Anesthesiology Performance Improvement and Reporting Exchange (ASPIRE)

Pediatric Subcommittee Meeting Minutes – June 23, 2025

Attendance:

Henrietta Addo, MPOG	Bevan Londergan, Vanderbilt University
Benjamin Andrew, Duke University	Eva Lu-Boettcher, University of Wisconsin
Peter Bow, Michigan Medicine	Tiffany Malenfant, MPOG
Robert Brustowicz, Boston Children's	Kam Mirizzi, MPOG
Kate Buehler, MPOG	Allison Nye, OHSU
Mei Calabio, MPOG	Diana O'Dell, MPOG
Ruth Cassidy, MPOG	Vikas O'Reilly-Shah, Seattle Children's
*Jurgen de Graaff, Erasmus MC	Wendy Owens, MyMichigan
Prabhakar Devavaram, Boston Children's	Denise Schwerin, Bronson Health
Lucy Everett, Mass General Brigham	Ashka Shah, University of Utah
Marla Ferschl, UCSF	Ruchika Sharma, University of Virginia
Kim Finch, Henry Ford	Frances Guida Smiatacz, MPOG
Jackie Goatley, Michigan Medicine	Brady Still, University of Chicago
Kirsten Groody, Michigan Medicine	*Kim Strupp, Children's Hospital Colorado
Ruchika Gupta, Michigan Medicine	Rachel Stumpf, MPOG
Meredith Kato, OHSU	Meridith Wade, MPOG
Jeana Havidich, Vanderbilt University	*Lindsey Weidman, CHOP
John Huntington, Corewell Health	Aaron Weinberg, New York-Presbyterian
Amanpreet (Aman) Kalsi, Vanderbilt University	Theodora Wingert, UCLA

**Denotes participant from non-active MPOG Institution*

Start: 1602

Minutes from March 10,2025 meeting approved - minutes and recording posted on the MPOG website for review

Upcoming Events

- Pediatric Research Proposal Presentation (PCRC-302) – Monday, Jul 14, 2025
    - Topic: *Patterns of inotrope use in pediatric cardiac surgery.*
    - Open to every active MPOG site; email Meridith if interested in attending (meridith@med.umich.edu)
- MPOG Retreat @ ASA – Friday, Oct 10, 2025 (San Antonio, TX)
    - All pediatric champions urged to attend for networking. In addition, a pediatric focused round-table discussion will be held immediately following the retreat at 3pm CT.
    - More information regarding the agenda and Registration on the MPOG website

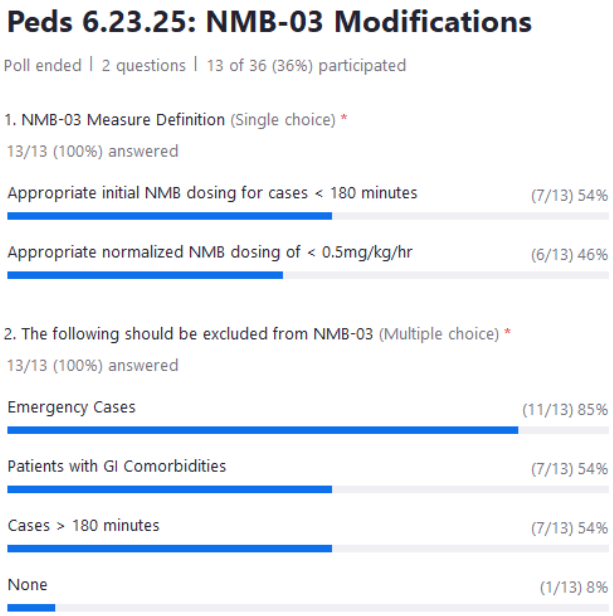
- Next Pediatric Committee meeting – Monday, Dec 1 2025 (virtual)

General Updates

- 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
- New sustainability measures approved to build
    - SUS-08 & SUS-09 (fresh-gas flow limits for maintenance and induction) and SUS-10 (case-level carbon-footprint score) will appear on dashboards later in 2025.
- Pediatric comorbidity phenotypes released
    - Modeled after Pediatric Complex Chronic Conditions - Now available in DataDirect to support inclusion/exclusion criteria for research and future metrics.

NMB-03 Update — Initial NMB dosing in patients < 5y

- The committee voted to modify this metric. Specific modifications were discussed and voted on.
- Example discussed: 10 kg infant, 5-hour case, received 40 mg upfront. Under the new rules this case will still be flagged despite the length-of-case exclusion—desired outcome.
- **Decision**
    - *Exclude* cases > 180 minutes and any case coded as emergency or with GI comorbidities.

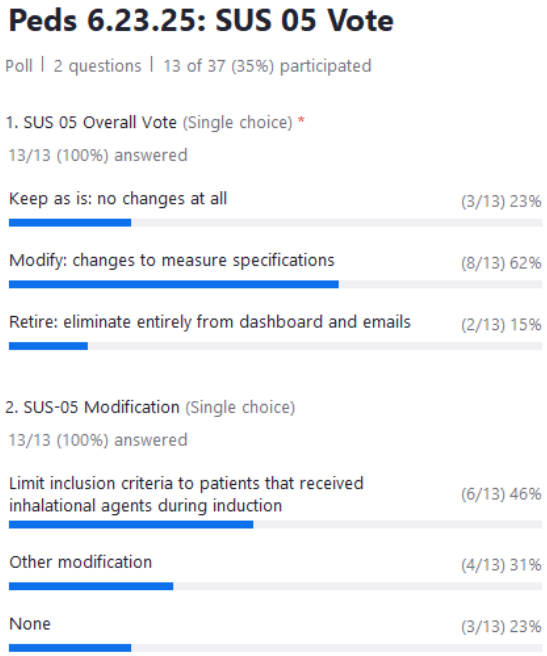


SUS-05 Review — Nitrous Oxide Avoided During Induction

Dr. Brady Still (University of Chicago) - Review

- Current state: Denominator includes all GA cases; IV inductions inflate pass rates and mask true inhalational practice.
- Near-perfect compliance in term neonates and adolescents (where nitrous rarely used).
- Much lower success in toddlers and young children—the cohort most likely to receive nitrous.
- 8–9 % of IV inductions still document nitrous given solely for IV placement.

- Discussion points:
    - Experienced clinicians note rising mask aversion in repeat procedures; nitrous remains valuable for highly anxious or patients with autism.
    - Consensus that the metric should be "educational, not punitive"—10 % flag allowance remains.
    - Add to measure rationale: "In addition to its greenhouse warming potential, nitrous oxide reduces the delivered FiO_2 during pre-oxygenation, shortening safe apnea time."
- **Decision - Modify**
    - Limit denominator to inhalational inductions only.
    - Retain 90 % success threshold but soften language to allow *judicious* use. Dr Robert Brustowicz will draft the new wording.

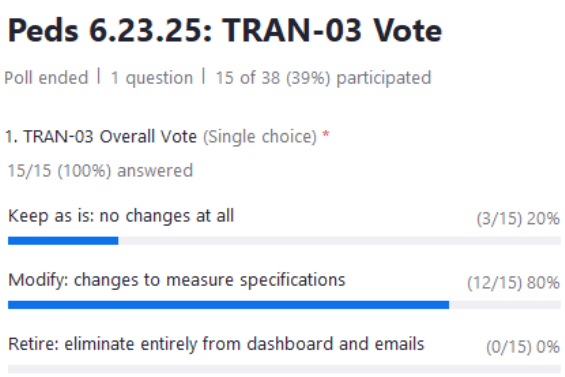


TRAN-03 Review — Pre-Transfusion Hemoglobin/Hematocrit Check

Dr. Jeana Havidich (Vanderbilt) - Review

- TRAN-03 checks whether a hemoglobin (Hgb) value is documented before red-cell transfusion in children. Perioperative blood management in pediatrics still lags behind adult practice and current AABB guidance (transfuse only when Hgb < 7 g/dL) is built almost entirely on ICU data. Evidence is thin, patient size and physiology vary enormously, and many centers still follow the "one-unit phenomenon," giving a full unit once blood is issued—behavior that can be flagged as over-transfusion in TRAN-04. Infants are flagged most often because their baseline Hgb is higher and blood-gas results may lag, prompting pre-emptive transfusion. Cardiac vs non-cardiac physiology distorts the "massive transfusion" threshold. The wide age range lumps 7 kg infants with 70 kg teens. A 15 mL/kg threshold equates to 1 L for a 70 kg teenager but only 105 mL for a 7 kg infant.

- **Decision - Modify**

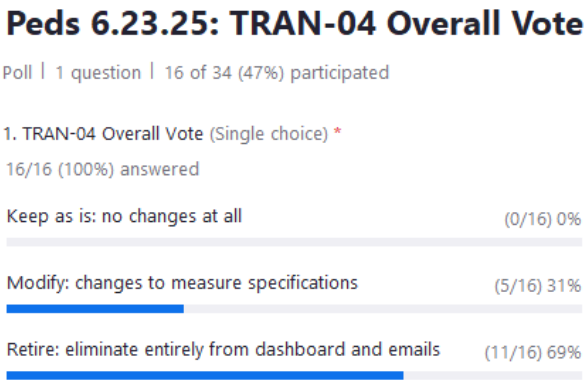


  - Count any PRBC transfusion (remove 15 mL/kg rule) to catch all clinically significant events.
  - Redefine "massive transfusion" as ≥ 30 mL/kg
  - Consider separate cardiac measure in the future but keep combined for now.

TRAN-04 Review —Overtransfusion

Dr. Amanpreet Kalsi (Vanderbilt) - Review

- Infants and cardiac patients—who often need higher hematocrits—drive most of the failures, while the metric paradoxically counts a post-transfusion Hgb of 4–6 g/dL as a "pass." Majority of institutions are failing this metric, suggesting mis-calibration rather than poor practice. This measure does not adequately consider high-blood-loss procedures such as craniosynostosis repairs and liver transplant cases, which almost always flag.
- **The committee agreed to retire TRAN-04 and build a new suite of pediatric transfusion metrics from scratch.** Priorities include specific age/weight bands (possibly adding a neonatal category), separate pathways for cardiac and hematology patients, exclusion of predictable high-loss surgeries, and more realistic upper thresholds (e.g., ≥ 12 g/dL, or ≥ 14 g/dL)



- A transfusion working group will be convened; volunteers will be solicited by e-mail with the goal of presenting a draft framework for discussion and vote at the December meeting.

For questions or to join the Transfusion Working Group, contact ***vikas.oreilly-shah@seattlechildrens.org*** *or* ***meridith@med.umich.edu***

Full Transcript

00:11 *Vikas O'Reilly-Shah (Seattle Children's)*: To respect everybody's time, I will go ahead and get us started. Thanks everybody for joining our second meeting of the year for the MPOG Pediatrics committee. I'm going to review some announcements and updates. and then we're going to jump into the meat of the meeting, which is to review a couple of measures, SUS-05 peds, and then transfusion metrics TRAN-03 and TRAN-04. I want to leave most of our time for those measure reviews. It's a packed agenda.

Announcements

I wanted to make sure everybody's aware that we're going to have the MPOG retreat meeting at the ASA which will be the day before the ASA meeting on Friday, October 10th. It's a great opportunity for folks to hear about what MPOG has been up to, what future plans are, best practices for use of MPOG as well as just really an opportunity to connect and really network on ideas, brainstorm and develop project ideas and collaboration. So I want to encourage everybody who can make it to that, to go, and then on December 1st we'll have our 3rd meeting of the year and more details to come as we get closer.

There's an upcoming pediatric research proposal which will be presented on July 14th, PCRC-302, which is the "patterns of inotropic medication use in pediatric cardiac surgery". If you are at an active MPOG site, these meetings are open for attendance, and I think that they're a great opportunity to see how the PCRC proposals are presented and what the process is for PCRC Review. If you're curious about any aspect of PCRC proposal development, please feel free to reach out. I've got a few under my belt at this point, as do I think a few other folks in the committee, so happy to help anybody get off the ground If you have an idea, you want to get spin up.

In terms of the MPOG Quality Committee, the non-pediatric specific sustainability measures were reviewed and voted on. I want to make sure folks are aware that there are several new sustainability metrics that are coming down the pipe. So that's going to be SUS-08 and SUS-09 for maintenance and induction flows. And then another measure, looking at total global warming footprint of the anesthetic (SUS-10). So that should be interesting to see how those measures play out, as well as how they may be applicable to our own populations.

Meridith and the team have done a ton of work to develop a bunch of pediatric specific comorbidity phenotypes which have been built and are available in data direct, and I think that for the purposes of our committee, this is going to be fantastic to really help us to identify specific subpopulations of interest that'll help us to build-in specific exclusion criteria for metrics that we want to develop. And so I think these are going to be a great addition to our ability to filter on and build off the existing data direct and phenotypes that have already been made available.

I want to announce that I'm also going to be cycling off as chair of this committee and Dr. Brown will be taking over as chair starting in January 2026. These positions are for 2-year terms. It's a great experience, a great opportunity to kind of see. Get your hands dirty in data and really help to develop as well as fine tune the metrics that we have and I think, set the stage and set the tone, for really what it is that we should be doing as pediatric anesthesiologists. So I want to encourage folks, if you have the inclination, to apply for the vice chair Job and I know Morgan's going to do a great job.

March Meeting Recap and NMB-03-Peds Vote

Vikas O'Reilly-Shah (Seattle Children's): To recap our las meeting in March, we reviewed and voted on

NMB-03 and sent a couple of messages via basecamp. I know that that's perhaps not the most natural venue for most of us to be interacting on. And so I wanted to revisit this and, maybe if we have time, Have a discussion. There's a big concern about longer cases, whether we should, account for that fact by, and that you might give a bigger dose for a longer case that was a common thing that was discussed. And so one option would be to update the success criteria to make per cake per hour threshold, say 0.5 mg/kg/hr, be if you gave that, or less than that would be considered success, otherwise the case would be flagged. and then the other option would be to exclude cases that are greater than 180 min. Meridith did find this one case that was interesting of a 10 kg baby that had a long procedure - 5 hr procedure, but got 40 milligrams of Rocuronium up front, which is, . I think most of us probably agree a fairly hefty dose and an unnecessarily large dose for anybody, really. And so, according to the criteria we would exclude cases that greater than 180 min. This would just be excluded if we adopt a normalized threshold dose of like 0.5 mg/kg/hr, as a threshold, then this case would still be flagged, and so I think it still gives people the opportunity to use a larger dose upfront if that's what they're wanting to do while still identifying cases like this, where maybe a review would perhaps be valuable. The other 2 or the other thing that we considered adding to the exclusion criteria were emergency cases, and then cases with patients with full stomach considerations like pyloromyotomy, or patients with short gut syndrome. Whether or not these are sort of flagged as emergency cases. I think we want to exclude these. So does anybody have any thoughts on this?

> *Meridith Wade (MPOG)*: Voting poll has been launched.
>
> *Vikas O'Reilly-Shah (Seattle Children's)*: Over 50% Want to exclude the longer cases. Okay. and so I think that we can go ahead and approve the modifications for excluding greater than how many minutes emergency cases. Gi core remedies and or 180 min so fantastic. Thanks, Meredith. All right. Well, that with that I'll turn over Dr. Still, and Dr. Lou Boucher for their review of SUS-05. Take it away.

SUS-05 Review

00:20 *Brady Still (University of Chicago)*: Excellent. I'm Brady Still out of the University of Chicago, my partner in crime, for this review is Dr. Eva Lu-Boettcher from the University of Wisconsin, and we looked at SUS-05-peds, which is specifically nitrous oxide avoided during the induction phase of anesthesia. So to summarize this is a straightforward measure. It is a process type measure with a success threshold of 90%, and its technical definition is percentage of pediatric patients less than 18 years of age, where nitrous oxide was avoided during induction of anesthesia excuse me general anesthesia, the exclusion criteria are very simple age greater than or equal to 18 years, and patients who did not receive general anesthesia rather obviously this is across institutions you can see compliance is kind of a mixed bag with some institutions reaching nearly 100% and many at the tail that are not meeting this criterion. But the more interesting data is when we break it down by age. which highlights that the term neonate patients, where many of us, I think, would not really consider using nitrous. Most are passing there, and by the same token, our adolescent patients, many of whom are going to be receiving IV Inductions are passing, but the middle period, where many providers at some institutions would use nitrous, there's actually not tremendous success rates in passing this criterion. And then just breaking down more granularly by institution, you see here that there's **significant institutional variance** as well in terms of success rates, and that's essentially across all age ranges.

So the sustainability workgroup met in April and the main thing that we highlighted here was the fact that the current definition includes all general anesthesia codes. Given that, by including IV inductions, you are essentially inflating the denominator with cases that are likely to pass. Now you'll note in this breakdown here, where it says failed, there's still 8-9% of IV inductions that are failing this metric

presumably patients who are getting nitrous oxide to facilitate IV placement. So this 1st case is documented as RSI. Given patient emesis just prior to induction, it appears that they, at least as far as I'm able to divine from the record, use nitrous to facilitate IV placement and then convert it to an RSI. And then this other one is seemingly just nitrous to facilitate IV placement. The other component to highlight Here is when looking at the rationale for this metric, the rationale currently focuses on the global warming potential of nitrous oxide, which, of course, is tremendously important. But since the measure was initially published, there's been more work on the potential risk of hypoxemia when giving mixtures that have substantially higher concentrations of nitrous oxide, not because of the nitrous oxide itself, obviously, but because you're delivering lower fraction of inspired oxygen. So this is from a paper in 2021 from pediatric anesthesia. This figure is a little bit challenging to parse. To be perfectly candid, but what you can basically see is as your fraction of inspired oxygen decreases. So, going from the left to the right, the inspired fraction is decreasing. The odds. Ratio of a hypoxemic event is increasing not consistently, not across the entire band. But in general you're seeing more of these events where the odds ratio does not cross one

So that highlights the proposed changes to the measure. So one rationale would be a recommendation of the sentence quote, in addition to its greenhouse warming potential, nitrous oxide reduces the FiO_2 used during pre-oxygenation, decreasing safe apneic time. But the more critical component that we wanted to discuss with you all was the definition. So the current definition, again, is the percentage of pediatric patients less than 18 years of age, where nitrous oxide was avoided during induction of general anesthesia, and **our recommendation would be to tailor this to a specific process to essentially determine or reduce the use of nitrous oxide during inhalational induction to avoid inflating the denominator with cases that are likely to pass.** In any event, we would recommend changing this to where nitrous oxide was avoided during inhalational induction of general anesthesia, which would then require a change to the inclusion criteria simply that they would be undergoing general anesthesia with inhalational induction. the exclusion criteria, and the success criteria we felt were still appropriate. That is all I have.

00:22 *Vikas O'Reilly-Shah (Seattle Children's)*: Thank you for a great presentation. Are there any comments the group would like to add?

> *Robert Brustowicz (Boston Children's)*: Yeah, I have a question. I've noticed with this endeavor, more children are coming for repeat procedures that are afraid or terrified of the mask. And my concern is that while we may be helping the environment, we are creating psychological harm on patients. So when I was a fellow back at CHOP many, many years ago, the emphasis was on smooth inductions, a “steal” induction, and I find what happens is that very often in looking at things here, we end up doing a 8% smother induction And I mean, **MPOG is tacitly approving this because these inductions are fast, they're efficient, and they don't use nitrous**. But the children are then very much afraid of the mask. They're afraid of coming back for a 2nd and 3rd and 4th procedure. I had one patient not that long ago where the preoperative assessment went fine until he saw the mask, and then he jumped off the stretcher and headed for the door. That's not normal. I'm wondering if maybe we could **include with this, maybe an assessment of was the inhalation smooth**, or perhaps the toddlers and smaller kids. Where, you see, there is less compliance. There's a reason for that, and I think experienced pediatric anesthesiologists do find that nitrous is a very helpful adjunct, because it is odorless and colorless, and therefore you can sneak it in on a kid that does have a lot of anxiety. A lot of your autistic children that would otherwise be non-cooperative. And I think to set out for an outright ban is not appropriate. I agree with you. If you're over 18, or if you're an adolescent IV induction, then there's no need for it. **I also agree that there's no need for it during maintenance or during emergence**. But for

induction there really isn't any substitute for nitrous for certain situations, and I think to be so draconian, to say, really, there are no exceptions at all. I mean, we are making exceptions with the neuromuscular blocking agents. So I think a little window here would be very appropriate.

Via Chat

John Huntington (Helen Devos Children's): I agree
Jeana Havidich (Vanderbilt): I agree
Meredith Kato (OHSU): Agree
Lucy Everett (MGH): CHOP did a large QA study and did not find any difference in quality or length of induction. I don't think they looked specifically about kids coming back.

Eva Lu-Boettcher (University of Wisconsin): Yeah, that's a really good point. And , I think the threshold being at 90%, that's maybe another point for discussion. But our criteria for success really leaves 10% of our cases still available for nitrous oxide use. And then there's a lot of opinions and **literature coming out about how to optimize pre-medication, distraction, parental presence, and other modalities that children are more and more given during the period induction period**. At our institution Since cutting out nitrous, I think parental induction, a lot more use of tablets and a lot more introduction of child life specialists to bring the children back with gifts and other distraction techniques have been very helpful. I think that this measure is aiming for maybe awareness, and trying to reduce as much nitrous as possible, at least removing it from central supply would be very helpful. But I totally agree there's definitely cases where nitrous oxide is possible, but just wondering if there's any other thoughts about people who've had good experiences with other techniques, going off to sleep.

Vikas O'Reilly-Shah (Seattle Children's): So I think the one comment is that there is 10% sort of, we're not trying to go to 100%. I don't think anybody expects a measure to hit that mark. And I think the other thing is that I think this also speaks in part to the change in the language that no longer calls cases failed. Right? You don't fail the criteria. The case is flagged, because if the case is flagged for review, and you felt like, Hey, this was appropriate use of nitrous oxide for this case, then we all just move on. It's not that there's it's not meant to be punitive, it's not meant to be Draconian. **The purpose of the measure is for people to thoughtfully approach their care as it sounds like you're doing.** And if you're thoughtful approach to the care of an anxious child is, hey? I'm going to start with some nitrous to sneak it in that is not, precluded in the use by any definition that MPOG uses. So, I think very reasonable to use it in an appropriate circumstances. I think the purpose of the measure is to try and mitigate the routine and unnecessary use as well as in combination with some of the other things looking at flows and things like that to try and minimize the amount that's being released to the environment.

Robert Brustowicz (Boston Children's): I agree exactly with what you're saying, so might it be possible to modify the wording of it, to make it a little bit softer, so that there are circumstances where it might be acceptable. But we still are doing our best to eliminate the unnecessary use of nitrous, and not to just keep the spigots going like I think one of the things that institutions can do is get rid of all the wall sources of nitrous, because that's a big source of leaks and just go to tanks. For instance, I think that is something which is doable within our purview and would make a massive change, and that the toddlers and smaller kids, that you may need it for to get them off to sleep, especially if you've got a kid that is going to be coming back multiple times. You don't want to have them so that they're crazy. By the 3rd or 4th induction.

Meredith Kato (OHSU): Hi, guys. yeah, if the if the goal of the measure is to raise awareness and

to get people to start thinking about it, then I'm not so sure we should eliminate an IV induction, because if you're using nitrous in order to facilitate an IV placement in a teenager, I don't see that as any different right? You either need it or you don't. And the whole purpose is to raise awareness so that you are more thoughtful about when you really need it. I'm not sure we really should exclude those teenagers we do with nitrous for an Iv placement. Anyone have any thoughts about that?

Amber Franz (Seattle Children's): I agree.

Robert Brustowicz (Boston Children's): I agree. We've gotten nurse practitioners placing our IVs. Now they use J-tips, and that helps to improve a lot of the anxieties that we no longer need. , people coming into the degree of starting nitrous before you start the IV induction.

Vikas O'Reilly-Shah (Seattle Children's): Well, I think we have to spend some time wordsmithing a modification to the criteria to soften it, if you feel like you could draft just like a couple of sentences that you'd want to have included That would be great, and I'd be happy to bring that back to committee for a vote. That sound like a reasonable plan, Bob?

Robert Brustowicz (Boston Children's): Yeah, definitely, thank you.

Prabhakar (Boston Children's): I'm kind of new to this forum, but I do have interest in mitigating greenhouse gases. So this recommendation is only for inhaled induction. **Is there any look at during extubation during the recovery phase?** There's a fair number of people who are still using it, and it's a low hanging fruit to deal with, while you can make an argument for induction. As this group has mentioned, using nitrous, there's really no reason at the time of extubation to turn on nitrous oxide.

Brady Still (University of Chicago): We talked about that briefly In some of our meetings prior to this there is the adult measure. SUS-07, which specifically looks at, **nitrous, avoided essentially over the length of a case where there's no, to my knowledge, pediatric equivalent, which I think could be worthwhile to explore**. The conversations leading up to this were focused on the fact that what we're essentially trying to do, as Bob and others rightly identified is, nudge providers to be judicious about their use during inhalational induction. But I think outside the scope of this, I think that there is definitely room for another measure to look at overall nitrous use intraoperatively, because I agree with you.

Prabhakar (Boston Children's): Thank you.

Robert Brustowicz (Boston Children's): And I agree, too. I think I'm just voicing concerns on the induction period, and once the induction is done, I got my Sevo at 8%, I never want to look at nitrous for the rest of the case.

Brady Still (University of Chicago): And to be clear, I used nitrous in a case today. So I'm also not militant about its use. I very much agree that there are places and patients where it's really the best for the patient.

Prabhakar (Boston Children's): I'm a bit militant, as Dr. Brustowicz would confirm.
Robert Brustowicz (Boston Children's): Yeah, but you mean, well.

00:33 *Vikas O'Reilly-Shah (Seattle Children's)*: Any other discussion, or should we go ahead and vote? Let's go ahead and vote on the proposed modifications, and then Bob, if you could email a couple of sentences to recognize the value of this measure and how it continues to have beneficial patient indications. That'd be great.

> *Robert Brustowicz (Boston Children's)*: If you'd be kind enough to send me the current wording of the recommendations, then I'll word it. So it's synergistic with what you've got and doesn't contradict anything but works to, to promote it Further.

00:34 *Meridith Wade (MPOG)*: So it looks like of the 13 who voted, 62% would like it to be modified to limit to just inhalational inductions. So we can look at that as well as the wording modifications that we discussed.

Vikas O'Reilly-Shah (Seattle Children's): I'll turn it over to Dr. Havidich and Kalsi for the transfusion metric reviews.

TRAN-03 Review

00:42 *Jeana Havidich (Vanderbilt University)*: Good morning, everyone, and thank you for being here. I'm Gina, the quality director for our pediatric division. I've invited **Dr Kalsi**, one of our pediatric cardiac anesthesiologists and director of the Heart Institute's blood-management program, to join today's discussion.

To keep us on schedule I'll move quickly, but I want to restate why peri-operative blood management is so important. Although firmly established in adult practice, it is still gaining traction in pediatrics. The concept rests on **three pillars**:

1. Pre-operative optimization of red-cell mass *(treating anemia before the day of surgery).*
2. Intra-operative conservation strategies such as cell salvage and meticulous surgical hemostasis.
3. Maintenance of adequate hemoglobin throughout the peri-operative course.

The most recent **AABB pediatric guideline** recommends a *restrictive* transfusion strategy—transfuse only when hemoglobin falls below 7 g/dL. That recommendation, however, is based almost entirely on ICU data; very few of the cited studies involved children in the operating room, which is a key limitation. The guideline also assigns a separate category to **cardiac patients**, recognizing that their physiology and bypass circuits alter transfusion thresholds. As we refine our metric we need to decide whether cardiac cases should be analyzed separately so we can compare practice accurately across institutions.

A quick look at the evidence shows just how thin it is. Only a handful of pediatric RCTs—most single-center and ICU-based—inform the guideline, and the certainty of evidence is rated moderate to low. I've included the neonatal recommendations for completeness; they are age-stratified and supported by data from both U.S. and international cohorts, though they are not yet embedded in our MCAD guidance.

Practical challenges remain. Publication bias favors ICU studies: few centers publish OR data. Our patient population is heterogeneous—age, weight, and diagnoses vary widely—making a **single transfusion trigger difficult to defend.** Many of us still follow the "one-unit phenomenon": **once a unit is opened** (commonly 15 mL/kg, though some centers use 10 mL/kg or 20 mL/kg) **we give the entire unit, even if the post-transfusion hemoglobin climbs to 12 g/dL.** While clinically defensible to avoid multiple donor exposures, that practice is flagged as a potential over-transfusion in TRAN-04, our current MPOG metric. TRAN-03 passes when a hemoglobin is documented *before* any transfusion in children 6 months to 18 years old. Most sites perform well, but infants have the highest flag rates because they start with higher "normal" hemoglobin values, have tiny circulating volumes, and suffer from lab-result lag times that push clinicians to transfuse pre-emptively.

Given those realities, we need to decide:

- Should **any** transfusion, regardless of exact volume, count as the metric numerator/denominator?
- Should we analyze **cardiac** cases separately from non-cardiac cases?
- Do neonatal and infant hemoglobin thresholds need to be higher than 7 g/dL to reflect their physiology?

Finally, I want to note an excellent example: UNC has published a robust pediatric peri-operative blood-management program that might serve as a template for us.
Dr Kalsi, would you like to add anything before we move on?

> *Aman Kalsi (Unknown)*: Thank you, Gina. The modification we're proposing—counting **any** red-cell transfusion—aims to account for the vast size difference between patients. A 6- or 7-kilogram infant and a 70-kilogram, 16-year-old cannot be held to the same "15 mL/kg" threshold: for the teenager that would require roughly one liter of packed cells, or more than three MPOG "units" (each unit is defined as 300 mL), just to trigger inclusion. By treating *any* red-cell transfusion as the qualifying event, we avoid that size-related bias and capture clinically meaningful practice across the full pediatric age range.
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> *Vikas O'Reilly-Shah (Seattle Children's)*: I have one more comment. We can argue whether "massive transfusion" should be 30 mL/kg or 40 mL/kg, but whatever threshold we pick will change the number of cases we flag. When we reviewed this metric at Seattle Children's, almost all of our flagged events were either craniosynostosis repairs—where we start transfusing as soon as the incision is made—or liver transplants, where we give incremental boluses without drawing a blood gas after every dose. Excluding those scenarios would let us focus on true lapses, where transfusion happened without adequate monitoring. Has anyone else revised their exclusion list? Additional updates would help us sort cases more intelligently.
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> *Jeana Havidich (Vanderbilt University)*: I agree. The metric is well-intended, but a few wording tweaks could make it far more useful. Some procedures—in particular craniosynostosis—require immediate transfusion because blood loss is inevitable.

Meridith Wade (MPOG): Should we put it to the vote? Please vote on two items:

1. Redefine "massive transfusion" (30 mL/kg vs 40 mL/kg).
2. Count **any** red-cell transfusion as meeting inclusion instead of the current 15 mL/kg threshold.

I'll leave the poll open for a moment.

Vikas O'Reilly-Shah (Seattle Children's): Okay, 80% to modify. So we will modify TRAN-03 based on these recommendations here. Thank you very much. Appreciate the review. And then, Dr. Kalsi, I you'll review TRAN-04 for us.

TRAN-04 Review

00:50 *Aman Kalsi (Vanderbilt)* Hi—sorry, I had a technical issue joining. I'll pick up **TRAN-04**, which looks at both transfusion *triggers* and potential *over-transfusion*. A lot of centers are failing this metric in its current form.

- **Inclusion range:** children > 6 months to ≤ 18 years.
- **Trigger threshold:** hemoglobin ≤ 8 g/dL.
- **Over-transfusion flag**: post-transfusion hemoglobin ≥ 10 g/dL *or* hematocrit ≥ 30 % (≈ 13 g/dL) measured within 18 h of anesthesia end.
- **Exclusions:** ASA VI cases on cardiopulmonary bypass are out, but cardiac patients having non-

cardiac surgery remain included—and that skews results.

We've prepared several slides showing exactly where cases are flagged. The first set highlights post-transfusion values above the hematocrit target of 30 %. One key question: 10 g/dL is still an anemic value—should it really be labeled "over-transfusion"? Age complicates things: hemoglobin 10 might be excessive in a 17-year-old, yet perfectly acceptable in a 6-month-old, or in polycythemic, shunt-dependent cardiac kids who need hematocrits of 40–45 %.

Could you jump to the next slide, please? Here we've broken performance down by age bands. You can see that infants and adolescents behave very differently; the youngest group drives most of the flags. If we go one more slide—yes, those box-and-whisker plots—post-op hemoglobins range from under 4 g/dL (counted as a "pass") all the way up to 14 g/dL (flagged as "fail"). A hemoglobin of 4–6 g/dL hardly represents successful care, yet the metric treats it as such.

Issues we need to address

1. **Age/weight granularity** – The blanket 6 mo-to-18 yr window lumps a 7 kg infant with a 70 kg teenager. We may need separate age or weight categories.
2. **Comorbidities** – Cardiac and hematologic patients have different targets. Should we exclude them or build a separate metric?
3. **High-blood-loss procedures** – Liver transplants, craniosynostosis repairs, and cardiac operations for non-cardiac indications might warrant exclusion.
4. **Trigger and target values** – Keep the trigger at ≤ 8 g/dL, but raise the "over-transfusion" threshold from 10 g/dL to 12 g/dL, and up to 14 g/dL for patients with hematologic disease.
5. **Low pass rates** – Right now institutions pass only about 10 % of the time, and the variance is enormous, which suggests the metric is mis-calibrated rather than everyone providing sub-standard care.

Jeanna and I think it's worth tracking transfusion quality, but TRAN-04 needs a thorough overhaul before it can reflect practical, evidence-based pediatric practice.

00:56 *Jeana Havidich (Vanderbilt University)*: Aman and I have gone back and forth on this metric for quite a while. What strikes me is that we, like many international blood-management groups, are issuing strong recommendations based on very little evidence—often just a handful of studies that report associations, not causality. Yes, hemoglobins above 10 g/dL correlate with morbidity, but that alone doesn't prove harm. I believe the metric is worth keeping, yet we should return to the drawing board.

Questions we need to answer include:

- **Age or weight bands?** Should thresholds differ for infants, toddlers, children, and adolescents—as Aman suggested?
- **Cardiac vs non-cardiac?** Several societies already publish separate guidelines for cardiac kids; should our metric do the same?
- **Neonates?** New data and recommendations are emerging, so do we add a neonatal category?
- **Defining "success."** A hemoglobin < 6 g/dL technically "passes," but is that really acceptable? We may need upper and lower brackets.

It's an important, clinically relevant topic, but the current build doesn't capture those nuances.

Vikas O'Reilly-Shah (Seattle Children's): Right—so rather than voting on piecemeal tweaks today, it sounds like we need a **working group to craft a suite of transfusion metrics**. We'd separate under- and over-transfusion, define age brackets, and account for cardiac versus non-cardiac surgery or comorbidities. In other words, we might retire this version of the metric altogether and build something that truly reflects current practice. When we reviewed it at Seattle

Children's, we reached the same conclusion: in its present form it doesn't match the way we transfuse, nor do the pass rates make sense. We need a metric set that accurately flags cases deviating from real-world practice so teams can focus on meaningful outliers.

Jeana Havidich (Vanderbilt University): I think that's reasonable, but it's up to the process that you want. Do you want to keep this, or do we just retire it and start over - which I think Dr. Kalsi and I, after debating this for 2 weeks, would in the end recommend.

Vikas O'Reilly-Shah (Seattle Children's): We've got 3 min, I think. If you're interested in helping build a new transfusion metric, what we'll do is we'll send out an email and solicit interest for a working group And between now and December have kind of a worked out set of metrics that we can, vote on, or discuss and then vote on to build out as like a set of transfusion metrics. That would parse this in ways that are going to be helpful cause I don't think we're going to get it done in 3 min. Let's go ahead and vote on TRAN-04 now.

Meridith Wade (MPOG): Is there anyone that currently looks at this metric on their dashboard?

Jeana Havidich (Vanderbilt University): Yeah, I think it's an interesting metric. And really something we need to think about, because the adult data is pretty impressive. I mean, looking at some of their morbidity. Mortality that's associated with over transfusion, let alone the cost and exposure to that. **And we really don't have good data in pediatrics, and this may be a start.**

Vikas O'Reilly-Shah (Seattle Children's): Okay? Well, yes, we have consensus. Dump it. Start over. If you are interested in the transfusion work group, please, email, me, or Meridith directly, and we can hopefully get something going to put together for the distant meeting.

Meridith Wade (MPOG): Yeah. Sounds good. Thank you To the measure reviewers. That was extremely helpful.

Vikas O'Reilly-Shah (Seattle Children's): Yes, thanks and thanks everybody for joining, and hopefully. We'll see you all in October at the Retreat.

Meeting Concluded @ 1702