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# Treatment of Post-Operative Pain in Children with Severe Neurological Impairment

Jordan Keys

*Children's Mercy Kansas City*

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# Treatment of Post-Operative Pain in Children with Severe Neurologic Impairment

## PAS 2023

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# Disclosure



## **Jordan Keys, MD**

Has documented no financial relationships to disclose or Conflicts of Interest (COIs) to resolve.

# Background



- Children with medical complexity (CMC) account for 1% of all children.
- CMC make up 56% of all hospitalized patients.
- The highest frequency and severity of pain occurs in children with severe neurologic impairment (SNI).

# Background



- Medical tests, procedures, and surgery are a frequent source of pain in children with SNI.
- No standard approach to pain and symptom treatment in children with SNI.

# Objectives



- Describe the type, number of classes, and duration of post-operative pain medications for procedures common amongst children with SNI.
- Describe the variability in pain management strategies across children's hospitals, specifically for opioid administration post-operatively.

# Study Population



- Retrospective cohort study of the Pediatric Health Information System (PHIS) dataset which includes 41 children's hospitals.
  - Children hospitalized with SNI aged 0-21 years old who underwent common procedures during 2019.



# Definitions



- SNI is defined using previously described high-intensity neurologic impairment (HI-NI) codes.
- HI-NI codes include conditions that:
  - Impact central and/or peripheral nervous system
  - Last at least 12 months
  - Associated with physiologic impairment requiring pediatric specialty care

# HI-NI Categories



1. Anatomic
2. Epilepsy
3. Genetic
4. Metabolic
5. Peripheral
6. Progressive/Movement
7. Static
8. Stroke/Hemorrhage

# Study Design



Identified six common procedures (>500 encounters) among our population:

- Fracture treatment
- Tracheostomy
- Spinal fusion
- Ventriculoperitoneal shunt placement (VP shunt)
- Colostomy
- Heart Valve Procedures

# Definitions



- Medication classes were defined using the *Classification of Palliative Care Pain Medications* from Boston Children's Hospital.

Non-Opioids	Benzodiazepine	Anticonvulsants	Opioids
Topical Agents	Alpha-2-Adrenergic Agonists	Corticosteroids	Antidepressants
	N-Methyl-D-Aspartate (NMDA) Antagonist	Miscellaneous	

# Definitions



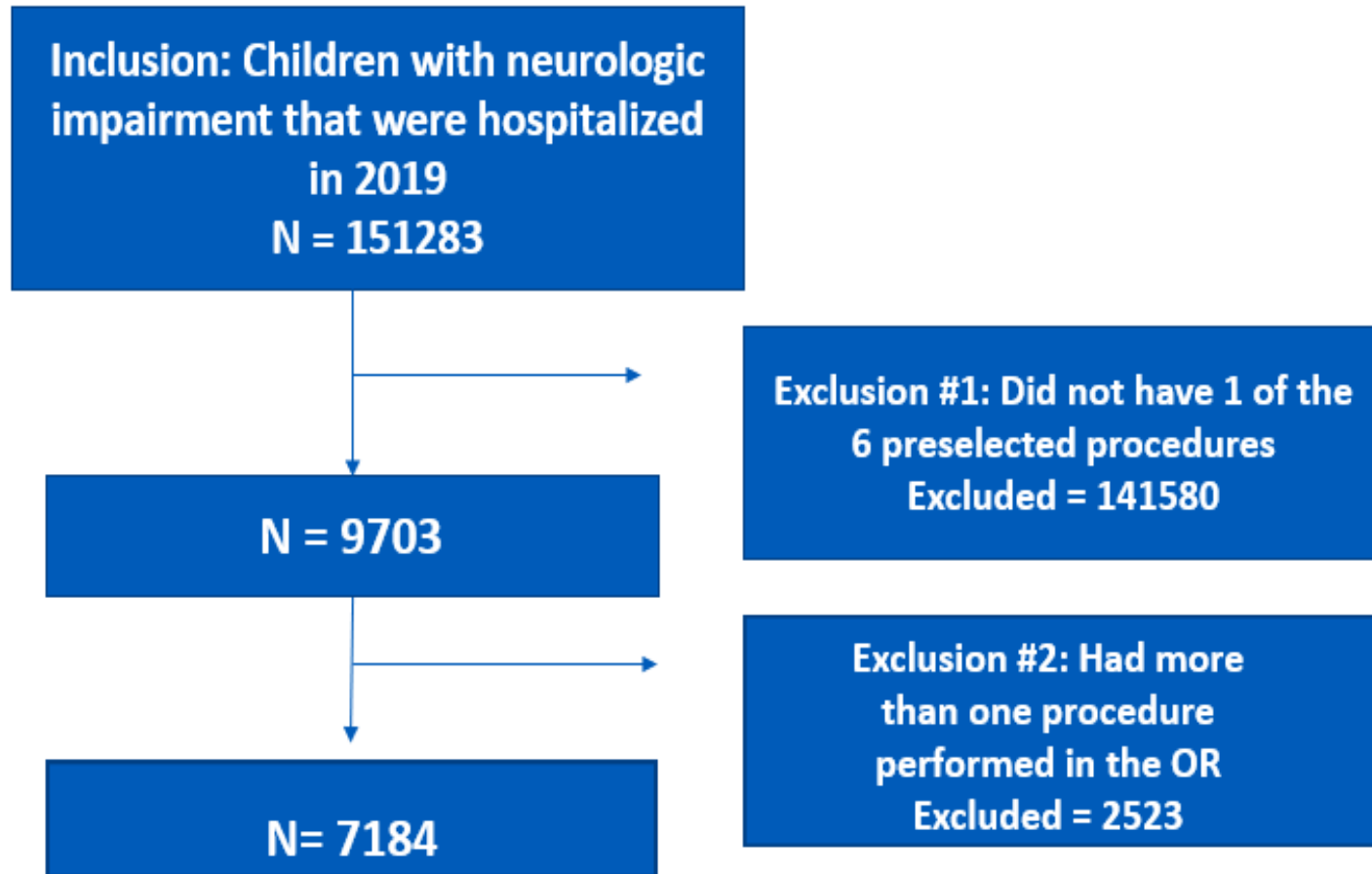
	Benzodiazepine	Anticonvulsants	Opioids
Topical Agents	Alpha-2-Adrenergic Agonists	Corticosteroids	Antidepressants
	N-Methyl-D-Aspartate (NMDA) Antagonist	Miscellaneous	

# Statistical Analysis



- Described the frequency of HI-NI diagnoses in our cohort
- Proportion of post-operative days with pain medications by class and procedure
- For each procedure, we described the proportion of children that received pain medications by class
- Hospital level variation in prescribing pain medications across procedures
- Hospital level variation in prescribing opioids

# Consort Diagram



# Results: HI-NI Frequencies



- The most frequent HI-NI category was Anatomic at 36.7% (n =2634).
- 12% of our cohort had three or more HI-NI diagnoses.
  - Anatomic + Epilepsy + Static (n= 479, 6.7%)



# Results: Pain Medication Classes

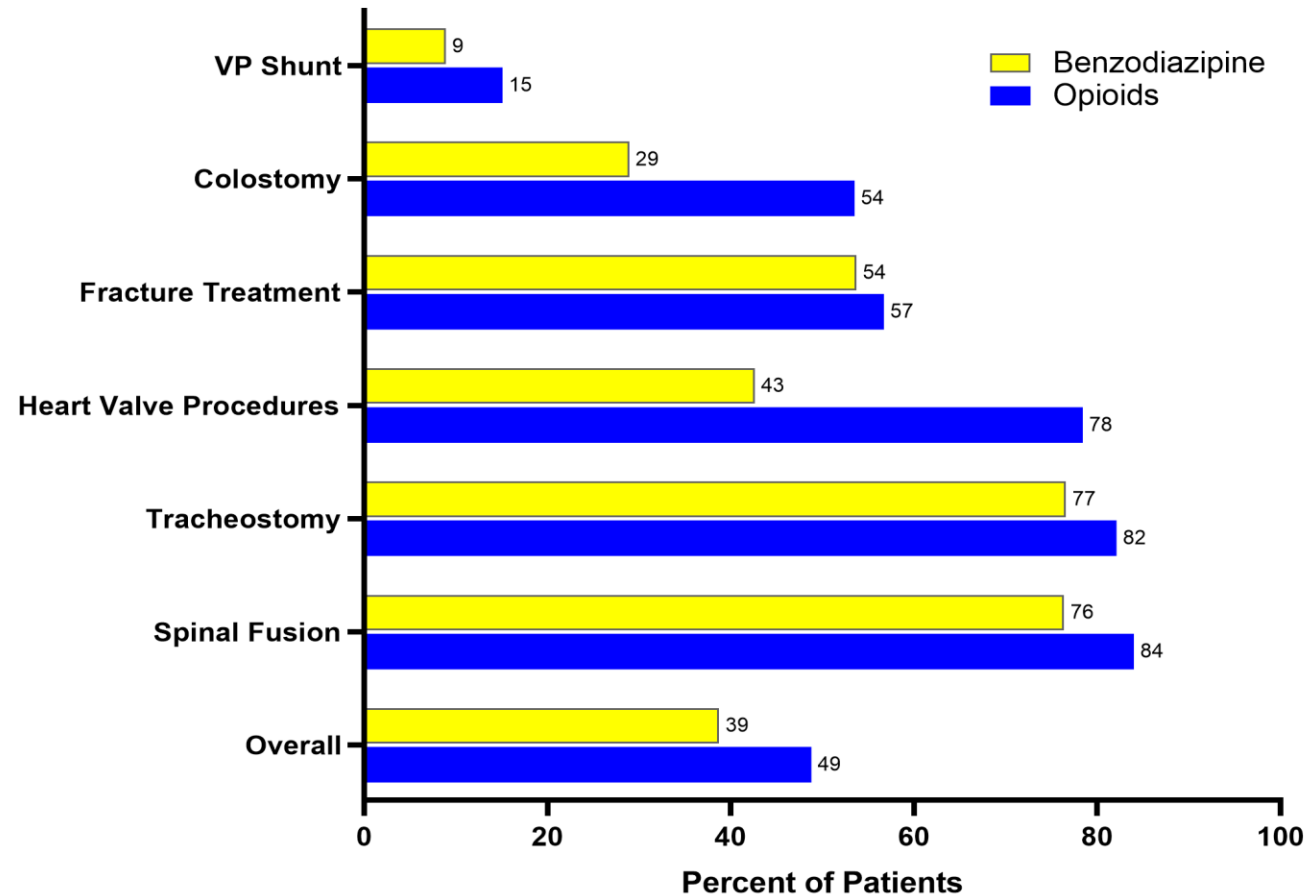


Procedure Type	Median	[IQR]
Overall	1	[0,3]
VP Shunt	0	[0,1]
Colostomy	1	[0,2]
Heart Valve Procedures	2	[1,3]
Spinal Fusion	2	[2,3]
Fracture Treatment	2	[0,3]
Tracheostomy	3	[2,4]

# Results: Proportions by Medication Class



Opioids and Benzodiazepines were the most common medications administered.

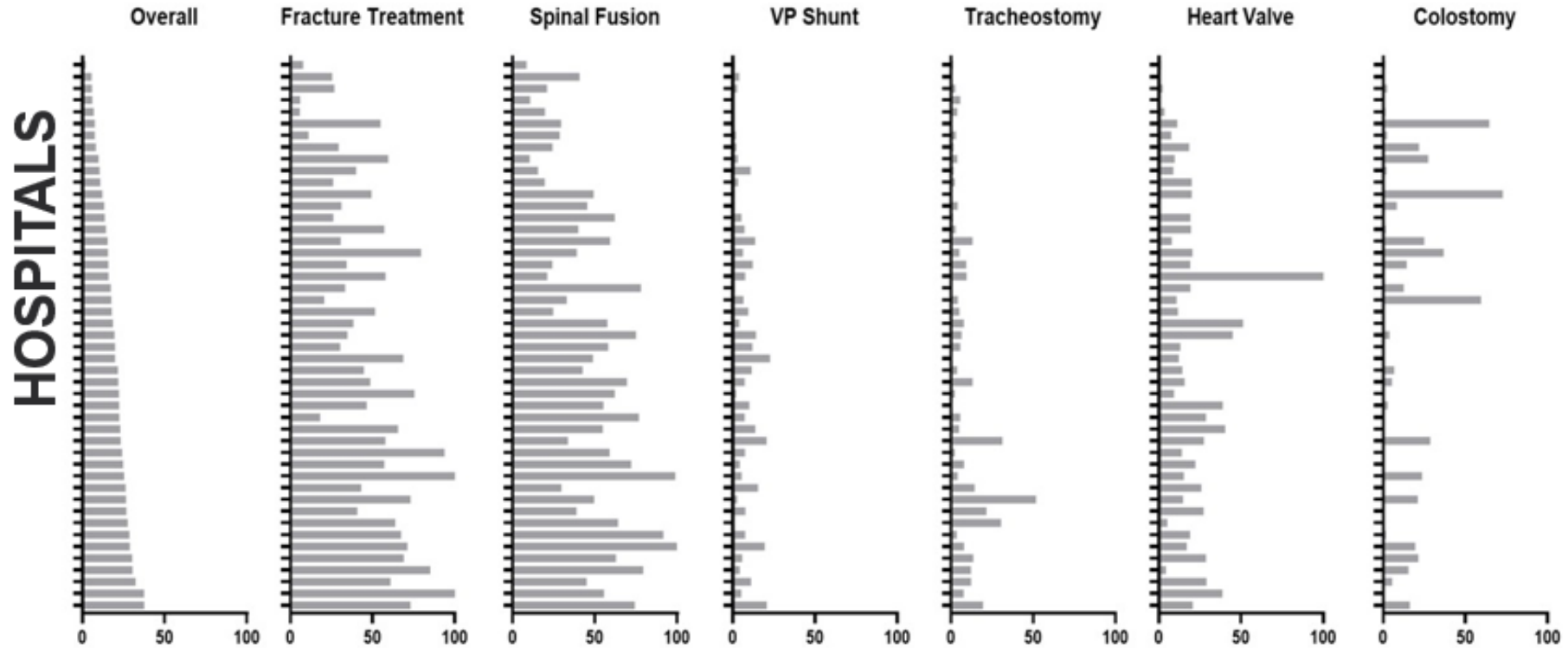


# Post-Op Days with Pain Medications



Procedure Type	Percentage of Post-Op Days with any Pain Medication
Overall	53%
VP Shunt	29%
Colostomy	38%
Heart Valve Procedures	47%
Tracheostomy	62%
Fracture Treatment	63%
Spinal Fusion	72%

# Results: Post-Op Days With Opioids



Percent of Post-Operative Days with Opioids

# Limitations



- Unable to determine if pain medications were indicated for reasons other than post-operative pain management
- Unable to determine which medications were home medications
- Unable to determine if larger children's hospitals have protocolized approaches to pain management for children with SNI in comparison to smaller institutions

# Conclusions



- Children with SNI experienced variability in the type, number of classes, and duration of all pain medications delivered post-operatively.
- Inconsistent use of opioids based upon hospital and procedure.
- Variability across hospitals and procedures in opioid administration.
- Few hospitals with high opioid usage.

# Implications & Future Goals



- Need for both a standardized approach to the assessment and treatment of post-operative pain management for children with SNI.
- Investigate if communication status (verbal vs non-verbal) affects pain management in children with SNI.
- Explore if parental insight improves pain management during hospitalizations for children with SNI.

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**Children's Mercy** @ChildrensMercy · Sep 1, 2022



It's back to school for Parker and Hadley! 🎒 Parker is starting 4th grade and Hadley is starting 3rd grade. Parker was born at Children's Mercy and continues to be a patient in many of our clinics. We're so excited to see you both starting a new school year! 🍀 Good luck!



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Children's Mercy @ChildrensMercy · Apr 18, 2022

Carter was born with #epilepsy, #cerebralpalsy and #spinabifida and is an inspiration to her family and friends. "She's gotten me through so much with how she fights – if she can do it, so can I, and we can help other families fight just like she does." – Carter's Mom, Amber



ALT 1 13



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Thank you to @Mix933, @Q104KC and the 101 community champions who made a gift as part of this year's Request-a-thon! Your support met the \$5,000 match – dollars that will go directly towards creating a world of well-being for children like Jack. #ImagineThePotential



ALT 2 13

