12 years old: 45 mg/kg/day div q8hr
 - ≥12 years of age: 30 mg/kg/day IV div q8hr
 - Discuss with ID if vancomycin should be started x36 hours:
 - <52 weeks PMA[‡]/about <3 mo old: 15 mg/kg q8hr or as determined by pharmacy based on estimated AUC
 - ≥52 weeks PMA[‡]/about ≥3 months old – 11 years old: 70 mg/kg/day div q6hr (max 3 g/day)
 - ≥12 yrs old: 60 mg/kg/day div q8hr (max 3 g/day)

[‡]PMA (Post-Menstrual Age) = gestational age + postnatal age

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DELIRIUM EVALUATION: PRIMARY STEPS

If the patient is febrile with delirium, empiric broad spectrum antimicrobial coverage should be initiated with ceftriaxone and acyclovir

Addition of vancomycin should be discussed with ID

CLINICAL PATHWAY:

Delirium Evaluation Primary Steps

THIS PATHWAY
SERVES AS A GUIDE
AND DOES NOT
REPLACE CLINICAL
JUDGMENT.

Initial Workup:

Labs:

- iStat chem 10, CBC, CRP, ESR, ammonia, PT/PTT/INR, TSH, free T4, VBG or CBG, AST, ALT, EtOH level and urine toxicology screen (as appropriate)

Imaging:

- STAT head CT without contrast

*If febrile and considering CNS infection**

Following:
alteration of attention or arousal, catatonia: [QR](#)
Score ([Appendix A](#)) or [Vanderbilt Assessment](#)

PICU. If in PICU, follow PICU

in Children (see [MIS-C Pathway](#)), hypoxemia,
drug withdrawal, metabolic disease, neoplasm

Treat suspected etiology as
appropriate and continue to [Delirium
Evaluation and Management:
Secondary Steps](#)

Initial Workup:

Labs:

If febrile and considering CNS infection:

Consult Infectious Diseases

* If febrile and considering CNS infection:

- Consult Infectious Diseases
- Blood and urine cultures
- Obtain LP: opening pressure, cell count with differential, protein, glucose, gram stain and culture, HSV PCR. *Call lab to hold CSF for further studies (ideally 3.5 mL).*
- Begin empiric IV antimicrobials listed below:
 - Ceftriaxone IV 100 mg/kg/day q12hr (max 2,000 mg/dose) x36 hours **AND**
 - Acyclovir IV until CSF HSV studies negative
 - <3 months of age: 60 mg/kg/day div q8hr
 - 3 months of age - <12 years old: 45 mg/kg/day div q8hr
 - ≥12 years of age: 30 mg/kg/day IV div q8hr
 - Discuss with ID if vancomycin should be started x36 hours:
 - <52 weeks PMA[‡]/about <3 mo old: 15 mg/kg q8hr or as determined by pharmacy based on estimated AUC
 - ≥52 weeks PMA[‡]/about ≥3 months old – 11 years old: 70 mg/kg/day div q6hr (max 3 g/day)
 - ≥12 yrs old: 60 mg/kg/day div q8hr (max 3 g/day)

[‡]PMA (Post-Menstrual Age) = gestational age + postnatal age

the cultures
opening pressure, cell count with differential,
protein, glucose, gram stain and culture, HSV PCR. *Call lab
for further studies (ideally 3.5 mL).*
IV antimicrobials listed below:
Ceftriaxone IV 100 mg/kg/day q12hr (max 2,000 mg/
dose) x36 hours **AND**
Acyclovir IV until CSF HSV studies negative
months of age: 60 mg/kg/day div q8hr
months of age - <12 years old: 45 mg/kg/day
div q8hr
years of age: 30 mg/kg/day IV div q8hr
with ID if vancomycin should be started x36
hours
weeks PMA[‡]/about <3 mo old: 15 mg/kg
q8hr or as determined by pharmacy based on
estimated AUC
weeks PMA[‡]/about ≥3 months old – 11
years old: 70 mg/kg/day div q6hr (max 3 g/day)
years old: 60 mg/kg/day div q8hr (max 3 g/
day)
[‡](Post-Menstrual Age) = gestational age + postnatal age

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DELIRIUM EVALUATION: PRIMARY STEPS

CLINICAL PATHWAY:

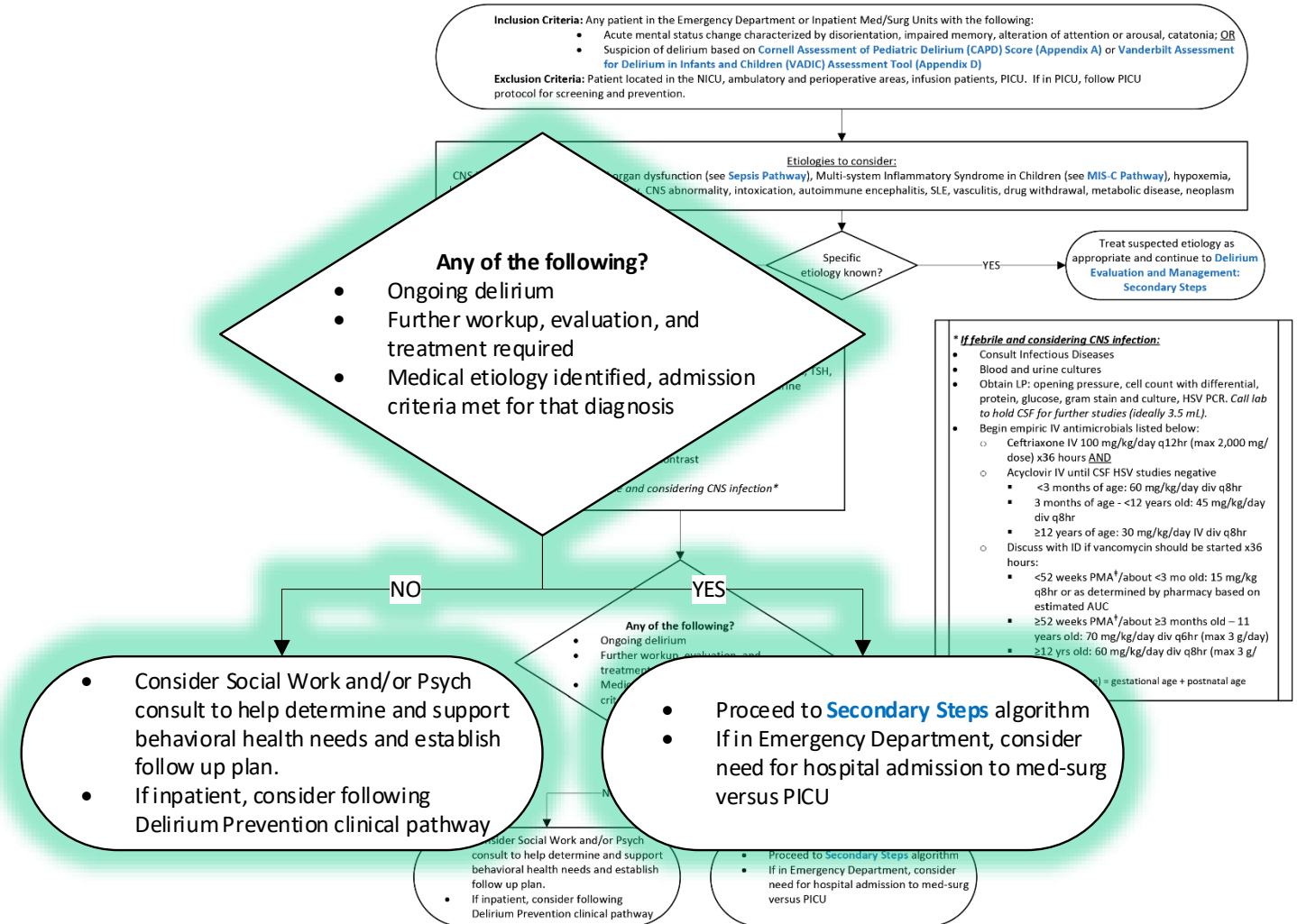
Delirium Evaluation Primary Steps

THIS PATHWAY
SERVES AS A GUIDE
AND DOES NOT
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JUDGMENT.

Based on initial testing and continual evaluation, disposition can be determined

Specific criteria warrant inpatient admission, including ongoing delirium or ongoing symptoms with need of further intervention

If being admitted or need for further workup, proceed to **Delirium Evaluation: Secondary Steps**



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DELIRIUM EVALUATION: SECONDARY STEPS

Secondary workup should happen in consultation with the appropriate specialties

- Examples for indications to consult these specialties are listed on the pathway

Delirium often requires a multidisciplinary approach, and a family-team meeting can be helpful to delineate the management plan

The pathway continues with **Delirium Management**

CLINICAL PATHWAY:

Delirium Evaluation Secondary Steps

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*Consider the following consultations as appropriate
(may recommend LP, EEG, Brain MRI, further lab testing)*

- **Infectious Diseases:** if febrile and not already consulted
- **Neurology:** if concern for seizure, abnormal EEG, movement disorder, abnormal neurological imaging or focal deficit, or other neurologic diagnosis
- **Rheumatology:** if patient has signs of autoimmune rheumatic disease, such as rash, elevated inflammatory markers, leucopenia or thrombocytopenia, arthritis, hematuria or proteinuria, nodules on imaging, or other signs of inflammatory disease
- **Psychiatry:** to assist with recognition/diagnosis of delirium (utilizing [Appendix D: VADIC assessment tool](#)); determine/confirm etiology; assist with pharm + non-pharmacological management; help with ongoing monitoring/response to therapies; for ongoing co-management
- **Ophthalmology:** (retinal exam may provide cause for infectious and non-infectious causes)

Consider Additional Work Up:

(Directed by specialty consultants, and may include the following)

- Infectious Encephalitis Panel:
 - **Blood:** Tick Borne Panel (anaplasma/ehrlichia NAAT, rickettsia serology, babesia NAAT), Lyme IgM/IgG, Arbovirus panel (West Nile IgM/IgG, SLE, EEE, JCV, LaCrosse, Powassan), Mycoplasma IgM/IgG, Bartonella IgM/IgG, Syphilis testing (for at risk patients, order Syphilis TP reflex RPR titer and TPPA)
 - **CSF:**
 - If LP not previously obtained: obtain LP and opening pressure, cell count with differential, protein, glucose, Gram stain and culture, HSV PCR. *Call lab to hold and refrigerate ideally at least 3.5 mL CSF for further studies.*
 - Add-Meningitis/Encephalitis (ME) PCR Panel (CSF BioFire)
 - Add on the following tests to the held CSF (ideally 3.5 mL): EBV PCR, Mycoplasma PCR, Bartonella PCR (if hx of exposure to cats/kittens), VDRL (at risk patients)
 - **Respiratory:** Viral Respiratory BioFire (Dec-May)
- Consider evaluation for other etiologies (including Autoimmune Encephalitis)
 - **Imaging:** Brain MRI
 - **Blood:**
 - Pediatric Autoimmune CNS Disorders Evaluation Panel (serum), ANA, ds DNA Ab, C3, C4, IgG, SSA, SSB, SM (Smith) Ab, SM/RNP Ab, anti-phospholipid Ab panel, Von Willebrand Factor antigen, ACE level, ANCA, TPO, anti-thyroglobulin Ab
 - **CSF:** (add on to previously obtained CSF) Pediatric Autoimmune CNS Disorders Evaluation Panel (CSF)

If diagnosis or treatment plan involves multidisciplinary approach, strongly consider family meeting

If diagnosis or treatment plan involves multidisciplinary approach, strongly consider family meeting

Delirium Evaluation and Management: Delirium Management



RETURN TO
THE BEGINNING



Treat suspected etiology as appropriate and continue delirium management per
Delirium Evaluation and Management: Delirium Management

DELIRIUM MANAGEMENT

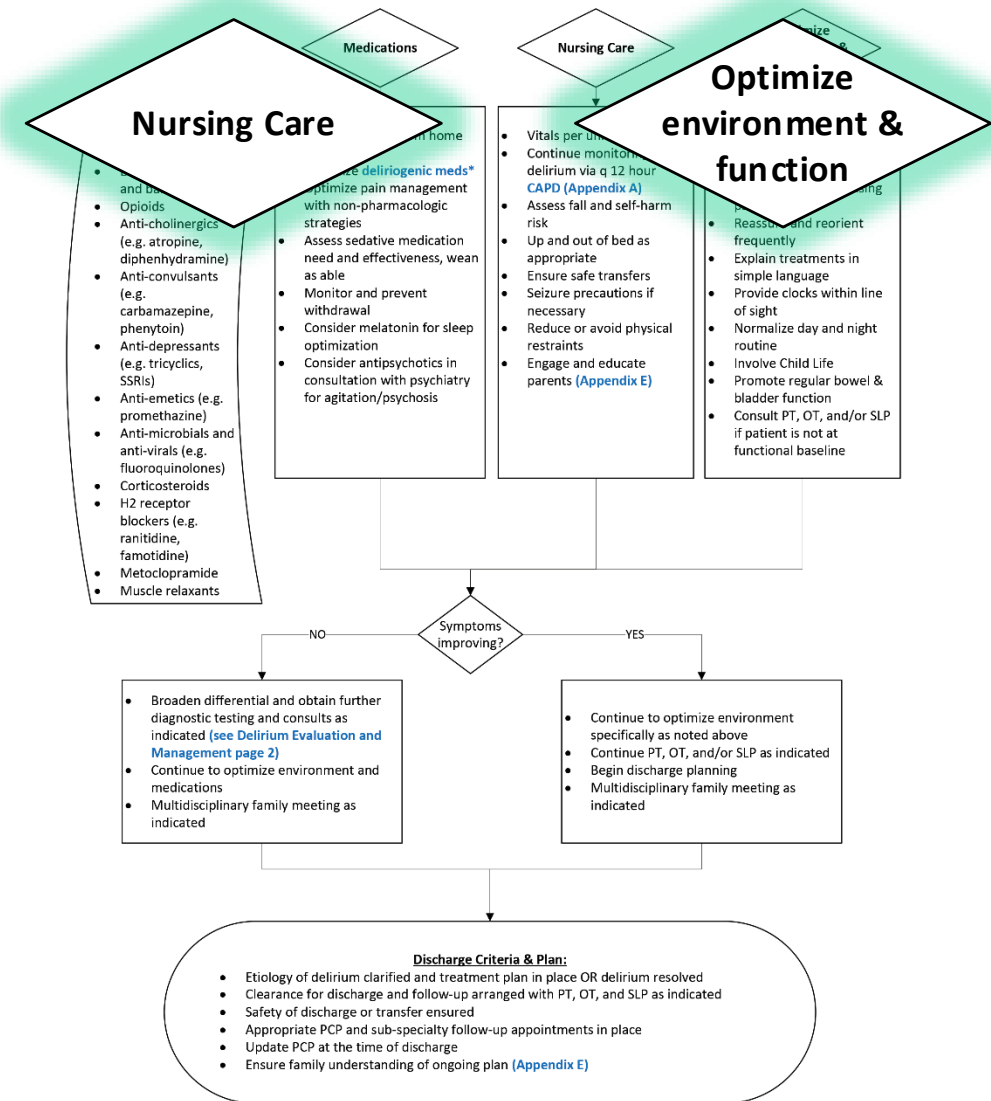
Medications

- Management of delirium encompasses 4 key categories:
- Treating the suspected etiology
 - Medications
 - Nursing care
 - Optimizing environment and patient function

We will discuss these strategies more in depth in later slides.

CLINICAL PATHWAY: Delirium Management

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DELIRIUM MANAGEMENT

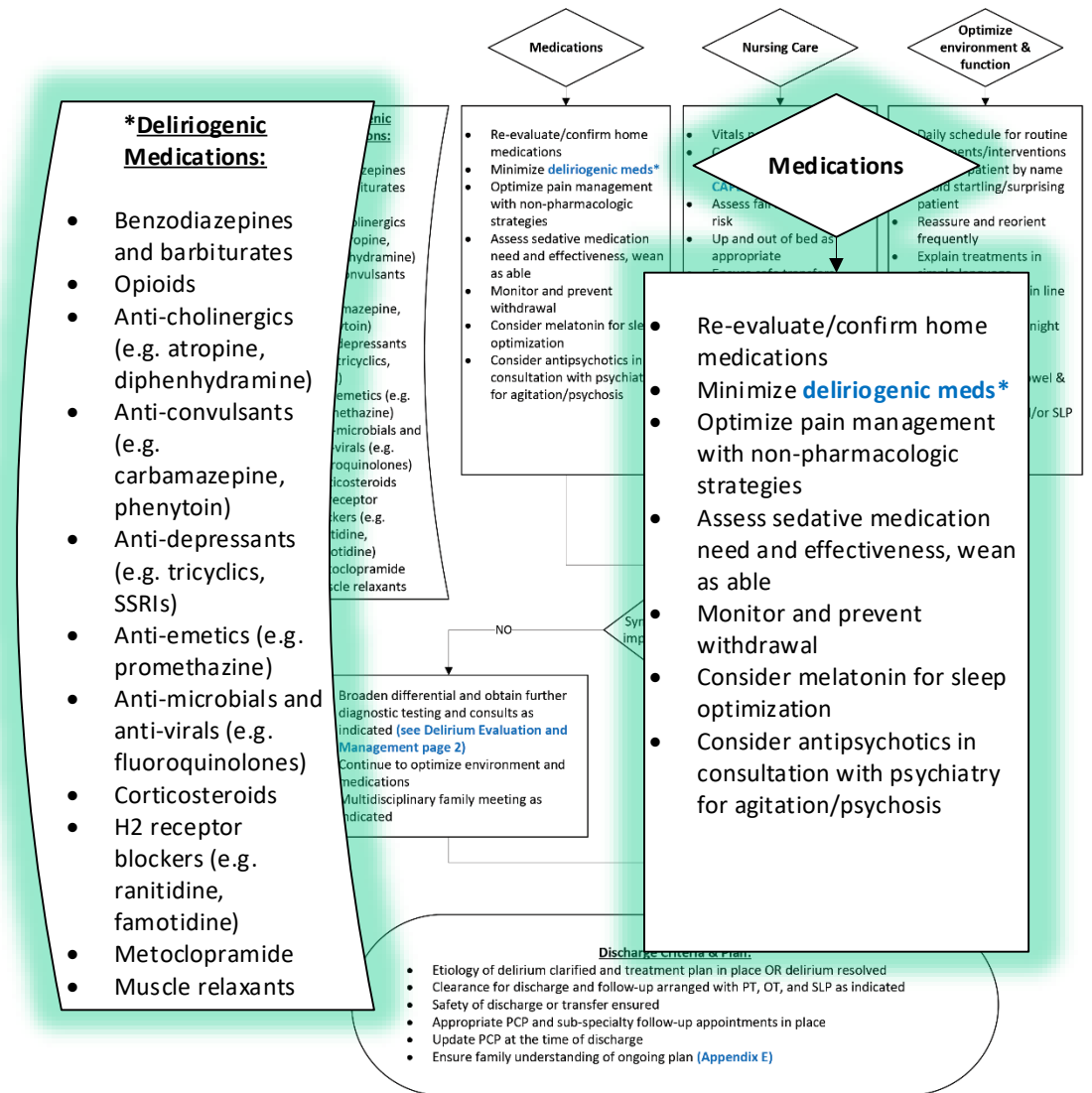
Because certain medications can contribute to delirium, it is important to re-evaluate medications and minimize exposure to any deliriogenic medications

A list of deliriogenic medications is included on the clinical pathway

Psychiatry may assist with medical treatment of agitation and delirium

CLINICAL PATHWAY: Delirium Management

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DELIRIUM MANAGEMENT

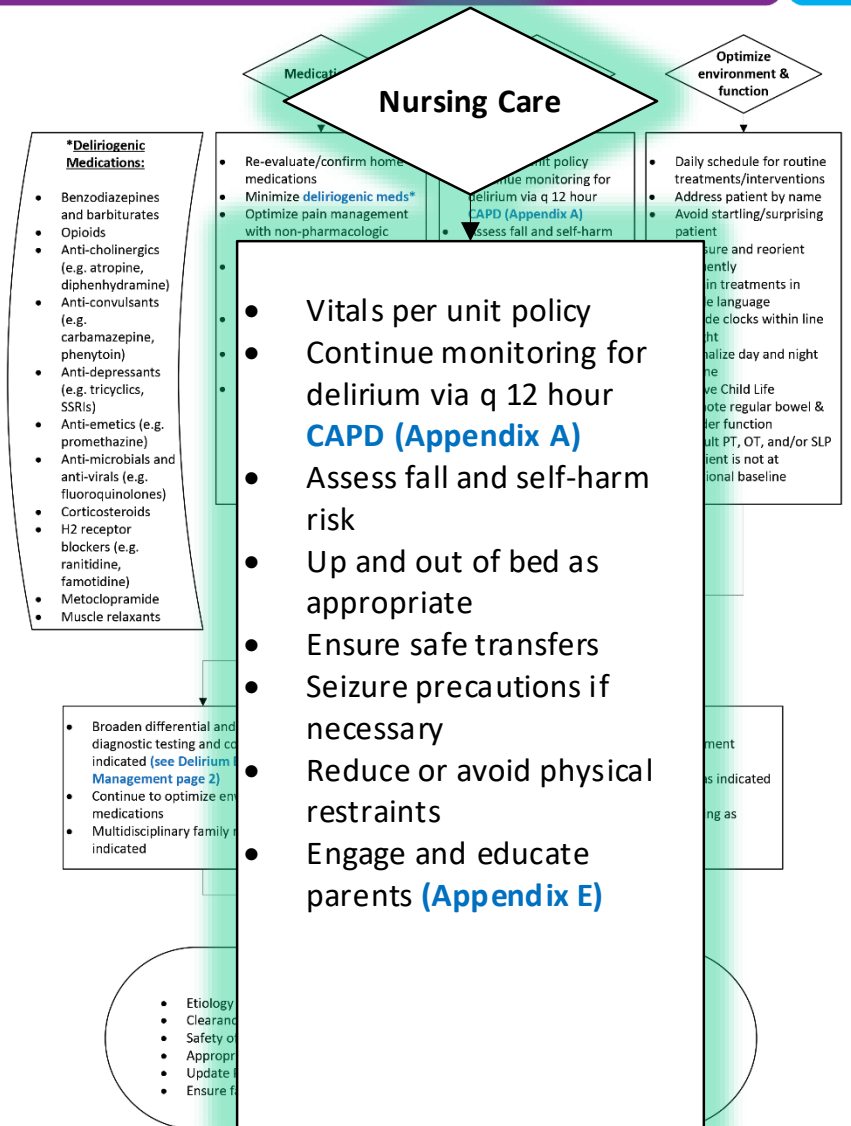
Continued and regular assessment of delirium is very important to assess for improvement or worsening

Modified nursing care and safety monitoring are a vital part of the management plan

Please provide families with the Caregiver Handout (Appendix E)

CLINICAL PATHWAY: Delirium Management

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DELIRIUM MANAGEMENT

Optimizing the environment to help re-orient the child to their surroundings can help improve delirium

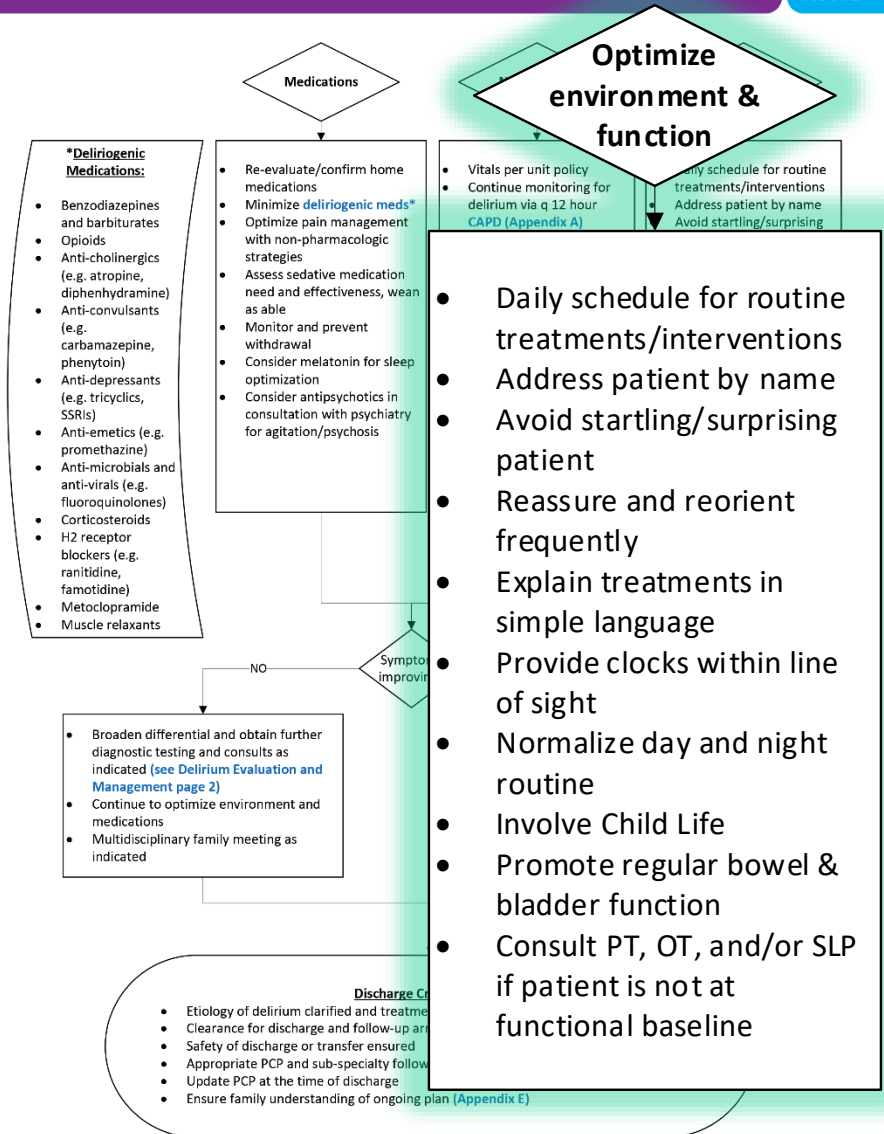
Having a daily schedule, providing clocks, and decreasing potential stressors are all examples

Physical/Occupational/Speech Therapy and Child Life should become involved as early as it is safe to do so

Child Life is helpful for creating a functional plan to help normalize day time and night time routines

CLINICAL PATHWAY: Delirium Management

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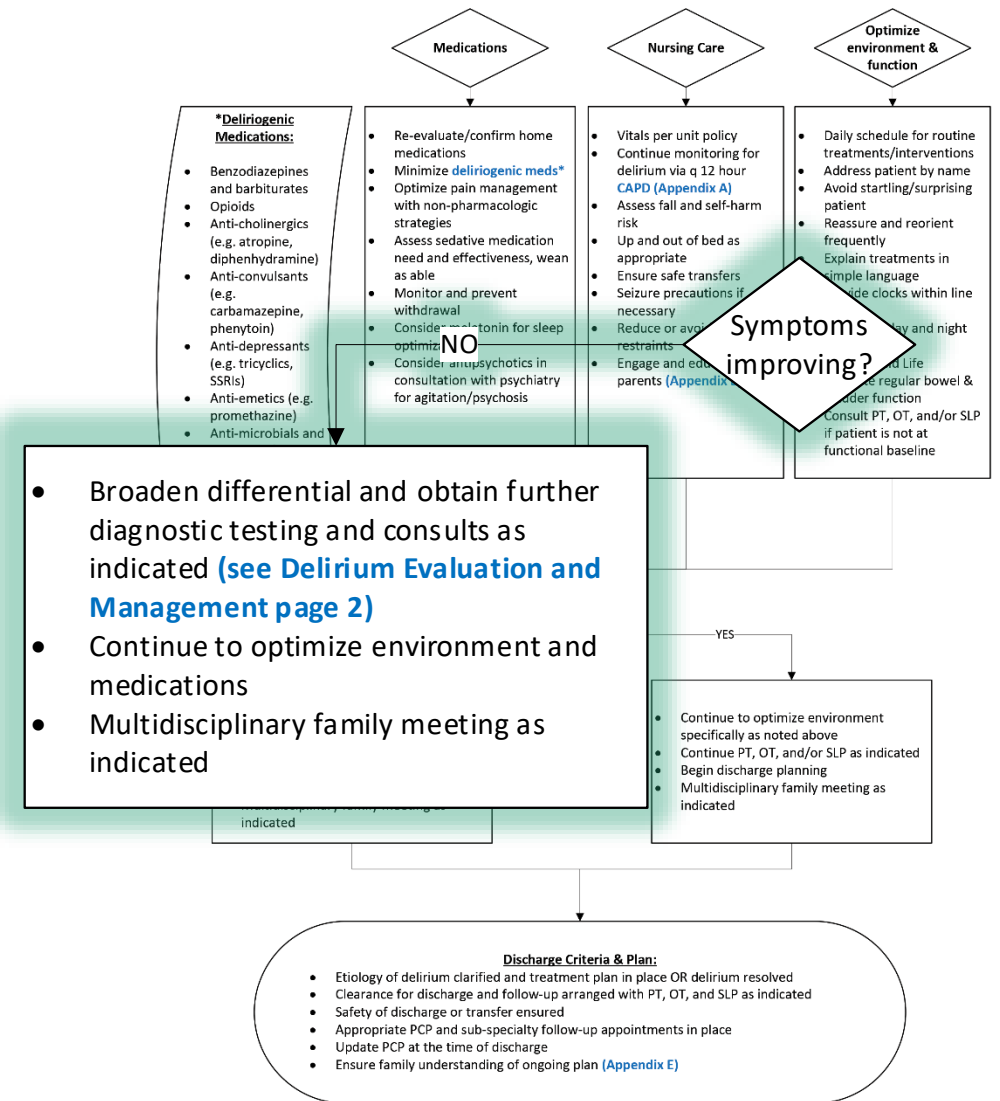
DELIRIUM MANAGEMENT

If symptoms are not improving, the differential should be broadened to further assess for a missed or other potential etiology

Optimization of the environment and the patient's medications should be ongoing during this time

CLINICAL PATHWAY: Delirium Management

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DELIRIUM MANAGEMENT

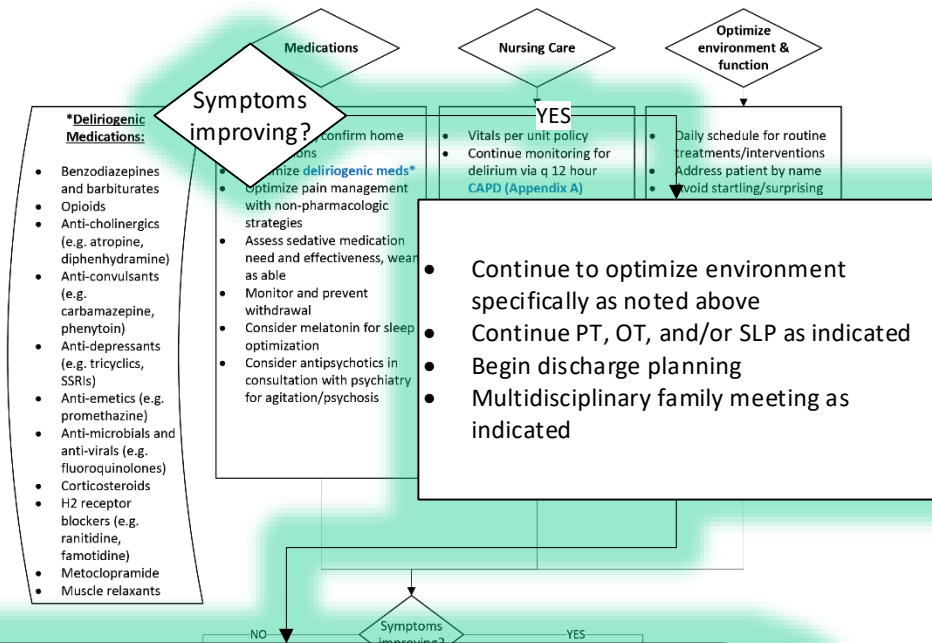
If symptoms of delirium are improving, management strategies to continue while planning towards discharge.

Depending on the circumstance, a multidisciplinary family meeting may be necessary

The patient must have specific criteria met in order to be discharged – specifically, delirium should have resolved (or a treatment plan is in place for etiologies that have been determined)

CLINICAL PATHWAY: Delirium Management

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The CAPD: Where is it in the Chart?

Assessment Scoring		Report
03/28 0701	03/29 0701	Most
03/29 0700	03/29 1100	Recent
Delirium (CAP-D):	0-2	2 03/29 0400

On the patient's Summary screen under "Assessment Scoring"

On the Vital Signs screen listed under the vital signs

Cornell Assessment of Pediatric Delirium											
CAP-D Score			8	5	4	0	0	3	0	2	CAP-D Score

You can also add a column for the CAPD to "My List" for easy viewing when looking at your patient list

Under the flowsheet "Pedi A&I"

Neuro	
Additional Documentation	
Screening Assessments	
CAP-D Developmental Level	
State Behavioral Scale (PICU)	
Cornell Assessment for Pediatric Delirium *	
Does the child make eye contact with	
Are the child's actions purposeful?	
Is the child aware of his/her	!
Does the child communicate needs and	
Is the child restless?	!
Is the child inconsolable?	
Is the child underactive? (very little	
Does it take the child a long time to	
Calculated Delirium Score (CAPD):	

The CAPD: Our Practice Advisory (OPA)

By selecting to open the order set or add the problem, you are saying that you are performing the appropriate actions.

This means that you DO NOT have to select an acknowledgement reason below

BestPractice Advisory - Summers, Scott

⚠ Patient has an Elevated CAP-D Score.

Delirium (CAP-D):: (!) 19 (02/13/19 1658 : Joseph Iacuone, RN)

Open Order Set Do Not Open Delirium Eval, Work Up and Management [Preview](#)

Add Problem Do Not Add Delirium [Edit details](#) (Hospital problem, Share with patient)

Acknowledge Reason

Will assess (Does not Silence) Assessed & Not delirious (72h Silence) **Defer to primary team (24h Silence)**

Actively Managing Delirium (72h Silence)

Accept

Elevated CAPD scores will automatically trigger a OPA for providers. On the OPA there are two sections.

- On the top you can Open the Order Set and Add Delirium as a Problem
- If you do neither you will need to chose a reason why on the bottom "Acknowledge reason section"

The Acknowledge Reason section should be used when you do not want to perform one of the above two actions.

- Actively Managing Delirium could be used when you have already placed orders and added the problem but it has been 72 hours and the patient is still getting an elevated score.
- When you select one of the acknowledge reasons the top two actions will automatically change to "Do Not..."

Order Set

Nursing orders are prefilled out and preselected for ease of ordering

Notice the orders are broken down into tiers

Order Sets

Delirium Eval, Work Up and Management Manage My Version ▾ ⤴

▼ **General**

▼ **Pathway**

☒ Initiate Clinical Pathway: Delirium
Until discontinued starting Today at 1438 Until Specified

▼ **Nursing**

▼ **Activity**

☐ Activity, as tolerated

☐ Up with assistance

☐ Activity, strict bed rest

▶ **Safety Risk Protocol**

▼ **Nursing Delirium Management**

☒ Seizure precautions
Continuous starting Today at 1438 Until Specified

☒ Implement Daily Schedule
Until discontinued starting Today at 1438 Until Specified
Please specify: Implement Daily Schedule to incorporate routine treatments and interventions. Post schedule in room.

☒ Implement Toileting Schedule
Until discontinued starting Today at 1438 Until Specified
Please specify: Implement toileting schedule to facilitate regular bowel function.

☒ Lights On/Lights Off
Until discontinued starting Today at 1438 Until Specified
Lights on by **, Lights out by ** to facilitate normalization of day and night routine.
Please specify: Lights on/Lights off to facilitate normalization of day/night routine.

☐ Sequential compression device

☐ Peripheral IV

▼ **Delirium Specific Work Up and Management**

☐ Delirium Tier 1

☐ Delirium Tier 2

☐ Delirium Tier 3

▼ **Medications**

There are two order sets for inpatient use:

1. Admit to MS – Delirium
2. Delirium Evaluation, Work up, and Management

Either can be used at any time, but the second is meant for patients already admitted

Review of Key Points

- Pediatric delirium is an under-recognized and high-risk diagnosis in pediatric patients that can lead to several complications
- Delirium is a condition caused by a medical etiology, it is not a psychiatric illness
- Many factors contribute to the development of delirium, including underlying illness, medications and disruption of normal routine
- CAPD screening tool can help earlier identify patients with delirium in the inpatient and ICU setting
- Our Clinical Pathway provides a consistent approach to preventing, screening, evaluating, and managing delirium **for those patients at risk of developing, or already exhibiting, delirium**

Quality Metrics

- Percent patients with pathway order set
- Percent patients with at least one screening done
- Percent patients with a delirium ICD10 code and have at least one screening done
- Percent patients with at least one CAPD ≥ 9
- Percent patients with a CAPD ≥ 9 who are transferred to PICU
- Percent patients with a CAPD ≥ 9 who have a MET activation
- Percent patients with CAPD ≥ 9 who have delirium ICD10 code
- Percent patients with CAPD ≥ 9 who are being evaluated by Psychiatry.
- Percent patients with CAPD ≥ 9 who have a CT Scan
- Percent patients with CAPD ≥ 9 who have developmental delay, developmental disability and/or intellectual disability code
- Average Length of Stay (days) for patients with CAPD ≥ 9
- Average Length of Stay (days)

Pathway Contacts



- Hayley Wolfgruber, MD
 - Pediatric Hospital Medicine
- Lisa Namerow, MD
 - Psychiatry
- Eric Hoppa, MD
 - Pediatric Emergency Medicine

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Thank You!



About Connecticut Children's Clinical Pathways Program

The Clinical Pathways Program at Connecticut Children's aims to improve the quality of care our patients receive, across both ambulatory and acute care settings. We have implemented a standardized process for clinical pathway development and maintenance to ensure meaningful improvements to patient care as well as systematic continual improvement. Development of a clinical pathway includes a multidisciplinary team, which may include doctors, advanced practitioners, nurses, pharmacists, other specialists, and even patients/families. Each clinical pathway has a flow algorithm, an educational module for end-user education, associated order set(s) in the electronic medical record, and quality metrics that are evaluated regularly to measure the pathway's effectiveness. Additionally, clinical pathways are reviewed annually and updated to ensure alignment with the most up to date evidence. These pathways serve as a guide for providers and do not replace clinical judgment.