Anesthesiology Performance Improvement and Reporting Exchange (ASPIRE)

Pediatric Subcommittee Meeting Minutes – December 1, 2025

Attendance:

Morgan Brown, Boston Children's	Tiffany Malenfant, MPOG
Kate Buehler, MPOG	Viviane Nasr, Boston Children's
Mei Calabio, MPOG	Katie O'Conor, Johns Hopkins
Joseph Cravero, Boston Children's	Diana O'Dell, MPOG
Rob Coleman, MPOG	Rebecca Pantis, MPOG
Anjali Dixit, Lucile Packard Children's*	Rishi Parikh, Johns Hopkins
Lucy Everett, Mass General Brigham	RJ Ramamurthi, Lucile Packard Children's*
Marla Ferschl, UCSF	Chuck Schrock, St. Louis Children's
Amber Franz, Seattle Children's	Nirav Shah, MPOG
Jackie Goatley, University of Michigan	Ruchika Sharma, University of Virginia
Kirsten Groody, University of Michigan	Frances Guida Smiatacz, MPOG
Ruchika Gupta, University of Michigan	Brady Still, UChicago Medicine
Bishr Haydar, University of Michigan	T. Wesley Templeton, Wake Forest
Michelle Huntington, Helen Devos Children's	Meridith Wade, MPOG
Rahul Koka, Johns Hopkins	Theodora Wingert, UCLA
Eva Lu-Boettcher, University of Wisconsin	

**Denotes participant from non-active MPOG Institution*

Start: 1500

Minutes from June 23, 2025 meeting approved - minutes and recording posted on the MPOG website for review

Announcements & General Updates

- **Pediatric participation in MPOG**
  - 31 pediatric hospitals now participate in MPOG, with additional sites in the pipeline (including Arkansas Children's, CHOP, and Children's National).
  - The MPOG database now contains 3.6 million pediatric anesthetic cases
- **Expanded data extract to full hospital admission**
  - MPOG is piloting collection of **full acute-care encounter data** (floor/ICU flow sheets, ADT, meds, microbiology, etc.) beyond the OR.
  - Two pathways:
    - **NIH-funded research project** (Colquhoun, Sun) building Clarity-based acute-care extracts.
    - **Michigan operational pilot** at Michigan Medicine, U of M Health–West, U of M Health-Sparrow, and Trinity–Ann Arbor.

- Lessons from these projects will inform how to scale **full-encounter** data collection to additional MPOG sites.

MPOG Pediatric Research Update

PCRC 311 - January 12, 2026 @ 10am Eastern

Association of intraoperative hypotension and postoperative acute kidney injury in children undergoing noncardiac surgery

- Primary Author: Jurgen de Graaff, Weill Cornell
- Anyone from an active MPOG site is invited to attend.
- Credit available for providers who participate
- *Email mpog-research@med.umich.edu if interested in attending*

MPOG Pediatric Research in Progress

- PCRC 302 - Practice patterns of inotropic medication use in pediatric cardiac surgery
- PCRC 257 - Neonatal airway management practices: An analysis from the Multicenter Perioperative Outcomes Group
- PCRC 254 - Pediatric Hemodynamic Management in Anesthesia: A Multicenter Analysis Using MPOG to Understand Practice Variability and Outcome
- PCRC 192 - Reference values for post-induction hemodynamic measures in pediatric patients undergoing general anesthesia for non-cardiac procedures
- PCRC 145 - Prophylaxis Practice in Pediatric PONV: A Retrospective Observational Study Using the MPOG Database

Recent Publications from MPOG Peds

- Congratulations to Dr. Yao and Team on their recent publication in Pediatric Anesthesia!
    - *Practice variation in intraoperative management of pediatric organ donation after brain death: A retrospective observational multicenter perioperative outcomes group study*

Leadership & Upcoming Meetings

- Leadership transition
    - Dr Vikas O'Reilly-Shah rotates off chair role Dec 2025; Dr. Morgan Brown assumes chair on January 1, 2026.
    - Nominations are open for a two-year Vice-Chair term (2026-28). Role Description
    - Email Morgan (Morgan.Brown@childrens.harvard.edu) or Meridith (meridith@med.umich.edu) if interested in the Vice-Chair role
- Plans for Spring and Fall 2026 pediatric subcommittee meetings.
- MPOG Retreat at ASA (Friday, October 16) will again provide QI/research updates and pediatric networking; virtual option available

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June 2025 Meeting Recap

Peds Committee voted to:

- **Modify NMB-03, initial NMB dosing – *Complete!***
    - Exclude cases where initial NMB dose → extubation was > 180 minutes

    - Exclude emergency cases
    - *Did not apply exclusion for cases with pyloromyotomy and short gut. Logic needs refinement.*
- **Retire TRAN-04, Overtransfusion – *Complete!***
- **Modify TRAN-03, Transfusion vigilance – *In Progress***
    - Include cases with *any PRBC transfusion* to catch all clinically significant events. (removed 15 mL/kg rule)
    - After additional case review, decided to also exclude emergent cases
    - Allow multiple administration of PRBC within 60 minutes without requiring additional lab check

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2026 Measures Requiring Formal Review

- Four pediatric measures are scheduled for literature review and update:
    1. FLUID-02 – Minimizing Colloid Use
    2. PAIN-01 – Multimodal Analgesia
    3. SUS-06 – Low Fresh Gas Flow, Induction
    4. TEMP-04 – Intraoperative Normothermia
- **Main reviewers** must practice at an **active MPOG site** and will use an MPOG review template.
- Contributions will be **recognized** on the MPOG website and at the annual meeting.
- Volunteers are encouraged, especially where there is strong clinical interest.

SUS-05 – Nitrous Oxide Avoided During Induction

- **Background**: SUS-05 was previously narrowed to focus on **inhalational inductions** (rather than all GA cases).
- **New proposal**: Question raised (Dr. Bob Brustowicz, Boston Children's):
    - Should cases with **≤2 minutes of nitrous use** (e.g., for IV placement) be excluded from the metric?
- **Discussion**
    - *Lucy Everett (MGH):* CHOP data showed no change in induction quality/duration after nitrous elimination. Recommend keeping the metric simple and using SUS-05 as a "minimization" goal rather than adding time-based exclusions.
    - *Eva Lu-Boettcher (University of Wisconsin) [via chat]:* I'd also leave it as is, not using nitrous is a metric we are interested in. Not just shortened use of metric
    - *Bishr Haydar (University of Michigan) [via chat]:* I agree. The long term consequences of that short term nitrous is still significant to the environment
- **Decision**
    - **Will not add nitrous time-based exclusion**
    - SUS-05 will remain focused on avoiding nitrous during inhalational induction without a "≤2-minute" carve-out.
    - Group acknowledged that QI metrics are not meant to be 100% and that some clinically appropriate exceptions will occur.

PONV-04-Peds – Planned Updates

- Measure was reviewed in November 2024. Committee proposed the following modifications:

    - **Broaden age range** to **include infants**, based on preliminary data from MPOG coordinating center showing reported PONV in this group.
    - **Opioid risk factor:** change from "long-acting intraop opioid only" to "any intraoperative opioid."
    - **Success criteria** to mirror new 2025 consensus guidelines:
        - **0 risk factors:** ≥1 prophylactic antiemetic.
        - **1–2 risk factors:** ≥2 prophylactic antiemetics.
        - **≥3 risk factors:** ≥2 prophylactic antiemetics plus other risk mitigation strategies.
    - Add intraop anticholinesterase administration as a PONV risk factor.
    - **Count IV hydrocortisone** given intraoperatively as an accepted prophylactic agent
- **Discussion:**
    - *Lucy Everett (MGH):* Do the guidelines consider propofol infusion to be an antiemetic in the same way that MPOG does?
        - *Chuck Schrock (WashU) [via chat]:* So long as propofol only TIVA for imaging studies does not require ondansetron...
    - *Nirav Shah (MPOG QI Director):* Currently any propofol infusion dose counts as prophylaxis. Essentially there's no minimum. At the MPOG retreat, when Dr Gan was talking, he casually mentioned that he thought the benefit was from pure TIVA and removing the inhalational agent was where the primary benefit was but I don't know if that's borne out in the guidelines. I think we just have to look into that a little bit more and also get some feedback from the group about what's practical.
        - *Joe Cravero (Boston Children's):* I thought what he said was it has to be running at rates of 100 mics per kilo per minute, based on the literature, to really be of any effect. So I don't know, I didn't hear him say it had to be pure TIVA, but there was a dose that was significant in the background. And I think he was discounting the 25 mics per kilo, or 50 mics per kilo that some people use, or I think urban legend has been that it's effective, and I think he was discounting that. I think this is a appropriate thing to take a close look at for sure.
    - *Kate Buehler (MPOG):* Yeah, they don't specifically specify in the new guidelines. They just say both propofol TIVA and sub hypnotic dose propofol infusion are effective in combination with other antiemetics. So I think we're going to have to figure out what that equates to. I don't think it matches our current definition that we have in the measure.
        - *Morgan Brown (Boston Children's):* I think when he was speaking, obviously he was specifically targeting the adult populations. Because, at least by some hypnotic doses, I would take that to be any dose. We can all look into that, and that is a good reminder to go find that paper and actually spend some time reviewing that in detail.
    - *RJ Ramamurthi (Stanford)[via chat]:* If anticholinesterase isn't a risk factor, why should we recommend use of sugammadex in this context?
        - *Meridith Wade (MPOG):* in the current measure, it's not coded as a as a risk factor, and I can't remember why we did not include that, but we plan on adding it moving forward.
    - *Morgan Brown (Boston Children's):* Yes, and that will probably be another good study to do at some point is, have we dropped PONV rates? Because we use sugammadex, I feel like my patients are still vomiting, so I don't know, but it will be interesting to see.

I'm always surprised to review that metric myself and find patients who didn't know had nausea and vomiting.

- **Decision**
    - Meridith, Kate, Nirav, and colleagues will:
        - Review the new guidelines and key studies (including Dr. Gan's work).
        - Propose a **revised, clinically meaningful definition** of propofol TIVA/sub hypnotic infusion for PONV-04.
        - Aim to implement the core PONV-04 changes by the next meeting (mid-2026).

2026 Measures Requiring Formal Review

- Four pediatric measures are scheduled for literature review and update:
    5. FLUID-02 – Minimizing Colloid Use
    6. PAIN-01 – Multimodal Analgesia
    7. SUS-06 – Low Fresh Gas Flow, Induction
    8. TEMP-04 – Intraoperative Normothermia
- **Main reviewers** must practice at an **active MPOG site** and will use an MPOG review template.
- Contributions will be **recognized** on the MPOG website and at the annual meeting.
- Volunteers are encouraged, especially where there is strong clinical interest.

Measure Development – Patient Blood Management (PBM)

- Work has begun on AKI-03-C, the **first pediatric cardiac-specific metric** (CPB cases) using **KDIGO** AKI criteria, including neonates.
- PBM emerged as a priority topic at the June meeting and MPOG Retreat.
- **Potential PBM metrics discussed**
    - **Preoperative anemia prevalence**
        - % of patients with pre-op anemia (likely within a **high-risk cohort**).
        - Could support development of **pre-op optimization pathways**.
    - **Outcome metric: change in Hgb (pre-op to post-op)**
        - Could identify gross over/under transfusion, but requires careful framing and guardrails.
    - **Informational process metrics**
        - % of eligible cases receiving **TXA**.
        - % of cases transfused intraoperatively, stratified by case type.
- **Discussion:**
    - *Joe Cravero (Boston Children's):* The perioperative anemia metric is worth exploring—it's likely more common than appreciated. Outcome-based measures (like change in hemoglobin) are harder to define and would require careful framing to avoid mislabeling appropriate care. Looking at extreme post-op hemoglobin values could highlight over- or under-transfusion but must be approached cautiously. TXA use is nearly standard in many high-risk cases, so a metric showing whether appropriate cases received TXA could be useful. Overall, pre-op anemia and TXA-use metrics seem most straightforward; outcome metrics would need more work.
        - *Morgan Brown (Boston Children's):* A key question is whether we should limit PBM metrics to **high-risk non-cardiac cases** rather than all children, since many routine cases won't have relevant labs or anemia issues. Potential groups include spine, craniosynostosis, and other major surgeries, similar to how adult PBM metrics

target joint replacement. Developing such a cohort could support multiple related measures.

- *Morgan Brown (Boston Children's):* Asked whether defining a high-risk non-cardiac cohort would help focus PBM efforts and reduce noise.
    - *Nirav Shah (MPOG QI Director):* Agreed that stratifying by procedure type is essential; this mirrors adult PBM work, where surgeon engagement depends on having service-specific data. Without case-type stratification, performance signals get diluted and workflow change becomes much harder.
    - *Rahul Koka (Johns Hopkins) [via chat]:* Supported high-risk case stratification.
    - *Morgan Brown (Boston Children's):* Noted that defining "high-risk major non-cardiac cases" will rely partly on expert opinion.
    - *Nirav Shah (MPOG QI Director):* Proposed starting with a few procedure types—similar to adults (e.g., major spine, major abdominal surgery). Some phenotypes already exist, which would speed implementation; others may require new phenotype development and more time.
    - *Morgan Brown (Boston Children's):* Recognized the complexity but agreed this approach makes sense.
    - *Nirav Shah (MPOG QI Director):* Suggested leveraging existing phenotypes and focusing on larger case groups (e.g., spine, craniofacial, major GI surgeries) rather than rare edge cases.
- *Ruchika Gupta (University of Michigan) [via chat]:* Suggested considering neonates as a subgroup.
    - *Morgan Brown (Boston Children's):* Neonates are easy to define, but many are transfused pre-op, making anemia assessment less meaningful. Still, it's worth exploring as part of the larger strategy. Overall, there is strong interest in PBM metrics, and this gives the group a starting point.
- *Joe Cravero (Boston Children's):* Susan Goobie's work shows that identifying surgeries with high transfusion rates is feasible. Across MPOG, it would be valuable to compare transfusion rates in **anemic vs non-anemic** children in these high-risk surgeries. If pre-op anemia leads to more transfusions, it strengthens the case for **pre-op anemia optimization**.
    - *Morgan Brown (Boston Children's):* Agreed; transfusion almost always indicates a major case, which can help define the target cohort.
- *Rishi Parikh (Johns Hopkins):* Noted that target hemoglobin varies by case type, adding complexity.
    - *Morgan Brown (Boston Children's):* Yes—variation in comorbidities and transfusion thresholds makes outcome-based over-transfusion metrics complicated, especially since clinicians often "top off" small volumes to avoid post-op anemia from blood draws or ongoing losses. More refinement will be needed, but there is clear enthusiasm for PBM measure development.

- **Next steps**: Define a **manageable high-risk case cohort**. Explore:
    - Pre-op anemia prevalence.
    - Relationship between pre-op anemia and intraop transfusion.
    - TXA use patterns within these cohorts.

2026 Measure Development – Postoperative Pain

- **Initial concepts**

    - % of cases receiving opioids in PACU.
    - % of cases with **first PACU pain score above a threshold** (e.g., >4).
    - **Response-to-treatment** metric – e.g., ≥X-point reduction in pain score.
    - Focusing on **extreme pain events** rather than all scores.
- **Discussion:**
    - *Chuck Schrock (WashU) [via chat]:* Suggested comparing **PACU vs OR opioid (OME) ratios** to identify under-dosing patterns.
        - *Morgan Brown (Boston Children's):* Asked whether certain **procedure groups** should be the focus initially to avoid confounding issues like emergence delirium—for example, tonsil/adenoid procedures or other standardized surgeries.
    - *Rishi Parikh (Johns Hopkins):* Proposed that **repeat opioid dosing in PACU** could indicate poor pain control.
    - *Joe Cravero (Boston Children's):* Emphasized that continuous pain scores are unreliable across centers. Recommended **categorizing pain** instead—e.g., defining "low pain" (max ≤3–4) vs "high pain" (8–10). This avoids overinterpreting minor score differences and better reflects real variation in outcomes. Also noted that opioid-sparing approaches make an objective PACU pain measure even more important, but thresholds must be clearly defined. The metric should allow for expected opioid use while still identifying cases with significant, persistent pain.
    - *Bishr Haydar (University of Michigan) [via chat]:* Asked whether PACU nurses are individually identifiable, as this may help detect variation. Noted that regional anesthesia complicates interpretation but should not prevent metric development.
        - *Morgan Brown (Boston Children's):* Nurse-level attribution is likely impractical given staffing volume. Regional anesthesia is a confounder but manageable. Proposed that for the next meeting, the Coordinating Center pull data on the **frequency of severe PACU pain (e.g., ≥7)** to help determine whether a high-pain–focused metric is feasible and which patient groups are most affected.
    - *Joe Cravero (Boston Children's):* Recommended starting with a **single procedure group** that is common, known for postoperative pain variability, and already phenotyped—such as tonsil/adenoidectomy—or potentially the high-risk non-cardiac cohort being discussed for PBM. Starting small may allow the committee to pilot and refine a workable pain metric

- **Decision**
    - Coordinating Center will:
        - Pull initial data on the **proportion of patients with PACU pain scores ≥7**.
        - Stratify by procedure, opioid use, and regional anesthesia where possible.
    - Results will guide:
        - Choice of **index procedure group(s)**.
        - Final thresholds for "severe pain" and success definitions.

Wrap Up

- Members interested in: **Vice Chair role**, Serving as **main reviewers** for 2026 measure reviews, or Contributing to PBM or pain metric should contact **Morgan Brown**, **Meridith Wade**, or the MPOG Coordinating Center.

- THANK YOU Dr. O'Reilly-Shah for your many contributions over the past few years as subcommittee Chair and for your continued participation as a member of the MPOG pediatric subcommittee!

Meeting Concluded @ 1556

Full Transcript

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Morgan Brown (Boston Children's):
We'll start with a few announcements, updates, talk a little bit about can pediatric plans that we have, and then we'll go and look at the new measures that we have started discussing. So this is a map of all the MPOG sites. And you know, we still don't have as many as the adult group, but we are growing. There's 31 pediatric hospitals in MPOG. And on the next slide, Meridith nicely outlined all the new sites that are either in the application or in a legal or regulatory phase or actually onboarding. And so welcome to anyone from those sites who are here, and we're happy to have you. And I think it's great you can see we have some smaller places, some independent places, and then it's great to see some of the bigger, freestanding institutions joining with Arkansas Children's Hospital of Philadelphia and Children's National all in the process. So great news for both the quality work that we're all doing, but also for anybody who is interested in doing any sort of research, there'll be lots of opportunities for all sorts of projects. Next slide, and I love this slide, just showing how many pediatric patients there are. We're always talking about how MPOG is predominantly an adult database, but there's 3.6 million pediatric cases in it, which is really the biggest repository of data on children's anesthetics. And so, again, I'm happy to have everybody here, and hopefully everyone is enthusiastic about trying to use this data to all improve the care of our pediatric patients. Next slide. Other news from MPOG, which is super exciting, is that they are going to take on sort of the probably massive amount of data that it's going to require, but is going to expand how much data that we are collecting now, we collect our intraoperative data medications and much of the billing and discharge data, but and we've been collecting a lot of laboratory administrative data, but they are going to start collecting data up until hospital discharge, which is going to enable us to hopefully look at other outcomes for quality improvement. But again, it's just going to be a rich source of data for projects or things that people are interested in doing so that is coming and excited about that. Marla going to go help with, Oh, someone is unmuted, if you just want to check your phones in terms of the research aspect. Just to mention, so there's projects that are presented through the PCRC, which is a committee of people who review projects that are upcoming, and the goal of the projects is really trying to help create better projects. And many people go review this as a main reviewer, but then everyone is allowed to contribute information and ideas and thoughts about how to make any sort of research more fruitful for the authors, and they have a really nice process that if you participate, you can become forget exactly the terminology, but there's a way to get some credit for the effort that you put into this. And so in January, it's exciting that Jurgen at well Cornell was going to be presenting on his project on intraoperative hypotension and postoperative AKI and children undergoing non cardiac surgery. This is great. There's, you know, it's a low frequency event, but we have so many patients that it's hopefully possible project. And so if you are interested, please email mpog-research@med.umich.edu, if you would like to attend. And it's great discussion, usually, about projects, and it's just exciting to have more pediatric presentations at that meeting.

Also wanted to highlight recent publication using MPOG data, there is a it's published in pediatric anesthesia, and it's looking at Intraoperative management of pediatric organ donation after brain

death, which is very interesting. Obviously, it's not something that people are thinking of often, but it is an important part of our care, as how we take care of our donors is going to be how those organs perform in the recipients. So that's a great paper. Congratulations to those authors and take a look at it if you haven't seen it.

Also, just to mention some of the other things that are ongoing, there's a project from some authors at Brigham and Women's I'm involved with. This one, looking at inotropic medication use in pediatric cardiac surgery. This one the data they are pulling for us now. Dr Stein here at Boston Children's, who's done a lot of work on airways, is specifically looking at neonatal airway management practices, and she has been busy reviewing this data, and hopefully, then the next six months or year, we're going to see a very nice publication out of that data from her, a group of people based out of Seattle Children's, Dr. O'Reilly-Shah also Dr. Templeton, are looking at some of the hemodynamics in patients who are undergoing anesthesia, and they, I guess, have their study data. And so that will be also exciting to see what comes from that, also from Weill Cornell, they are looking at reference values for post hemodynamic, post induction, hemodynamic measures in pediatric patients for non cardiac surgery. And that is also going to be exciting. I'm sure that will be a follow up on some of on that prior paper looking at blood pressure, normal values in children under anesthesia. And then lastly, for Mass General Hospital, Dr. Everett is looking at PONV which is also really interesting. I will be very excited to read that manuscript, just because we really have so little current data on what is going on with pediatric pond, and it's definitely a daily question that runs through my mind. So it'll be interesting to see those results.

The next thing we wanted to talk about was just reviewing what we discussed at our last meeting, which is now back in June, we voted to modify our NMB-03 measure and so we've excluded cases where the duration between first NMB dose and extubation is over 180 minutes, because people felt like the it didn't make clinical sense. You may have just given one for induction, and then you may not reverse a patient for a very if you give any for a very long period of time. And then we also excluded emergency cases. And there was some discussion about trying to exclude cases, some specific cases. But as everyone knows, everything is always more complicated than you first want it to be, and so trying to exclude certain cases still needs a little bit of work. We also reviewed our transfusion 04 our over transfusion metric, and we decided that we would retire that it didn't really make clinical sense to people. And we decided to also modify TRAN-03 the vigilance. And so we've where we've at with that is we've been reviewing some specific cases, trying to see why patients may have might why they might actually fail the metric. And so we've decided to include cases with any PRBC transfusion to collect all the clinically significant events and not just have the 15 mils per kilo rule. And then we've also decided we're going to try to remove emergent cases and allow multiple administrations of Packed cells within 60 minutes without requiring an additional lab check. Since it's pretty common for people to, for example, start an infusion and give a small bolus at this at a similar time frame that kind of thing. So because people were sometimes failing this, when really people probably would not be checking another lab value yet. So that will be hopefully updated and ready to go at our next committee meeting. Okay? That any questions anyone had about any of those where I'm happy to answer to just, you know, either put your hand up or answer in the put something in the chat.

Nirav Shah (MPOG QI Director) Actually, it's not a question, but I do have a comment and thank you so much for sharing some of our programs or plans to expand the extract to essentially include the entire acute care encounter. It's super exciting for us. We think it'll unlock just a lot of potential projects on the quality and research side and developing outcome measures and understanding what happens

after the patient leaves the pacu. So super excited about that. I The one thing I wanted to add Morgan is that in 2026 it's hap it's happening in essentially two specific pathways. One is via an NIH funded project. That's what Douglas Calhoun and Eric sun where they're essentially developing clarity extracts to include acute care data like floor and ICU data, admit, discharge, transfer, medications, microbiology, things like that. And so that's one pathway, is this research focused pathway for a specific research project, and the other is via a pilot grant that we're doing in the state of Michigan, where via four hospitals. So Michigan medicine, U of M health-West, Sparrow and Trinity-Ann Arbor were collecting this, this data, so this floor in ICU data, including things like flow sheet data, medications, orders via like this more operational pathway. And so the thought is that we would learn from those two projects started this past year and continuing next year, and based on what we learn in those projects, we would have a pathway to expand that across the rest of the the rest of empire. And so still, like early days, we're super, super excited about it, but we'll probably know more at this time next year about how other sites across MPOG, you know, would be able to participate in it.

Morgan Brown (Boston Children's) 12:32
Yeah, no, that's great. Thanks, Nirav for all that extra clarity and yeah, it's as we can all imagine, the process of trying to collect large amounts of data from multiple institutions has to be done slowly. Yeah, for sure. For sure. Yeah, no, that's great. Great. Thank you. And then we got a request, and so I wanted to bring it to the group for discussion. We recently reviewed our SUS-05 measure minimizing nitrous during induction, and we voted to modify the inclusion criteria to avoid nitrous during cases with inhalational induction, instead of including all general anesthesia cases. And so an additional proposal from Dr Brustowitz here at Boston Children's, he had contacted us and asked, you know if you used nitrous for two minutes or less. Should we consider adding that as a further exclusion criteria? Because some patients you may be, you know, just doing it to place an IV, I think some of the time, because we're trying to clarify only inhalational inductions, those patients would not make it into the cohort. But it may be, at times, a little bit difficult to tell. But I just wanted to see if anyone had any thoughts or opinions on whether they would be interested in adding in this addition, an additional exclusion criteria of a time requirement, essentially, of nitrous, or did we want to stick with an idea of having no nitrous at all?

Lucy Everett (MGH): I was just going to say Morgan, you know, CHOP did do a big QA study on the elimination of nitrous during inhalation inductions, and said that they found no. Difference in the quality or duration of the induction in children. And I don't know that that means, like, I guess I would leave it simple and just say, you know, it is what it is. You probably are going to use it, you know, you're not going to be 100% without nitrous. And it's just sort of a goal to minimize the use of it and so, you know, I wouldn't like build that extra time in.

Morgan Brown (Boston Children's):
Yep, no, I think that that's quite fair.

> **Eva Lu-Boettcher (UWisconsin) [via chat]:** I'd also leave it as is, not using nitrous is a metric we are interested in; not just shortened use of metric.
>
> **Bishr Haydar (University of Michigan) [via chat]:** I agree. The long term consequences of that short term nitrous is still significant to the environment

Morgan Brown (Boston Children's)

Okay, unless I hear any other opinions, I think we will just stick with our current exclusion criteria. And as Lucy mentioned, you know the it's very difficult to not want to get 100% on everything in our lives, but QI metrics are not something that we should be getting 100% on otherwise, I think we're probably not really actually doing things right. And so it is. It is hard though, to sometimes look at these and realize that you could have done better and but some of them are clinically not indicated, too. So, all right, that sounds great. Thank you for everybody for giving me your opinions on that.

MPOG Pediatric 2026 Plans

And then let's start to talk a little bit about our pediatric plans. So as I mentioned earlier, I will be starting the chair role in January. If you are at an active MPOG site and you would like to join as the vice chair, please email Meridith or me, or both. We'd be happy to have you. It's not, you know, an incredible everything takes some time, but it's not an incredible amount of time. And obviously, I think there's just huge potential here at MPOG, and I hope that we can have someone be interested in continuing all the good work that's been done before me on this, and you need to build all the pediatric metrics. So if you are interested, just please let us know.

Our next meetings We are going to have a spring and a fall meeting. And I also want to highlight there is an MPOG Retreat at ASA, if you haven't heard about it or been to it, it is a very nice day that is spent talking about all sorts of things, both quality and research. MPOG people, the leadership is there and also can provide a lot of the updates about what's going on. It does, unfortunately for us, conflict with SPA, but it, you know, potentially, you may decide at some point that this would be an interesting meeting, and it is going to be, I guess, on Friday, October 16. And if you can come, or, you know, for some reason you can't come, they have, at least in the past, been able to offer some remote viewing too. So it is a nice time, though, to actually connect with some of these other MPOG sites. And we were informally getting together at that meeting just to have some discussions in person with everyone, rather than just having everything on Zoom Next slide. So there are four. So if you don't recall, and park has a process by which you know these metrics are not just static. The idea is that we need to provide continual review of these metrics to make sure that they're still pertinent and best practices based on any new data that's out there. So we have four measures that are up for review this year. In order to be the main reviewer, you need to practice at an active MPOG site. And if you would be interested, and I would encourage you to really consider it if it's an either an area that is maybe close to your own personal interests, or something that you actually just would like to, you know, read up on and make sure that you're actually current. It's a great opportunity to just sit and review what has actually been written in the last few years. So the first one is minimizing colloid use and pediatrics. Yes, and I don't know what data is out there about that one. So that's interesting. There's our multimodal analgesia. PAIN-01, the sustainability, low fresh gas flow at pediatric induction is also up for review, SUS-06. And then the normothermia intraoperatively, TEMP-04 as well. But yeah, these are a great chance to review things. The there is a template that is provided to help you be able to do this, and MPOG is trying its best to recognize the work that people put into this. You can see that there they do list people on websites. And I know it's always mentioned at the annual meeting all the people who've actually contributed their time to doing these. And, yeah, it's a great, a great chance to be able to, I just think, spend some time actually looking at, you know, often, what we consider to be pretty basic practices. But you know is it really actually was, what if what you're doing and what your biases were for when you train for example are actually still supported by the literature?

Meridith Wade (MPOG): So back in November, we reviewed PONV-04 and we were waiting to make any changes until the new consensus guidelines came out this year, and I believe those are published or

in press or about to be so these are the changes that were kind of voted on by this committee, and kind of how they align with what the guidelines say. So we had said that we wanted to kind of open up the measure to include infants as well.

We did a preliminary analysis of the data here at the Coordinating Center, and there was some report of PONV in that age group. So the committee agreed to kind of broaden that. We're also going to update the opioid risk factor definition. Right now, we only consider it a risk factor if it's a long acting opioid given intra op. So now it'll be any any opioid. And then the success criteria, I think, is the biggest update, which is instead of a one to one ratio, risk factor to prophylactic antiemetic, the new guidelines state that if you have zero risk factors, patients should get at least one. If they have one to two risk factors, they should get two, and then if they have three, they should still get two plus other risk mitigation. Or do you know other things that they can other than just medication. We currently don't consider anticholinesterases as a risk factor, so we voted to add that. And then there was some discussion at the last meeting in November about adding hydrocortisone IV intra op. I didn't see that in in the guidelines, but the committee kind of had discussed there was consensus to add it. So I think we were going to go ahead and do that, unless there's any objections. And this is kind of the, I know they have a graphic in the previous guidelines. I just kind of took this from the new guidelines to show what the changes are. So hopefully by I want to say the next meeting, this will be done, at least by June, is my goal.

Lucy Everett (MGH): One of the questions that came up, actually, in the reviewer questions to our work, was the matching of the propofol T or counting propofol TIVA as an antiemetic. And I don't, I didn't, haven't looked back at the guidelines yet, but, but does that match? Does do? Does how MPOG is addressing it or considering it match how the guidelines? Does the guidelines consider it to be an antiemetic in the same way that MPOG does? Do? You know?

> **Chuck Schrock (WashU) [via chat]:** So long as propofol only TIVA for imaging studies does not require ondansetron...

Meridith Wade (MPOG): I believe so. But I think I remember at the mpog retreat, when Dr Gann was presenting, thinking that we need to revisit how we define that. I think it's any correct me if I'm wrong, Kate or Nirav.

Nirav Shah (MPOG QI Director): well, yeah, yeah, you know you're correct. Yeah. Any propofol infusion dose. Essentially there's no minimum where, and that's how you know that aligned with the previous guidelines. I and I have to read these new guidelines to see what they say. But you're absolutely right, Meridith. At the MPOG retreat, when Dr Gan was talking, he was like, well, from he was kind of casually mentioned that he thought the benefit was from pure TV and removing the inhalational agent. That's where the primary benefit of an antiemetic perspective, but I don't know if that's borne out in the guidelines, and so I think we just have to look into that a little bit more, in a little more detail, and also get some feedback from the group about what's practical, yeah,

Joe Cravero (Boston Children's): no, I just, I think, obviously you're correct. I thought what he said was it has to be running at rates of 102 50 mics per kilo per minute, based on the literature, to really be of any effect. So I don't know, I didn't hear him say it had to be pure Teva, but there was a dose that was significant in the background. And I think he was discounting the 25 mics per kilo, or 50 mics per kilo that some people use, or I think urban legend has been that it's effective, and I think he was discounting that. So I agree that. I think this is a appropriate thing to take a close look at for sure.

Kate Buehler (MPOG): Yeah, they don't specifically specify in the new guidelines. They just say both propofol TIVA and subhypnotic dose propofol infusion are effective in combination with other anti medics. So I think we're going to have to figure out what that equates to. I don't think it matches our current definition that we have in the measure, which is any confusion at all for any duration of time. But you're right. He did specify something more specific, based on a study in at the actual imposter trait. So we might have to get to the bottom of that.

Morgan Brown (Boston Children's):
Yeah, although I think when he was speaking, obviously he was specifically targeting the adult populations. Because, at least by some hypnotic doses, I would take that to be any dose. Per se, I'm slightly biased, because I, once upon a time, did a small study on this, and to my surprise, thought it actually worked. When I had come here, I thought this was kind of crazy, but I don't know. Anyhow, yes, well, with that we can all look into that, and that is a good reminder to go find that paper and actually spend some time reviewing that in detail.

> **RJ Rammamurthi (Stanford)[via chat]:** Is anticholine -esterase isn't a risk factor, why should we recommend use of suggammadex in this context
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> **Meridith Wade (MPOG):** in the current measure, it's not coded as a as a risk factor, and I can't remember why we did not include that, but we plan on adding it moving forward.

Morgan Brown (Boston Children's):
Yes, and that will probably be another good study to do at some point is, have we dropped po and B rates? Because we use the gamma x, I feel like my patients are still vomiting, so I don't know, but it will be interesting to see. Anyhow, I'm always surprised to review that metric myself and find patients who didn't know actually had nausea and vomiting.

2026 Measure Plans: Patient Blood Management

Morgan Brown (Boston Children's):
All right, so let's get to talking a little bit about some of these measures, Meridith and so we have been working on the our first cardiac specific metric. So we our first task was trying to identify these patients better amongst all the other cardiac patients, because we really wanted to target our patients who are on cardiac bypass. And then we used pretty standard kid go criteria to this. We did do some various investigations about, you know, can you really apply this in neonatal populations, etc. And it does seem like, although there are varying opinions, one can use kid go in neonates, there have also been discussions about implementing a metric on patient blood management, which I think we've had. Some we started the discussion back in June, and then we had some at our retreat, at the mpog retreat, and hopefully that will be coming. And then also, the consensus, at least at the last meeting, was that people would be most interested in a metric looking at postoperative pain, trying to get a little bit of a outcome based metric. So when we talked, and I'm I'd like input from this group too. I know some of you were at some of these meetings, but some people were not when we started talking about patient blood management. We had a nice, interesting discussion. Dr Goobey from who's also here in Boston, who's been involved a lot in patient blood management, came and was adding her thoughts about different metrics as well. But we talked a little bit about having a measure where we looked at the percentage of cases that had pre operative anemia, the, you know, the there were sort of advantages to that in that, you know, it's a quite a bit of interest to those people who are In the blood management

area, how many patients are actually anemic? There was some discussion about concerns about how many patients actually have preoperative lab work done in the pediatric patients, and what we would do with that. But that is one possible direction we could go. The second one is looking a little bit more at an outcome. So looking at cases where there was a change between the pre op hemoglobin and the post op hemoglobin, and we'd have to decide what kind of change was meaningful. And then also we talked about looking just at informational metrics, so things just trying to inform us a little bit better about either our own practices, but also at what is happening across the country, looking at percentage of cases who are receiving TXA, for example, because that's considered part of the package that most people for high risk surgical cases that are high risk of bleeding are now giving some dose of TXA, or looking at the percentage of cases that receive a back red cell administration intraoperatively. And again, we would have to focus those two metrics more on certain case types. And it's clearly there's going to be a lot of cases that we would never want to give TXA or never give PAC cells to. But right now, I don't even think we brought we don't even know too much about who is receiving these things, at least in pediatric centers. What does everyone sort of think about these different measures? Specific interest in any of these? Definitely not interested in any of them. I

Joe Cravero (Boston Children's): Morgan, I would just say offhand that the perioperative anemia question is kind of interesting. There's probably a decent amount of interest in this and that. I think it's probably not appreciated as much as it actually occurs. And there may be something to get from that. The outcome part, I find a little difficult, and that, boy, there'd have to be a lot of work done as to, what are you talking about and what, what exactly is this aiming for. I do think, I mean, the one thing that obviously Susan and the rest of us have been looking at here is where kids are transfused, and the first post op hemoglobin is extremely high or extremely low, if that's what she's talking about. That would maybe be kind of a little bit interesting to give people an idea of, maybe where they're grossly over transfusing or grossly under transfusing, but I think it would need to be very much couched with what a lot of caution about whether what is right and wrong or indicated not indicated. And I think the TxA stuff is almost at the point of being standard and indicated. Therefore there might be cases where different institutions would want to know that TxA was actually given because it is part of our at least at our place, as part of our protocols, etc. And if people were not giving TxA in cases where we normally think it's appropriate, least at our institution, I it would be helpful to know that. So I think one in three are kind of easy and could be helpful. I think number two, the outcome measure, could be really interesting. I think just a lot of work need to be done to communicate about it and to set parameters where people generally agree that there is
an importance to the outcome that was found.

Morgan Brown (Boston Children's):
Yeah, that's good feedback. I think one of the questions is, say, if we were to look at preoperative anemia, do we, you know, do we or the TxA, do we, rather than trying to include all children, knowing that kids who come for all the enormous amount of imaging that we do, and other non leading type of cases, or cases where anemia is probably not really going to come up as much. Do we focus our original group to sort of more of a high-risk group? Like, do we look at spine cases? Do we look at craniosynostosis cases, some other major non cardiac do people feel like that would be like a subtype of some basically, essentially major non cardiac cases that then would take effort to build something like that that then we could use that for developing multiple metrics.It would obviously be a little challenging. I mean, there'd be other cases we'd have to think about liver cases, But even if we came up with sort of what we thought were high risk, you know, the adults, right, they can look at hip replacements, knee replacements.

Morgan Brown (Boston Children's):
Would it be beneficial to come up with a cohort that then we view our sort of higher risk, non cardiac cases, to look at this and maybe other things?

Nirav Shah (MPOG QI Director):
Yeah. Morgan, I would agree. I think stratifying it by high risk case types, you would almost have to build that into the measure spec and make it because, you know, what we found on the adult side is that most of the discussions like. If you were to have a workflow change would involve the surgeons, at least, would need to include the surgeons. And in order to do that, you need to be able to stratify by particular service or particular case type, whether it's, yeah, right, like hip orthopedic or spine surgery or, you know, compatibility area, whatever. And so I wonder if that would apply on the pediatric side as well, that if you don't, if you can't stratify by case type, then there ends up being a lot of noise in the measure performance that makes it difficult to then do the kind of collaboration or discussions needed to actually change practice or change workflow.

Rahul Koka (Johns Hopkins) [via chat]: Agree. High risk stratification would be useful.

Unknown Speaker 10:50
Okay, that's great. I think we could work on trying to develop this. It's going to, obviously have to rely someone on expert opinion of what a high risk major non cardiac cases,

Nirav Shah (MPOg QI Director): yeah, I mean, you could start with a few, like, specific case types, like, in the adult population, like, maybe, yeah, you're right. It would be hip replacement, major spine surgery, you know, some, maybe some have really area, you know, some. And you can start with that, because the flip side of that, of that is that they're just gonna have to be work on the impact coordinating center side to make sure that we can build a feed the phenotypes for those procedure types. So that will necessarily, kind of slow the process down a little bit, because, you know, if we have an existing phenotype, great, we can just plop it in. But if we don't have that procedure type phenotype, then all that we would have to build that and that may, you know, take a little bit of time.

Morgan Brown (Boston Children's):
Oh, yeah, every everything, everything is harder than it looks. Yeah, no, that, that, that sounds great.

Nirav Shah (MPOG QI Director): I mean, yeah, I think we should definitely build on, hopefully, some preexisting phenotypes that are there, rather than trying to totally reinvent the wheel and trying, you know, we, we may not want to be focusing on trying to find sort of, you know, so called edge cases in pediatrics, and rather focus on where the big buckets of cases, so, You know, maybe crannies of some maybe not, spine surgeries, definitely, as you said, some sort of major GI procedures.

Ruchika Gupta (University of Michigan) [via chat]: would it also be worth looking at neonates?

Morgan Brown (Boston Children's): That's at least a little bit easier to do, since we can pretty easily define the neonate, I think the only trick with neonates and anemia is, at least for us, they often transfused them preop. So I don't know it'd be interesting to see how meaningful or what numbers they are, because I know at least for cardiac caths, for example, they're rarely going to look anemic, even though it actually just meant they just got a blood transfusion. So things to think about, but I think

it seems like from what everyone has contributed here and what we've been hearing from members, this is definitely an area of interest for people. So I think more to come, but at least this gives us a little bit of something to work from.

Joe Cravero (Boston Children's): Can I just say, I think what you know, Susan certainly has done her work here looking at cases where there's a significant percentage of transfusions applied. So, I mean, it's easy enough to be fairly objective about this. If you say we're going to choose cases where there's, you know, this percentage that actually receive transfusions. I think the other thing that actually could be interesting to look at from an empire perspective is what she's shown is that kids that come in anemic tend to get more transfusions. And that would that is certainly something that's been true here for the practice we have. It might be interesting to look across MPOG at high risk surgeries and kids who come in anemic and the kids who don't, and what the rate of transfusions are for those kids. It would be a compelling argument to try to see kids preop and manage anemia, if you did find that transfusion rates could be modified by treatment of anemia pre op. Anyways, it's just, I think the stuff that she's shown and would be the add on effect of something like this,

Morgan Brown (Boston Children's): yeah, no, that might be a great place to at least look for Sort of what we are thinking for are these major non-cardiac cases are, because I think probably most of the time, if we're transfusing, it's a pretty major case, because, you know, no one's shaking that too lightly.

Rishi Parikh: There may also be variation in target Hgb depending on case type

Morgan Brown (Boston Children's): Yes, that's where all of this gets so complicated so quick, you know, underlying comorbidities we're always concerned about using, you know, especially in kids trying to use the same unit. So that's why these over transfusion metrics, get really complicated, as many of us will give a little top off, because we know that otherwise, there's a chance that they made to get an additional transfusion early in the post operative period due to, you know, blood sampling and everything else that these kids and their during their hospital stay. So, yeah, so more to come. I'm sure we're gonna have a lot of refining, but it is exciting, because I think at least there's a lot of interest in this.

2026 Measure Plans: Postoperative Pain

Morgan Brown (Boston Children's): Yes And then we have just sort of preliminarily started talking about looking at pain management and kids again. It's a little tricky to say the least. You know, Dr Rivera has done much work on this topic over time, and is more than aware of many of these limitations. But we talked about looking at either the percentage of cases where patients received opioids in the pacu, percentage of cases where the first pain score was greater than some amount Joe had found previously when he tried to look at least pacu data here that you know, it is tricky, and I suspect we are no different than most PACUs and that how people rate pain is a little bit challenging to sometimes interpret when you're looking back retrospectively.

However, usually if you sort of look for what you consider to be severe pain or a significant pain event, it seemed to be a little more meaningful. So, you know, rather than looking for all pain all the time, do We just focus on patients who were extremely uncomfortable, and it was suggested maybe a pain score of greater than four in the pacu,or we could even try to look at the success of what we did. So did how many patients actually reduced their pain score, since some patients, as you know, are reported as a seven consistently throughout most of their hospital stay. Measuring, You know, did we actually make

some difference and take them from a seven to a five or a five to a three or something like that? Anyone have thoughts on this area, or ideas for us to consider.

> **Chuck Schrock (WashU) [via chat]:** ratio of morphine equivalents in PACU relative to morphine equivalents in the OR. Can identify providers, or patient groups, who routinely under dose?

Morgan Brown (Boston Children's Looking at this is interesting, You'd have to think a little bit about that. Do people think that in this pain group that, again, is there some sort of, are there some surgeries or procedures that we'd be more interested in to try to weed out, obviously, the problem of pain versus emergence delirium, type of issues, like, would we be more interested in nothing so procedures, for example, or something like That?

> **Rishi Parikh :** the need for repeat opioid doses might be a nice signal for a bad pain experience

Joe Cravero (Boston Children's):
These are obviously, really complex sort of questions, as we've talked I guess, my only my interest in what other people think, is that I personally feel like trying to use pain scores as a continuous variable is just so fraught, and that the way these pain scores are recorded in clinical work, etc, and the way kids act is it's difficult to know for sure whether across many different centers, you're getting super consistent data. So I just feel like grouping patients into groups with relatively low pain and then perhaps high pain, so that you there'd be less ambiguity about whether or not we can agree that the outcomes were actually different would be important. So for me, that means, you know, like putting kids who had low pain in the pacu, and kids who never recorded more than a three or four in a pacu as kids who had an excellent pacu experience, and kids who had pain scores in the 8-10 range as kids who had a significant pain experience I feel like on FACES, that's sort of a valid comparison to make. I think when people start dividing it up by point five or one point on a 10 Point pain scale across different centers, etc, I think you start getting to some real difficult issues. I do think that with the move towards less and less opioid use in pediatric anesthesia, or at least a strong recommendation by certain groups that we should be going to opioid free. I think some idea about how kids are doing the pacu in an objective way is really helpful. I just think it needs to be done in a way that people can agree that across, again, a diverse group of institutions, we are looking at something that actually is a is a real indication of difference. And so I would set the I would set the indicators for good and bad at significantly different numbers, so that it was possible to sort of see that. I do think, yeah, it's hard for me to say that someone did a bad job if the kid comes out and needs pain med, but certainly by the time they leave, you'd like to see them doing well, and I think there is a reason to look at when people are not giving any opioids, if a significant percentage of those patients are having severe pain in the back yet, I think that's sort of an important or interesting thing to understand. So anyways, I don't know if that makes any sense, but I do think these are interesting outcomes to look at. I just think, as you're saying about other things, this has to be thoughtfully put together so that we can agree that the differences or agreement that we're seeing is real. I think that's tough with the outcome measure being pain scores,

> **Bishr Haydar (University of Michigan) [via chat]:** Do we have PACU nurses individually identified? May be helpful to identify outlier practices, as we previously did in the OME measure for tonsils. Regional anesthesia also complicates this measure, but it shouldn't be a hard stop on doing this IMO.

Morgan Brown (Boston Children's)

True, although if you start to think about how many PACU nurses there probably are, it would be very difficult to try to just for individuals, I think. And then regional anesthesia also complicates it, but it shouldn't be a hard stop. Yes. I mean, maybe the thing we could think about, and maybe for the next meeting, Meridith, we could try to look at, just for example, how many patients are having pain scores of seven and up in the PACU at all, and sort of see what that data might look like if we were to try to look at extreme pain, because maybe the right metric is trying to look at how much pain you know, you'd have extreme pain by the time you're leaving you have less. I don't know. I guess we'll see once, we sort of see what that data is, but it may give us a clue as to which patients are actually having these events, because I don't know if I know off the top of my head who that might be.

But all right, we will continue to work on that if you know. Part of the point of all this, obviously, is to get everyone thinking about it, and try to get these ideas going. When you see your patients in the pacu, or you're transfusing your patient, trying to think about, How would we demonstrate something useful and good practice for our patients, and also trying to figure out, some of the practice that may have variation, which is not so useful to all of us, and what we can do about that?

Joe Cravero (Boston Children's): I would just suggest that we think about looking at a surgery grouping or type. It might be nice to start off with a small bite of this, like look at either a constrained group of procedures where they're common, they're known to have pain issues and that there is some variance in the way people are managing them. If we could agree on that and then agree on some measures, I think it could be really kind of interesting. Thanks for bringing this up. Yeah, we have, that's great, yeah. And I mean, at least, you know, they already have built a tonsil adenoid. I'd have to look into exactly what is all defined sort of group that might be an interesting patient population. Or maybe, you know, this non cardiac surgery group, this high risk group, might also be interesting to see what they're doing. Obviously, a component of them are going to be going to ICUs, but those that are go to pack use could be looked at too, but yeah, we'll have to take a look and see what we find. Or more work for Meridith.

Morgan Brown (Boston Children's):
yes, and again, just want to express my thank you to Dr O'Reilly-Shah for all that he has done, and I'm sure he is going to continue to be active in this group and on this committee, so we will see him again. And thank you for everybody else for participating as well and all your contributions. It really does take an entire village to do all of this.

If anyone has any other thoughts or things, you can always reply to the base camp. I know it always kind of makes you nervous, because it replies to everybody, but it's just like, reply all. It's okay.Or you can email Meridith or me directly. We're happy to always talk about these things, and otherwise, we'll see you in 2026

Nirav Shah (MPOG QI Director): Awesome. Thank you, Morgan. I'll just repeat the plug you made earlier about a vice chair, you know you, I mean the entire subcommittee leadership there. You guys do such an incredible job. It's just so impactful. It's amazing. I can't even imagine MPOG without its subcommittees, and subcommittee leadership is right front and center to make them as valuable as they are, and it's just a really important position. I hope it's interesting, but it's certainly impactful, and for anyone is, if you're even thinking about, you know, maybe being interested in it, you know please reach out. Morgan, Meridith, myself, someone at the according center, and happy to share more about it. So did want to end with that plug?

Morgan Brown (Boston Children's): Sounds great. All right. Well, happy holidays. Everybody. See you soon. Thanks everyone.