Pediatric Delirium

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Disclosures

- I have nothing to disclose

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Objectives

- Define delirium
- Describe available screening tools for pediatric delirium
- Identify prevalence and risk factors for development of pediatric delirium
- Identify management strategies for pediatric delirium

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Delirium

- DSM V—Neurocognitive Disorder
  - Acute brain dysfunction associated with underlying illness
  - Change from baseline
  - Disturbance in awareness with altered behavior or cognition
  - Develops over a short period of time (usually hours to days), fluctuates in severity
- Subtypes
  - Hypoactive
  - Hyperactive
  - Mixed*

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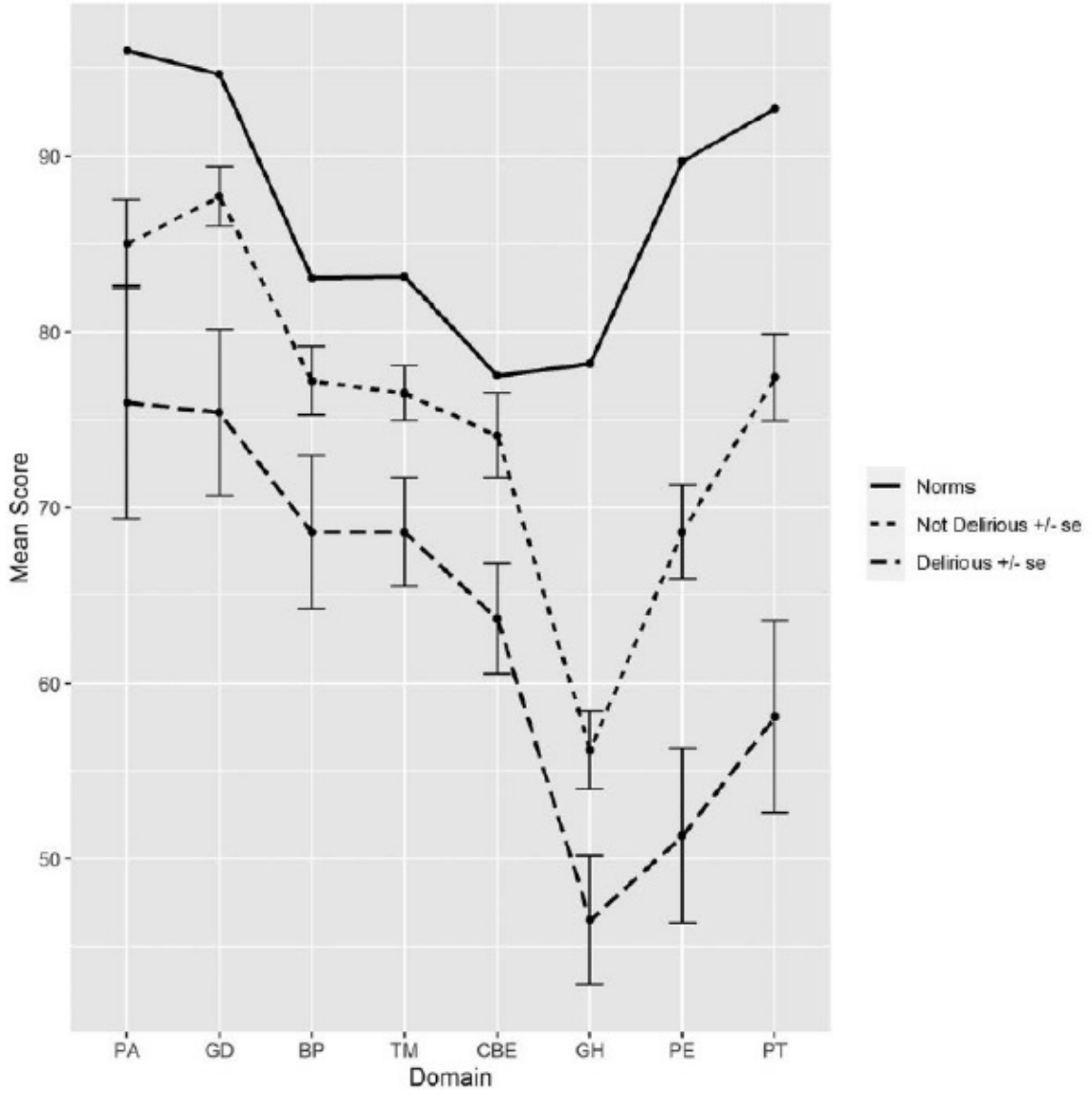
Delirium—Why should we care?

- In adults, delirium has been associated with increased mortality, increased hospital LOS, postdischarge morbidity, neurocognitive decline, decreased health-related QOL
- In children, delirium associated with:
  - Increased PICU and hospital LOS
  - Increased mortality
  - Decreased quality of life after discharge



Case

- 16yo F admitted s/p elective cholecystectomy, complicated by abdominal aortic laceration and subsequent arterial thrombi, lower extremity compartment syndrome and left leg fasciotomy
- Intubated and sedated with hydromorphone and dexmedetomidine infusions for 5 days
- Extubated on POD 6, methadone/clonidine initiated prior to extubation, sedative infusions weaned. The patient remains sedate with minimal interaction for the next ~36 hours.
- On POD 8, the patient screams at her mother and the nurse “You’re going to kill me! They’re going to kill me!” which started after her IV pump began beeping. She is waving her arms in the air like she is trying to hit someone.

Available Screening Tools for PD: Cornell Assessment of Pediatric Delirium (CAPD)

- Sensitivity 94%, Specificity 79%
- Based on RN observation
- Adapted from Pediatric Anesthesia Emergence Delirium scale
- Rooted in developmental milestones
- Validated in children with developmental delay

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Cornell Assessment of Pediatric Delirium

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 4	Rarely 3	Sometimes 2	Often 1	Always 0	Score
1. Does the child make eye contact with the caregiver?						
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 0	Rarely 1	Sometimes 2	Often 3	Always 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	

- Positive screen ≥9

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	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 discoordinated)	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

Available Screening Tools for PD: Pediatric Confusion Assessment Method (p-CAM) and Preschool Confusion Assessment Method (ps-CAM)

- Sensitivity 83%, Specificity 99%
- Requires patient interaction
- Not validated in children with developmental delay

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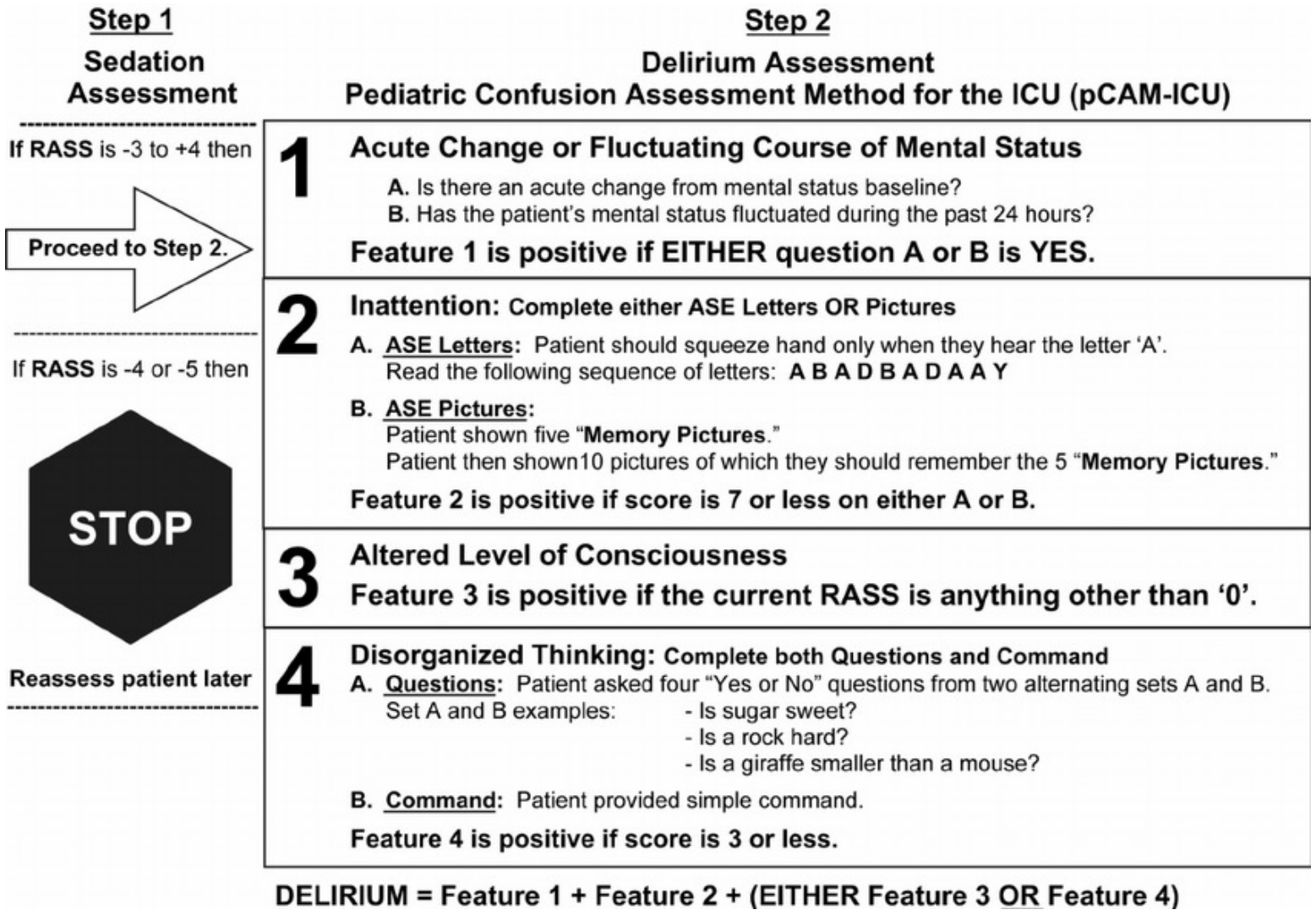
p-CAM ICU



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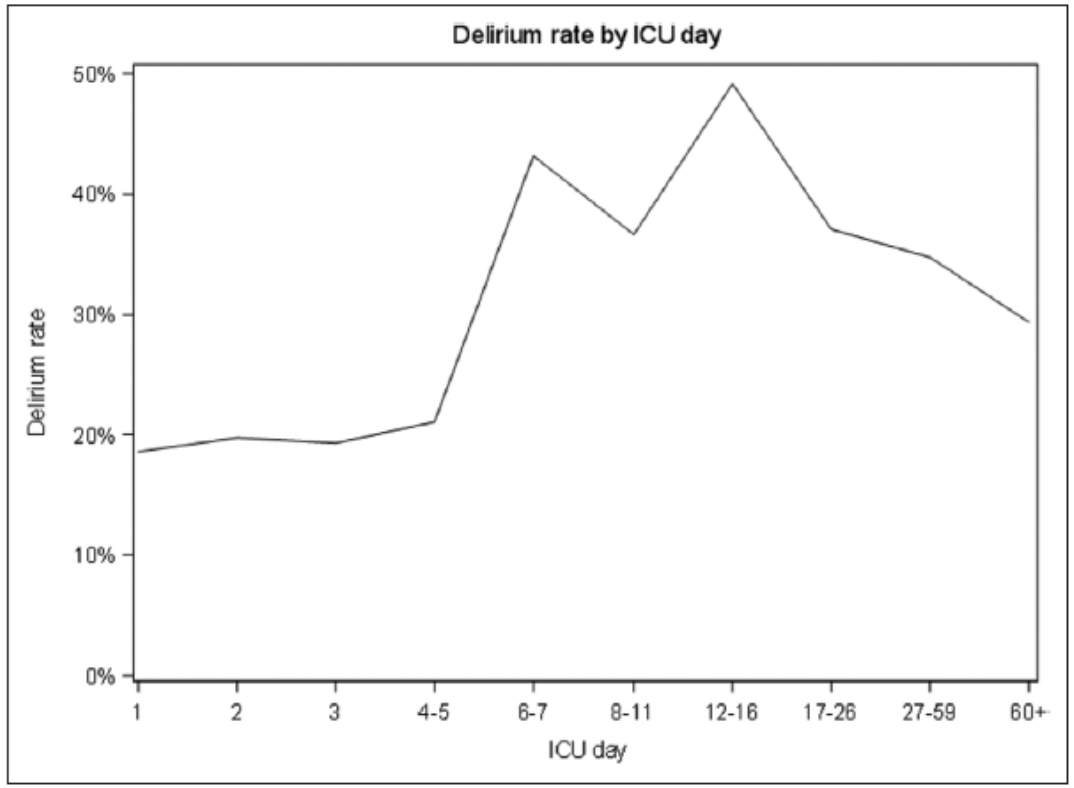
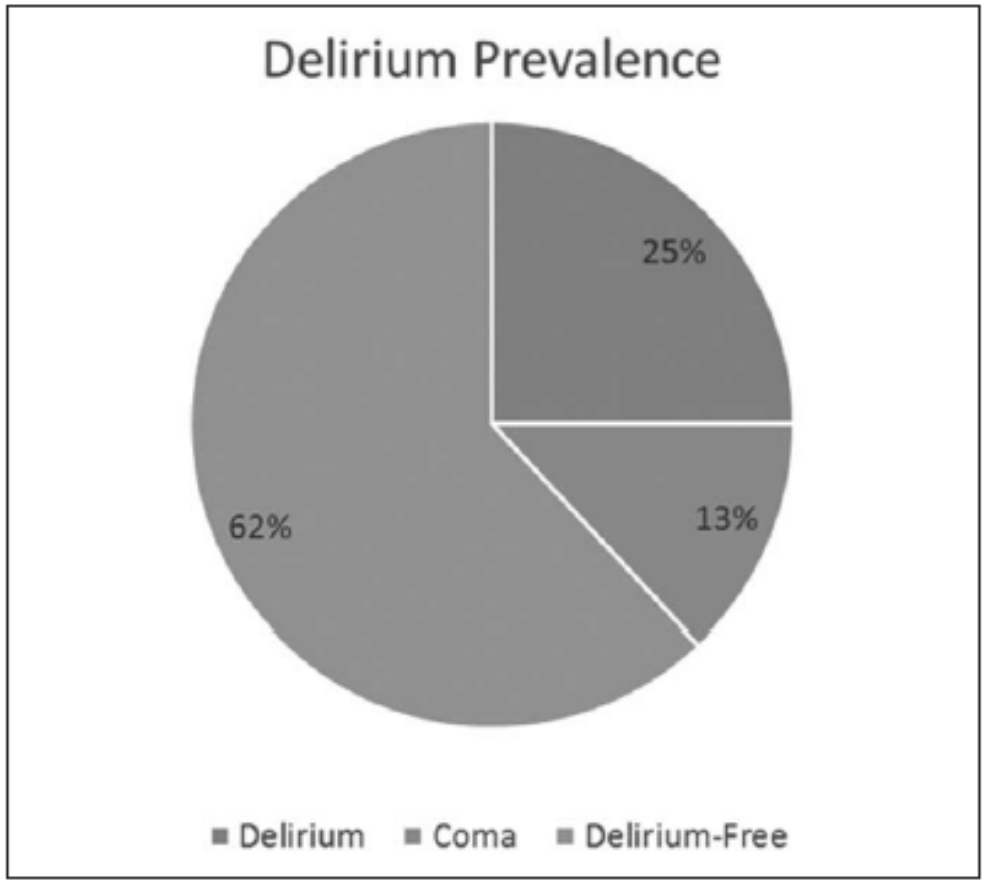
Delirium in Critically Ill Children: An International Point Prevalence Study

Chani Traube, MD[1]; Gabrielle Silver, MD[1]; Ron W. Reeder, PhD[2]; Hannah Doyle, BS[1]; Emily Hegel, MPH[1]; Heather A. Wolfe, MD[3]; Christopher Schneller, MD[4]; Melissa G. Chung, MD[5]; Leslie A. Dervan, MD, MS[6]; Jane L. DiGennaro, MD, MS[6]; Sandra D. W. Buttram, MD[7]; Sapna R. Kudchadkar, MD[8]; Kate Madden, MD, MMSc[9]; Mary E. Hartman, MD, MPH[10]; Mary L. deAlmeida, MD[11]; Karen Walson, MD[12]; Erwin Ista, RN, PhD[13]; Manuel A Baarslag, MD[13]; Rosanne Salonia, MD[14]; John Beca, FCICM, MBChB[15]; Debbie Long, BNurs, MNurs, PhD[16]; Yu Kawai, MD[17]; Ira M. Cheifetz, MD[18]; Javier Gelvez, MD[19]; Edward J. Truemper, MD[20]; Rebecca L. Smith, MD[21]; Megan E. Peters, MD[22]; AM Iqbal O'Meara, MD[23]; Sarah Murphy, MD[24]; Abdulmohsen Bokhary, MD[25]; Bruce M. Greenwald, MD[1]; Michael J. Bell, MD[26]





- Overall delirium prevalence 25%
  - 53% in mechanically ventilated

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Delirium and Mortality in Critically Ill Children: Epidemiology and Outcomes of Pediatric Delirium*

Chani Traube, MD[1]; Gabrielle Silver, MD[2]; Linda M. Gerber, PhD[3]; Savneet Kaur, MBBS[1]; Elizabeth A. Mauer, MS[3]; Abigail Kerson, BA[4]; Christine Joyce, MD[5]; Bruce M. Greenwald, MD[1]

- Pre-existing factors associated with delirium
  - Age ≤2y, developmental delay, preexisting medical condition, illness severity
- PICU factors associated with delirium
  - Mechanical ventilation, coma, receipt of: benzodiazepines, opioids, steroids, anticholinergics, vasoactives
    - Benzos, opiates increase odds of delirium in dose dependent fashion

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Conditions that may contribute to Delirium

- Physiologic
  - Deoxygenation
  - Infection/sepsis
  - Electrolyte imbalance
  - Pain
  - Seizures
  - Dehydration/lack of nutrition
- Iatrogenic
  - "Hardware"
    - Foley
    - ETT
    - Lines
  - Day/night disruption

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Case: Mixed Delirium

- No clear etiology for delirium
- Strict day/night schedule implemented with clustering of care
- Room decorated for orientation
- Melatonin started for sleep, Seroquel initiated several days later
- Gradual resolution of delirium over the course of the next 4-5 days (with weans of sedative meds, increased mobility)

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Management Strategies

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Pharmacologic Interventions for Pediatric Delirium

- Minimize use of opiates, benzodiazepines, anticholinergics
- Reassess pain, sedation goals
  - Consider dexmedetomidine in place of benzos, opiates
- Minimize polypharmacy
- Assess and treat for withdrawal
- Consider use of melatonin for sleep
- Consider antipsychotics for severe agitation
  - Quetiapine, Risperidone, Haloperidol

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Management Strategies

Pharmacologic

Non-pharmacologic

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NON-Pharmacologic Interventions for Pediatric Delirium

- Optimize orientation
  - Parents/photos/comfort items at bedside
  - Introduce self/explain interventions as age appropriate
    - Utilize Child Life staff expertise!
  - Use patient name, provide frequent (re)orientation
- Promote day/night routines
- Promote early mobility
  - Engage OT, PT
- Frequently reassess need for lines, tubes
- Avoid restraints

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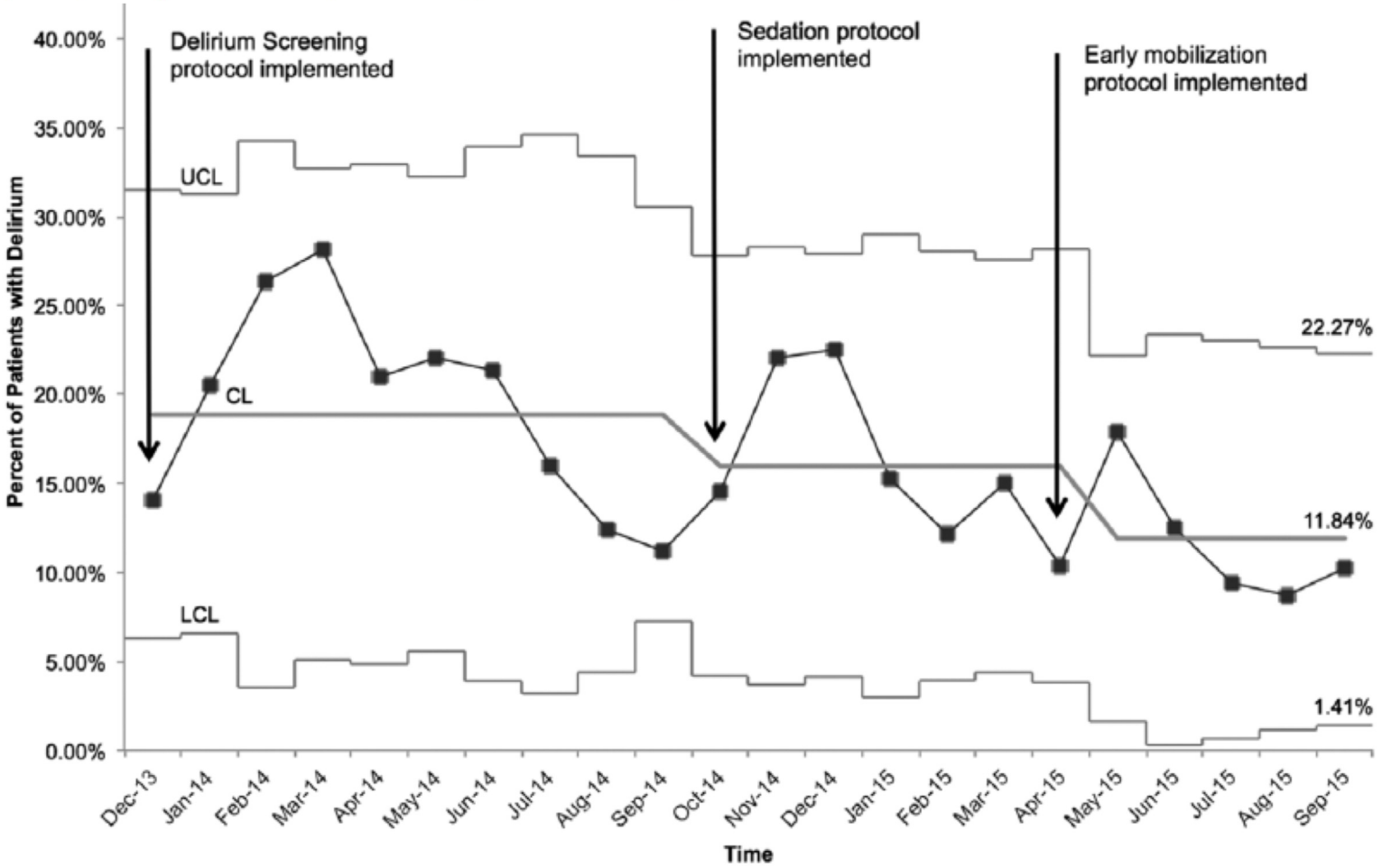
Implementation of an ICU Bundle: An Interprofessional Quality Improvement Project to Enhance Delirium Management and Monitor Delirium Prevalence in a Single PICU

Shari Simone, DNP[1]; Sarah Edwards, DO[2]; Allison Lardieri, PharmD[3]; L. Kyle Walker, MD[1]; Ana Lia Graciano, MD[1]; Omayma A. Kishk, PharmD[3]; Jason W. Custer, MD[1]



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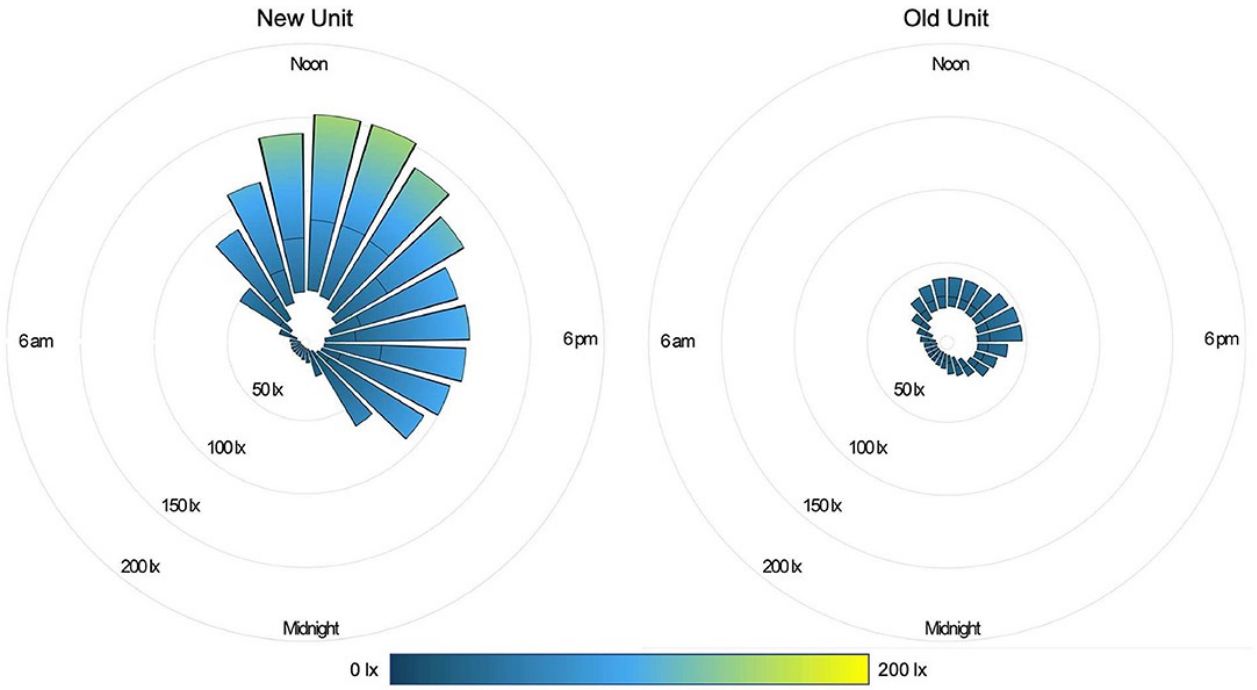
Light and Sound in the CHoR PICU

- Light and sound measurements for duration of admission
  - Unit summary: loud and dark
- No association between light and sound variables and development of delirium



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Pediatric Delirium: Where are we headed?

- Multicenter studies/RCTs
  - Environmental modifications
  - Pharmacologic interventions
  - Early Mobility
- NTDB metric

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Questions?

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