MPOG Pediatric Subcommittee Meeting

May 13, 2024

MPOG
MULTICENTER PERIOPERATIVE OUTCOMES GROUP

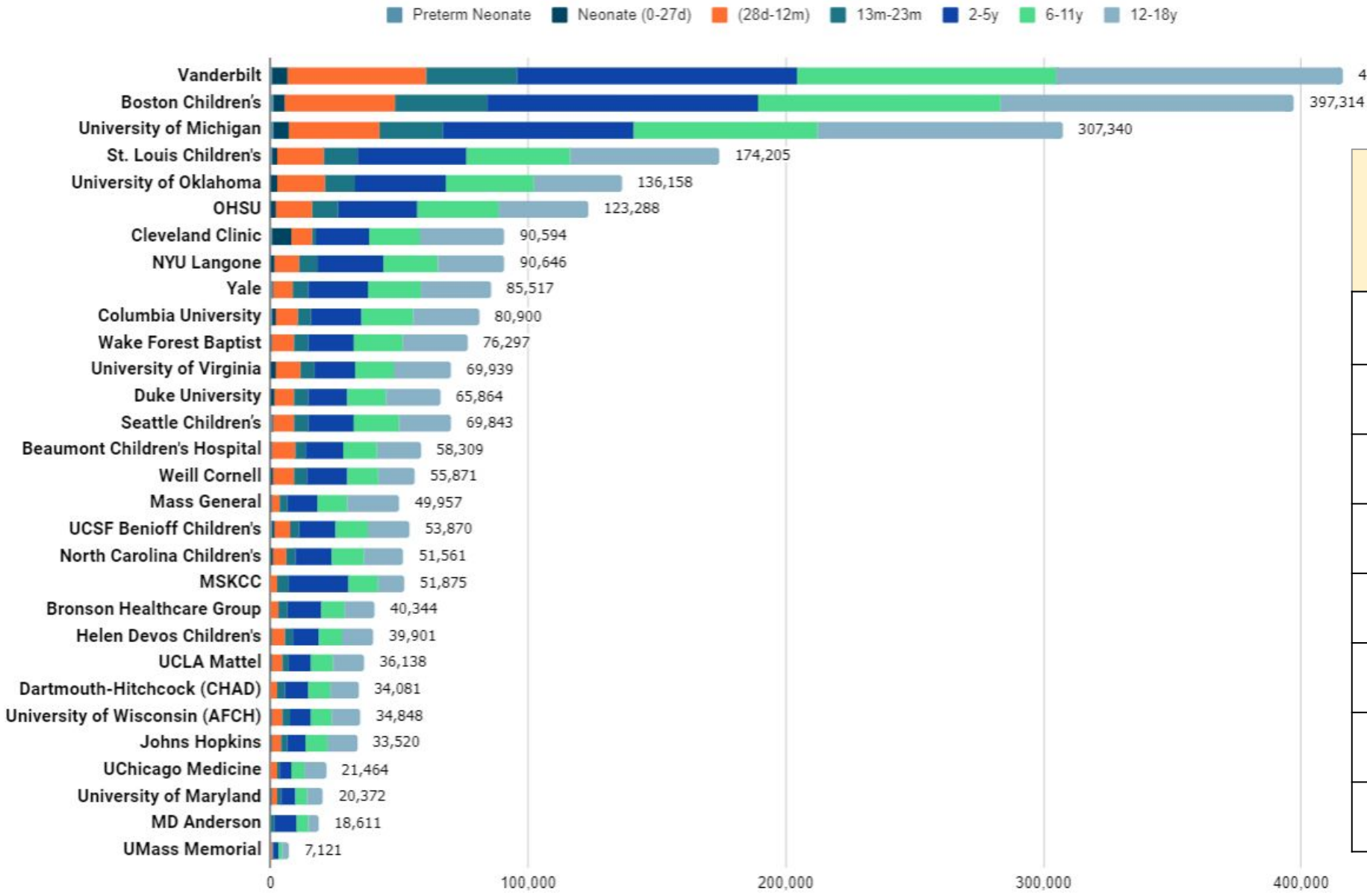
Agenda

Announcements

Case Study: MPOG QI Measure Selection
Seattle Children's Hospital

Unblinded Performance Review
Sustainability
Neuromuscular Blockade

Pediatric Case Count Across MPOG Institutions



Pediatric Cases in MPOG

2,809,405

Age Group	Case Count
Preterm Neonate	8,124
Neonate (0 - 27d)	42,957
Infant (28d - 12m)	313,450
Toddler (13m - 23m)	220,029
2 - 5y	723,458
6 - 11y	667,570
12 - 18y	833,817

2023 Recap

Measure Reviews

- **TEMP-04-Peds** Intraoperative Normothermia, Pediatrics → **MODIFY**
  - *Exclude GI Endoscopy cases*
  - *Exclude patients hypo/hyperthermic in preop*

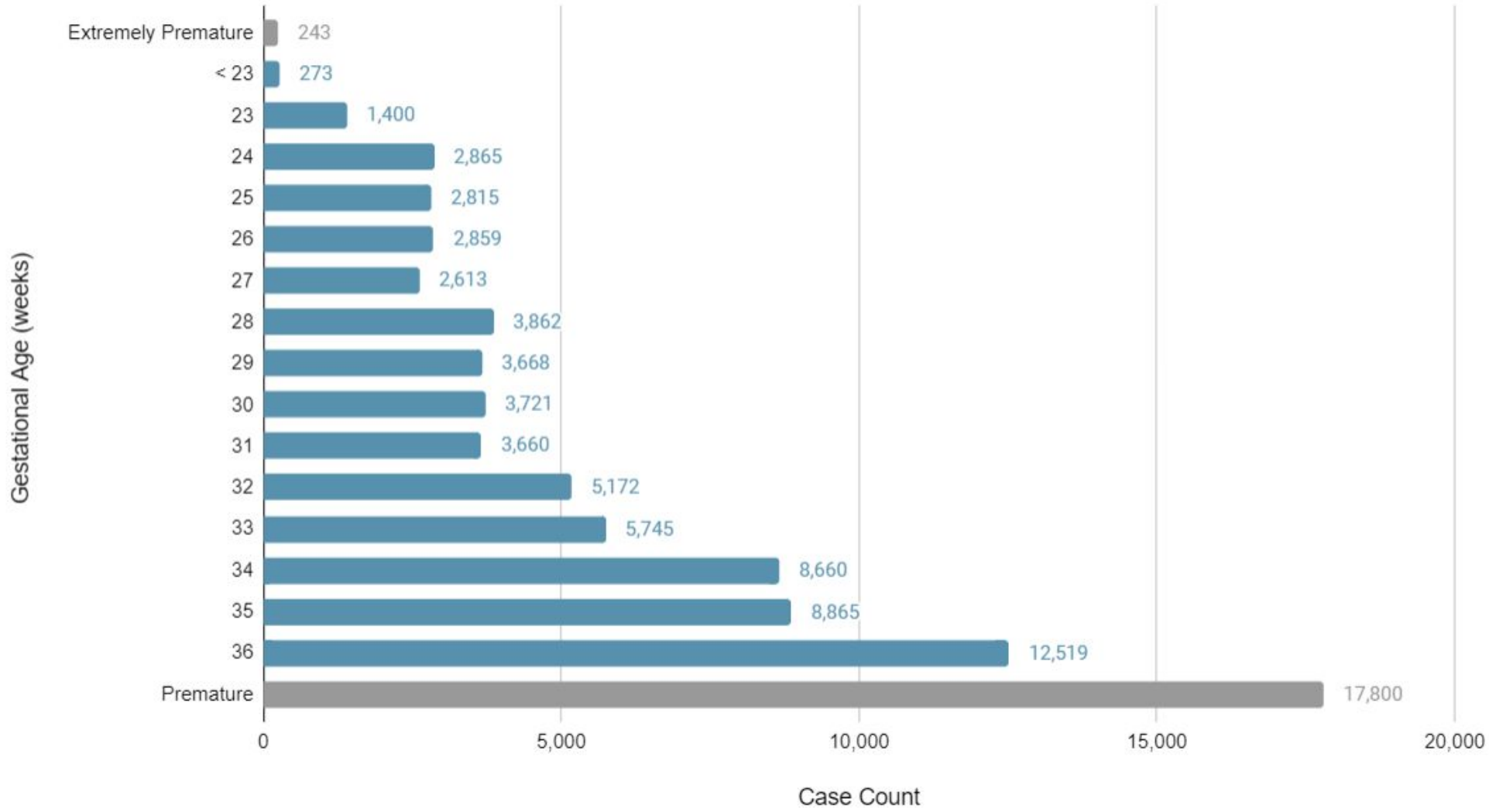
- **PAIN-01-Peds -** Multimodal Pain Management, Pediatrics → **MODIFY**
  - *Added performance threshold of 90%*
  - *Excluded Block Only cases*
  - *Excluded cases that received no analgesia*

Phenotypes Built

- **Gestational Age at Birth**

MPOG Patients Born Premature by Gestational Age

Pediatric Cases < 18y



QI Measures Retired - April 2024

- GLU-01 → **GLU-09**: Hyperglycemia Management, Intraop (> 180 mg/dL)
- GLU-02 → **GLU-12**: Hypoglycemia Management, Intraop (< 70 mg/dL)
- GLU-03 → **GLU-10**: Hyperglycemia Management, Periop (> 180 mg/dL)
- GLU-04 → **GLU-13**: Hypoglycemia Management, Periop (< 70 mg/dL)
- GLU-05 → **GLU-11**: Hyperglycemia Treatment, Periop (> 180 mg/dL)
- MED-01 → **PAIN-03**: Opioid Reversal with Naloxone
- PONV-01 → **PONV-05**: PONV Prophylaxis, Adults (2020 Guidelines)
- PONV-02 → **PONV-04**: PONV Prophylaxis, Pediatrics (2020 Guidelines)
- PUL-02 → **RETIRED**

QI Reporting Provider Dashboard

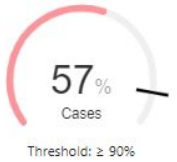
Pediatric Anesthesia Dashboard

SUS-06-Peds: Low Fresh Gas Flow, Pediatric Induction

More Info

Percentage of pediatric cases < 18 years old with a mean fresh gas flow (FGF) equal to or less than a weight-based threshold during the induction phase of anesthesia.

Overall Score

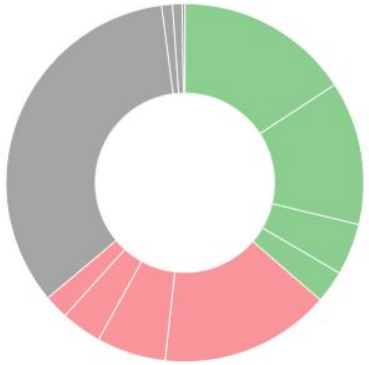


Threshold: ≥ 90%

Result Counts

Performance Trend

Result Reasons



Result	Reason	Case Count
Passed	Mean Fresh Gas Flow <= 6 L/min	129
Passed	Mean Fresh Gas Flow <= 3 L/min	106
Passed	Mean Fresh Gas Flow <= 4 L/min	38
Passed	Mean Fresh Gas Flow <= 5 L/min	24
Flagged	Mean Fresh Gas Flow <= 3 L/min	126
Flagged	Mean Fresh Gas Flow <= 4 L/min	51
Flagged	Mean Fresh Gas Flow <= 6 L/min	30
Flagged	Mean Fresh Gas Flow <= 5 L/min	18
Excluded	Inhalational Induction	278

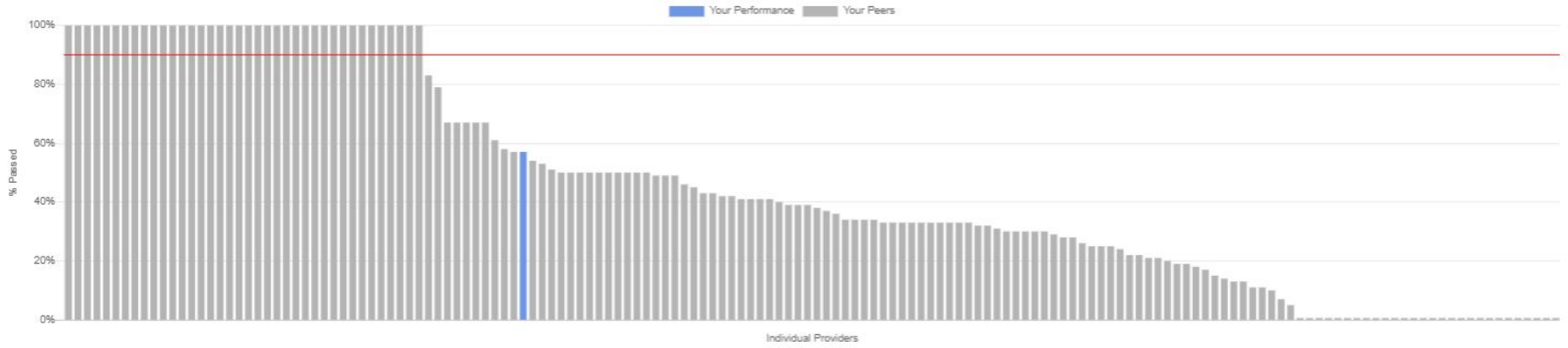
My Flagged Cases

View All Cases

View Case	Case Date	Procedure	Result Reason
View Case		(Actual)Direct Laryngoscopy & Bronchoscopy with possible Laser Excision and possible Dilation	Mean Fresh Gas Flow <= 3 L/min: 5.0
View Case		(Actual)Nasolacrimal Duct Probing (Right); MYRINGOTOMY AND TUBES (Bilateral)	Mean Fresh Gas Flow <= 3 L/min: 3.2
View Case		(Actual)Eye Muscle Correction - Bilateral Lateral rectus resection for 18- (Bilateral)	Mean Fresh Gas Flow <= 3 L/min: 4.0
View Case		(Actual)PERCUTANEOUS PINNING ELBOW (Left)	Mean Fresh Gas Flow <= 3 L/min: 6.8

Provider Comparison

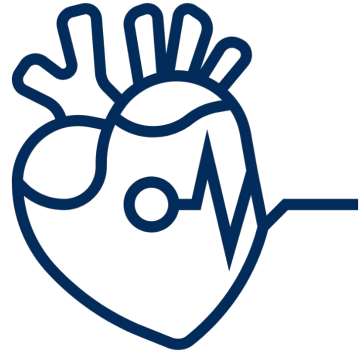
The provider comparison graph reveals performance differences among similar providers at your institution. Please note that the specifics of each measure (particularly the volume of cases in each measure) and provider factors can lead to outliers. These outliers might exaggerate the actual performance difference. Please interpret these graphs with these considerations in mind.



2024 Meetings

- **Pediatric Subcommittee Meetings**
  - Spring (May)
  - Fall (November)
- **Pediatric Cardiac Workgroup**
  - Winter (February)
  - Summer (June)
- **MPOG Annual Retreat 2024**
  - October (Philadelphia, PA)

Peds Cardiac Workgroup



- Chair - Morgan Brown, MD, PhD
- First meeting was held February 13, 2024

Determined Goals of workgroup:

- Define a cardiac phenotype specific to congenital cardiac procedures
- Build QI process and outcome measures → 2025
- Increase multicenter congenital cardiac research with MPOG platform
- Future CCAS-STS/MPOG data merge

Next Meeting: Summer 2024

Case Study

MPOG Metric Selection

Seattle Children's Hospital

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Organizing the Committee

Step 1: Find interested volunteers:

- Broadens the perspectives on the measure review
- Brings invaluable expertise in the department to the effort
- Improves the credibility of the effort in the broader department

Acknowledgements

- Amber Franz
- Elizabeth Hansen
- Vikas O'Reilly-Shah
- David Polaner
- Mac Staben
- Rani Sunder
- Michael Wadle

Committee Process

- Review ASPIRE metrics that might of interest to flag at SCH
- Identify concerns or problems with the metrics, the underlying data, or both
- Strategize and deploy interventions designed to result in improvement
  - Dissemination of performance → departmental level
  - Dissemination of performance → provider level (not planned at this time)
  - PDSA cycles for metrics of interest
  - EMR modifications (e.g. BPAs or changes to defaults in orders)

Measures we assessed

FLUID-02-C: Minimizing colloid fluid use in cardiac

TRAN-03-Peds: Whether H/H was checked prior to blood transfusion

TRAN-04-Peds: Was post-transfusion H/H > 10/30% postop?

PAIN-01-Peds: Multimodal analgesia (non-opioid adjuncts or block)

PONV-04-Peds: Antiemetic prophylaxis for PONV based on risk factors in pediatric patients age 3-17

TEMP-04-Peds: Median core temperature above 36°C for pediatric patients

NMB-01: Whether TOF is documented in cases with NMB administration.

NMB-03-Peds: Appropriate initial dosing of NMB for pediatric patients ≤ 5 years old.

SUS-05-Peds: Avoiding nitrous oxide during induction

SUS-06-Peds: Fresh gas flow during induction based on a weight-based thresholds

FLUID-02-C: Minimizing colloid fluid use

Cardiac

- Reviewer spoke with lead perfusionist - albumin given with every case for iso-oncotic priming solution to avoid FFP priming.
- Since on MAR, metric flags nearly all of our cases
- Deemed irrelevant as constructed

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TRAN-03-Peds: Whether H/H was checked prior to blood transfusion

Review of flagged cases

- 4 cases "incremental transfusions," likely administrations from a single unit
- 2 cases "were very close to the age (6m) exclusion threshold"
- 1 case "blood was sampled for testing nearly simultaneously with the transfusion, suggesting sudden rapid blood loss"
- 1 case "cadaveric kidney transplant … size discordance between the graft and recipient requiring the second transfusion" (H/H not checked prior to second transfusion)
- 2 cases "rapid sudden bleeding that did not cross the 40ml/k MPOG threshold but which was clinically significant" also with incremental transfusions recorded

Thoughts

- "All of these 'failures' to meet MPOG criteria do not represent failures of what MPOG is trying to measure, but rather demonstrate cautious administration of titrated transfusion aliquots instead of a single transfusion event of a large volume"

TRAN-04-Peds: Was post-transfusion H/H > 10/30% postop?

Notes:

- 1 case: Hct/Hb documentation was not ordered in patient undergoing MRI in which transfusion was started by primary team and continued during imaging study. Hct/Hb was documented @19 hours post transfusion.
- 3 cases: Hct/Hb <30/10 on POD1, 4 cases if expanded to POD6
- 2 cases: PRBC was ordered and continued by anesthesia providers during case
- 2 cases: craniectomies in which lab was taken concurrently with transfusion, suggesting rapid blood loss.

Thoughts:

- Reconsider adjusting post transfusion lab window to include all POD1 values, 40% reduction
- Clarify transfusion ownership and administration mapping, 20% reduction
- Consider judicious transfusion protocol for craniectomy in infants 6-12 months, potential 40% reduction
- Include rapid blood loss as exclusion criteria, 20% reduction

PAIN-01-Peds: Multimodal analgesia (non-opioid adjuncts or block)

Thoughts

- We are doing way above the national average.
- The list of non opiate medications includes **Ketamine**. I have a bone to pick with that. It has receptor activity / abuse potential / addictive potential / side effect profile somewhat similar to opioids.
- I would like to exclude ketamine and rerun statistics for a get a better sense of non opioid based analgesic use

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PONV-04-Peds: Antiemetic prophylaxis for PONV (peds factors)

- Discovered an error in the algorithm due to our review (!)
  - *"Volumes"* recorded at the end of case in Epic come after Out of OR
  - These volumes were being counted as administrations
  - Meridith fixed the glitch

- PONV Outcome rate 5.5%
- PONV Prophylaxis rate was 68% but deemed not worth chasing

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TEMP-04-Peds: Median core temperature above 36°C for pediatric patients

"The measure itself has a problem in that it favors longer cases where there is opportunity to rewarm, as it looks at the median temperature during the entire case."

"There doesn’t seem to be a specific service line opportunity, cases cross the spectrum, though neurosurgery, ortho, and gen surgery might represent opportunities if we want to pursue."

"There are a fair number of ENT and IR cases but I have a hard time believing this metric is very meaningful for most ENT or IR cases."

"Obviously profound hypothermia would be bad for a variety of reasons, but most cases were not extremely cold. Since we pre-warm and do a lot for hypothermia avoidance, not sure how much more opportunity there is."

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NMB-01: Whether TOF is documented in cases given NMB

Thoughts

- We are the 2nd worst institution in MPOG!
- People are lazy vs. culture of not checking (why?)
- People are confident in the reversal ability of sugammadex?
- People don't think residual NMB is clinically significant?
- People are confident in the pharmacokinetics/timing/duration of a single dose of rocuronium – knowledge gap may exist for infants (high inter-individual variability and prolonged duration) – see literature and evidence/quotes in next measure below:
- Lots of room for improvement on this metric!

NMB-03-Peds: Appropriate initial dosing of NMB for small peds patients

Reviewer performed a detailed lit review of the metric and underlying literature

Thoughts:

- Knowledge gap about lower dosing for infants and prolonged duration in infants. This represented new information to nearly every member of the dept (including me).
- Lots of cardiac patients (cath lab + OR) on list who were extubated at end of case (doesn't take into account the effects of bypass on NMB duration)
- Several other patients got RSI doses of roc, so maybe aspiration was a concern for these patients? (Exclude RSI in metric?)
- Measure doesn't take into account length of surgery – higher initial doses may be more appropriate for longer surgeries
- Sugammadex Sugammadex Sugammadex

SUS-05-Peds: Avoiding nitrous oxide during induction

Thoughts

- As expected, we do very well on this metric
- We continue to avoid nitrous oxide during induction for most cases
- I'm surprised and impressed that 4 MPOG hospitals have 100% no-nitrous for induction
- For the 498 cases where nitrous oxide was used
- It appears a few clinicians are responsible for most of the flagged cases (1 person is on 22% of the institutional cases)

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SUS-06-Peds: Weight-based fresh gas flow during induction (72% pass)

Thoughts

- We are below goal, but the 3rd best hospital in the group
- We have focused our attention on low flows for induction and maintenance, but without age/weight based thresholds/recommendations
- Our machine defaults to 3L/min which is acceptable for all age groups, so any flagged case happens with the flow is manually turned up (active decision)
- We have work to do here!

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Rollout

Discussed the

Addressi

One initial er

Added a "Do
2024)

Laminated ca

Motivations (and addressing your concerns)

- Cases are pass/**flag** not pass/**fail**
- 100% pass rate is neither feasible nor expected
- Flagging of cases are meant to identify opportunities for improvement
  - Flagged cases may have had perfectly reasonable care management
  - Again, flags are not failures
  - Example: our approach to blood administration during craniosynostosis surgery will always be flagged by MPOG
  - Example: we may choose to give a large dose of NMB at the start of a long case
- Personal performance on metrics is tied to nothing at all
- We have the data, so we might as well use it
- The data is there: if we don't do this, someone else will

Performance Review

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OUTCOMES GROUP

Reminder

- Thank you for attesting to the confidentiality statement during registration and adhering to its letter and spirit
- No photos permitted
- Understand that it can be uncomfortable to discuss QI measure performance. This is meant to be a safe environment to do that, with the goal of providing better care for all our patients
- Constructive counterpoints and disagreements welcome

Process

- Pick measures that are of timely interest
- Describe measure specifications to refresh memory
- Ask sites to describe their workflow

- What can the subcommittee learn from you?
- What can you learn from the subcommittee?
- What can we learn from each other?

Sustainability

Induction

- SUS-03: Global Warming Footprint
- SUS-05-Peds: Avoiding Nitrous, Induction
- SUS-06-Peds: < 3-6 L/min based on weight

Maintenance

- SUS-01: Mean FGF < 3L/min
- SUS-04: Mean FGF < 2L/min
- SUS-02: Normalized CO_2e < 2.83 kg CO_2/hr
- SUS-07: Avoiding Nitrous, Adults

SUS-06-Peds: Low Fresh Gas Flow, Induction

Percentage of pediatric cases < 18 years old with a mean fresh gas flow (FGF) equal to or less than a weight-based threshold during the induction phase of anesthesia.

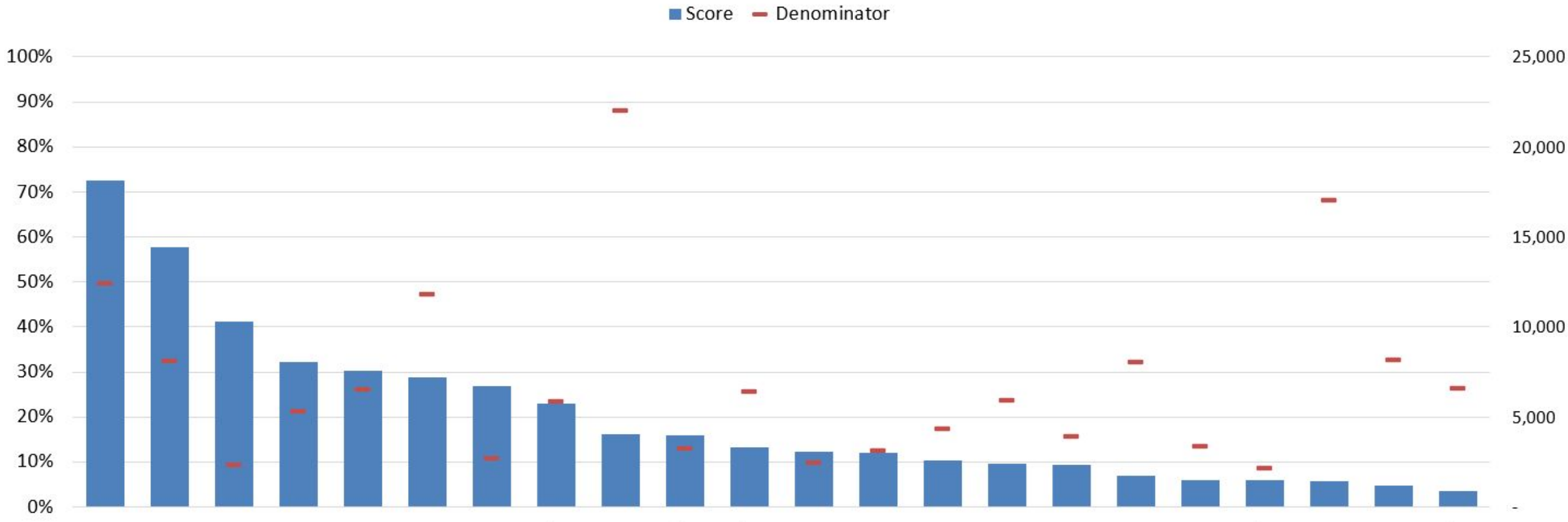
Weight Based Thresholds:

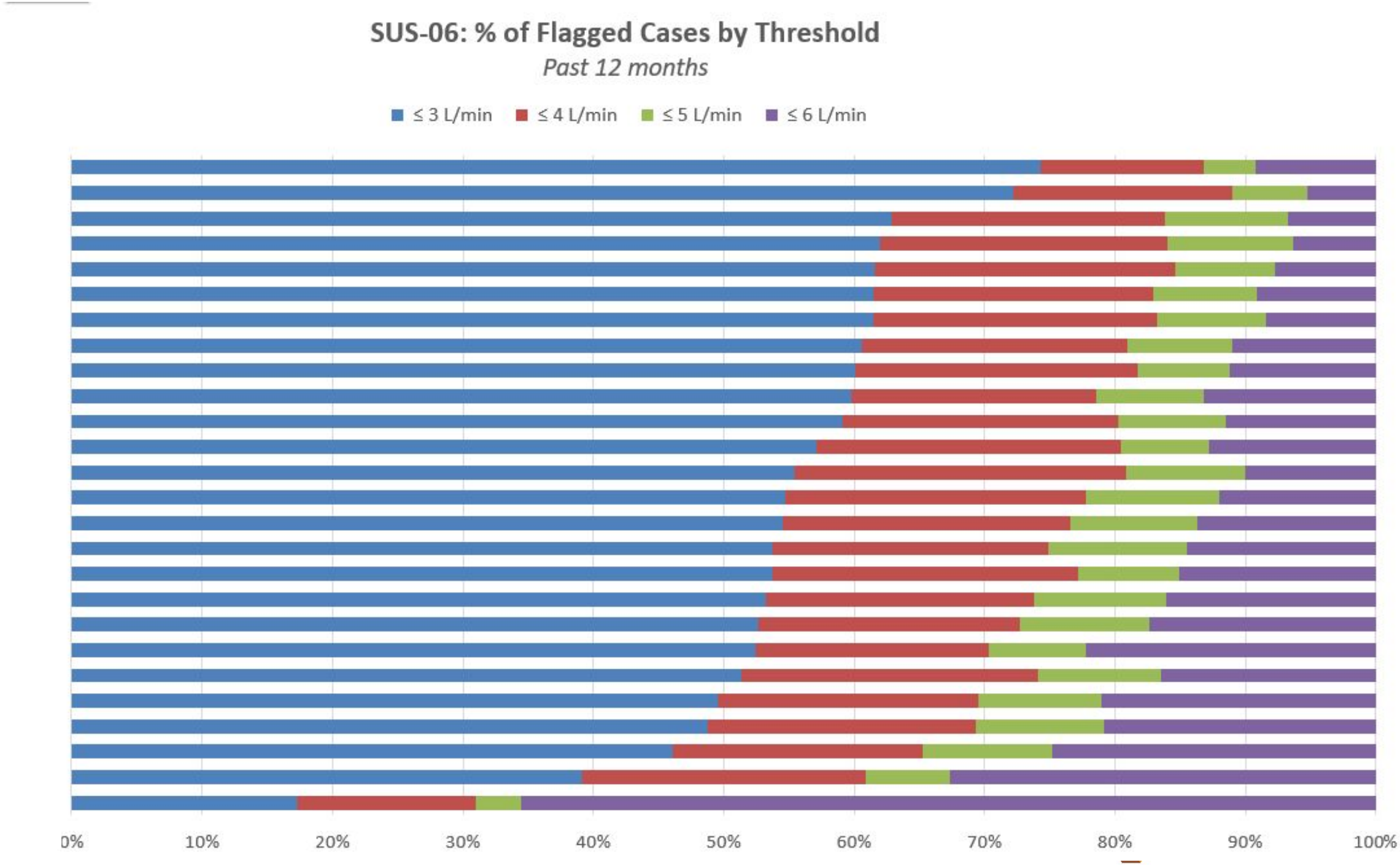
Weight	Mean FGF
< 20kg	≤ 3 L/min
20 - 30kg	≤ 4 L/min
30 - 40kg	≤ 5 L/min
> 40kg	≤ 6 L/min

Table: Glenski et al 2022. "Low Flow Anesthesia in Pediatric Patients."

SUS-06: Low Fresh Gas Flow, Induction

Past 12 months, Pediatrics < 18y




SUS-06: % of Flagged Cases by Threshold
Past 12 months
≤ 3 L/min
≤ 4 L/min
≤ 5 L/min
≤ 6 L/min
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

SUS-05-Peds: Nitrous Avoided, Induction

Percentage of pediatric patients < 18 years old where nitrous oxide is avoided during induction of anesthesia.

Included: All pediatric patients who receive general anesthesia

Attribution: Provider(s) signed in between induction start and induction end.

SUS-05: Nitrous Avoided, Induction

Past 12 months, Pediatrics < 18y

SUS-03: Global Warming Footprint, Induction

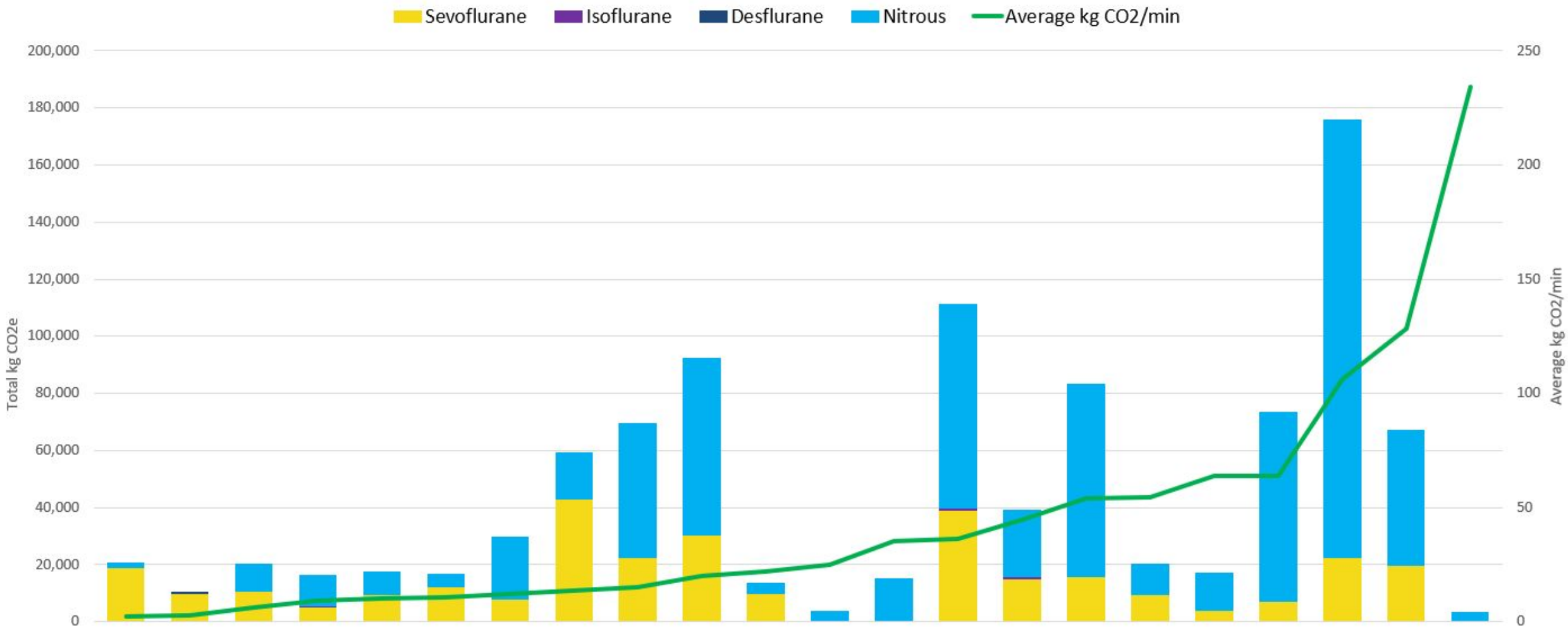
Informational Measure

Total carbon dioxide equivalents per induction for cases where halogenated agents and/or nitrous oxide was administered during the induction period of anesthesia

Inclusion: Patients with ETT or LMA who receive halogenated agents during maintenance of anesthesia

Total CO2 Equivalents by Agent, Induction

Past 12 months



SUS-02: Global Warming Footprint, Maintenance

Success:

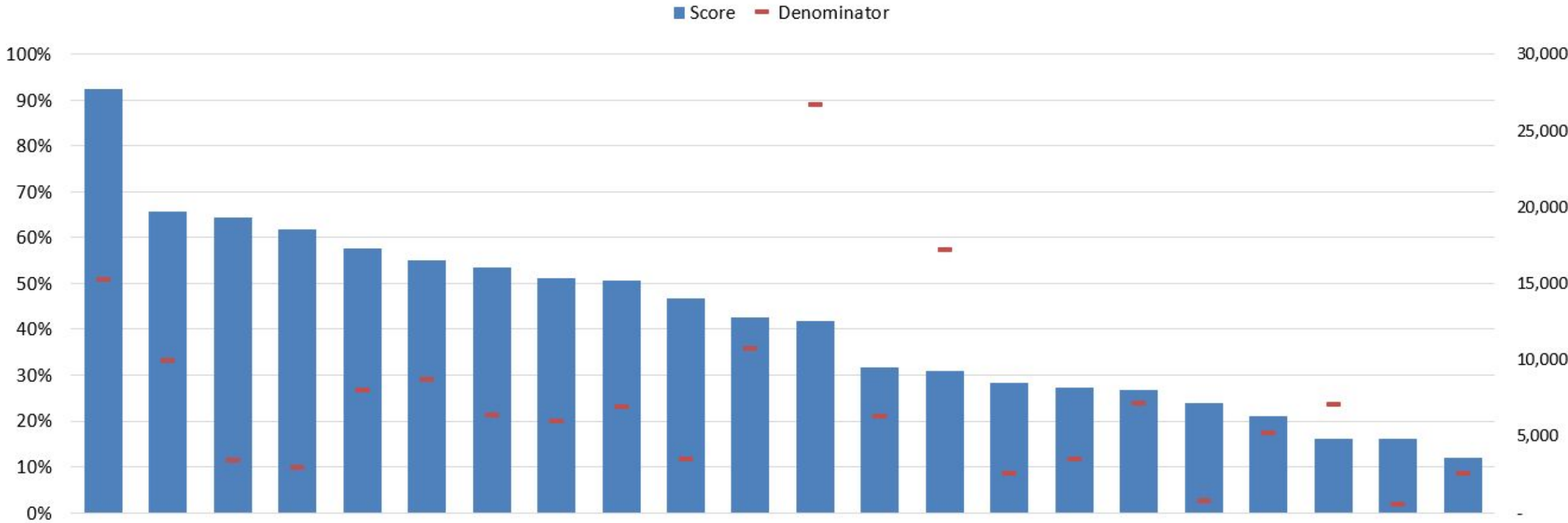
- Mean efficiency for the case is less than or equal to the CO2 equivalents of 2% sevoflurane at 2L FGF (**2.83 kg CO2/hr**) or…
- Total CO2 equivalents is less than or equal to 2.83 kg CO2

Inclusion: Patients with ETT or LMA who receive halogenated agents during maintenance of anesthesia

Attribution: Provider(s) signed in while patients are administered halogenated hydrocarbons, and/or nitrous oxide > 30 minutes from placement of the airway device to removal of the airway device

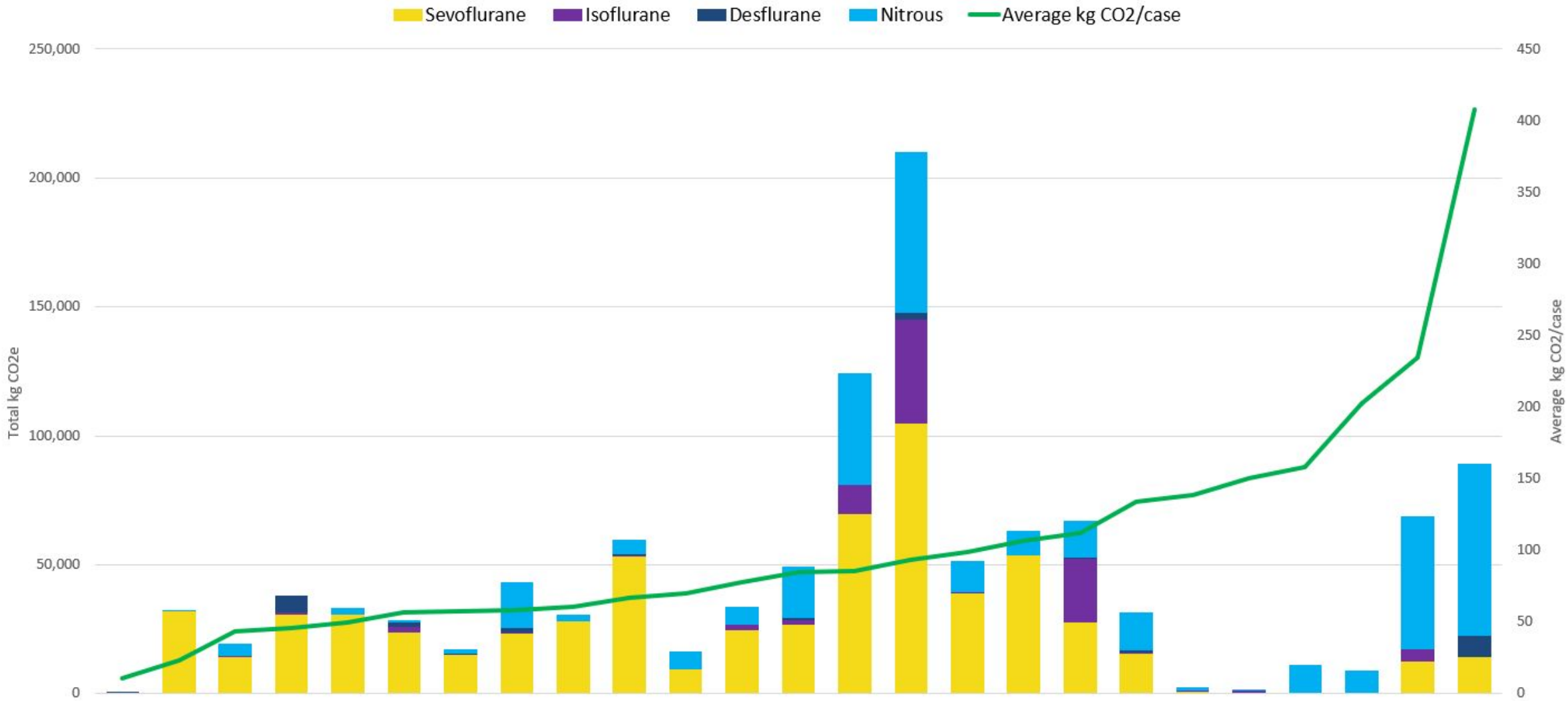
SUS-02: Global Warming Footprint, Maintenance

Past 12 months, Pediatrics < 18y



Total CO2 Equivalents by Agent, Maintenance

Past 12 months



Sustainability

The Sustainability Toolkit addresses the selection of anesthetic agents, management of fresh gas flows, and is an overview of the sustainability measures.

Introduction

Climate change has become one of the most important public health issues of our time. Anesthesia providers can be part of the solution. As anesthetic agents can be significant environmental pollutants, MPOG has developed a Sustainability Toolkit that provides guidance to reduce our global warming footprint during care of patients undergoing general anesthesia

Toolkit

- Sustainability Overview Presentation: A presentation for site champions to utilize for department education regarding sustainability best practices.
- MPOG Sustainability Measures: A presentation for site champions to introduce the sustainability measures to their department. Includes details regarding how measures are calculated with example case information.
- MPOG Sustainability Infographic – Practice Recommendations with MPOG Measures
- MPOG Sustainability Infographic – Perioperative Reminders
- MPOG Sustainability Infographic – Practice Recommendations with MPOG Measure Summaries Included

Educational Courses

Low Flow Anesthesia course offered by the American Society of Anesthesiology & Anesthesia Patient Safety Foundation:

- Course Link (ASA website login required to access)

Anesthesia Patient Safety Foundation Technology Education Initiative on Low-Flow Anesthesia:

- Course Link

Toolkit Available on our website!

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Participants from outside of MPOG are welcome to join our pediatric subcommittee!

Please contact Meridith if interested:

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Pediatric Program Manager | MPOG
meridith@med.umich.edu

Thank You!