MPOG Pediatric Committee Meeting

March 10, 2025

Agenda

Announcements and Updates

Measure Review: NMB-03-Peds
Dr. Chuck Schrock, St. Louis Children's Hospital

Hyperglycemia Management in Pediatrics
Dr. Ruchika Gupta, University of Michigan

Upcoming Meetings

2025 Pediatric Committee Meetings

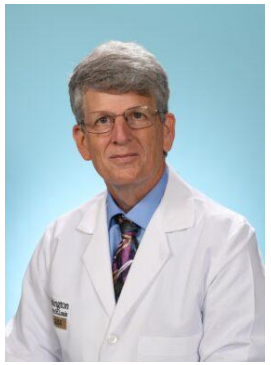
Mondays at 4pm Eastern

- March 10th
- June 23rd
- December 1st

2025 Pediatric QI Measure Reviews

March - NMB Initial Dosing

- *NMB-03-Peds* *Dr. Chuck Schrock, WashU*



May - Sustainability

- *SUS-06-Peds* *Dr. Eva Lu-Boettcher, UWisconsin*
- *SUS-05-Peds* *Dr. Brady Still, UChicago Medicine*

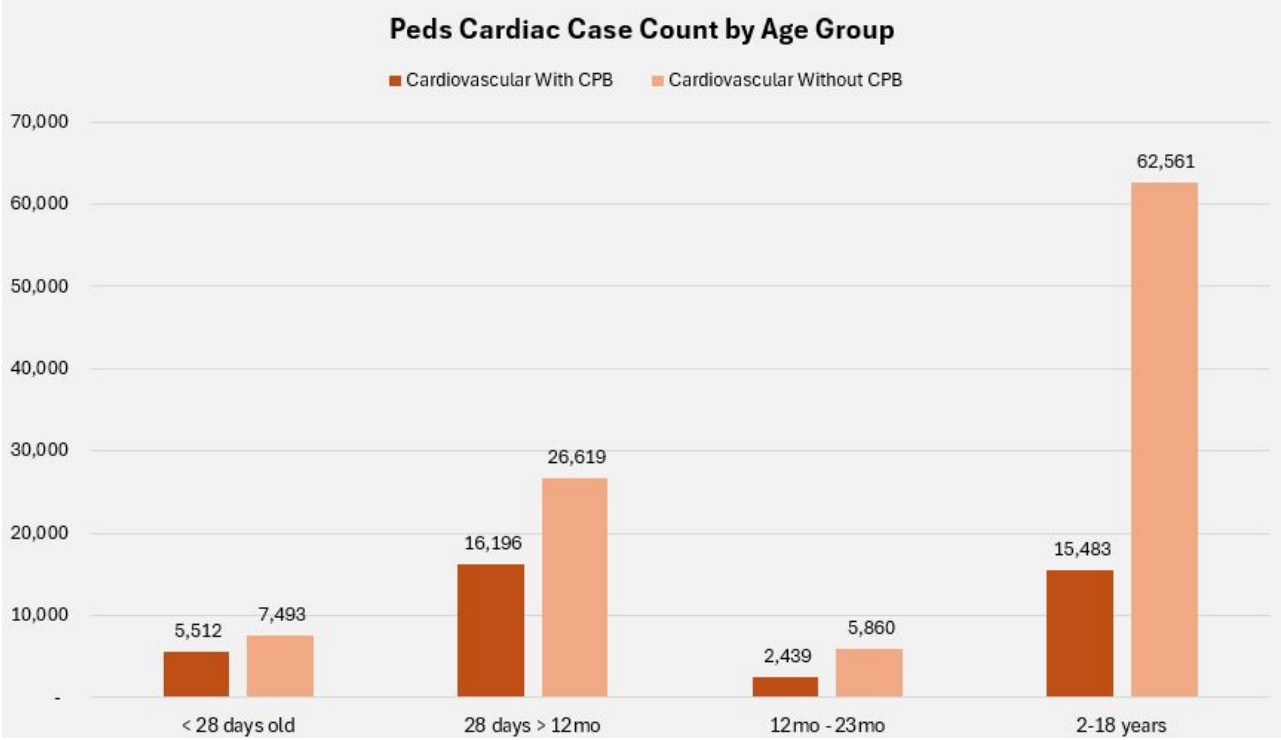
June - Transfusion Vigilance / Overtransfusion

- *TRAN-03-Peds* *Dr. Jeana Havidich, Vanderbilt*
- *TRAN-04-Peds* *Dr. Amanpreet Kalsi, Vanderbilt*

Peds Cardiac Workgroup Updates

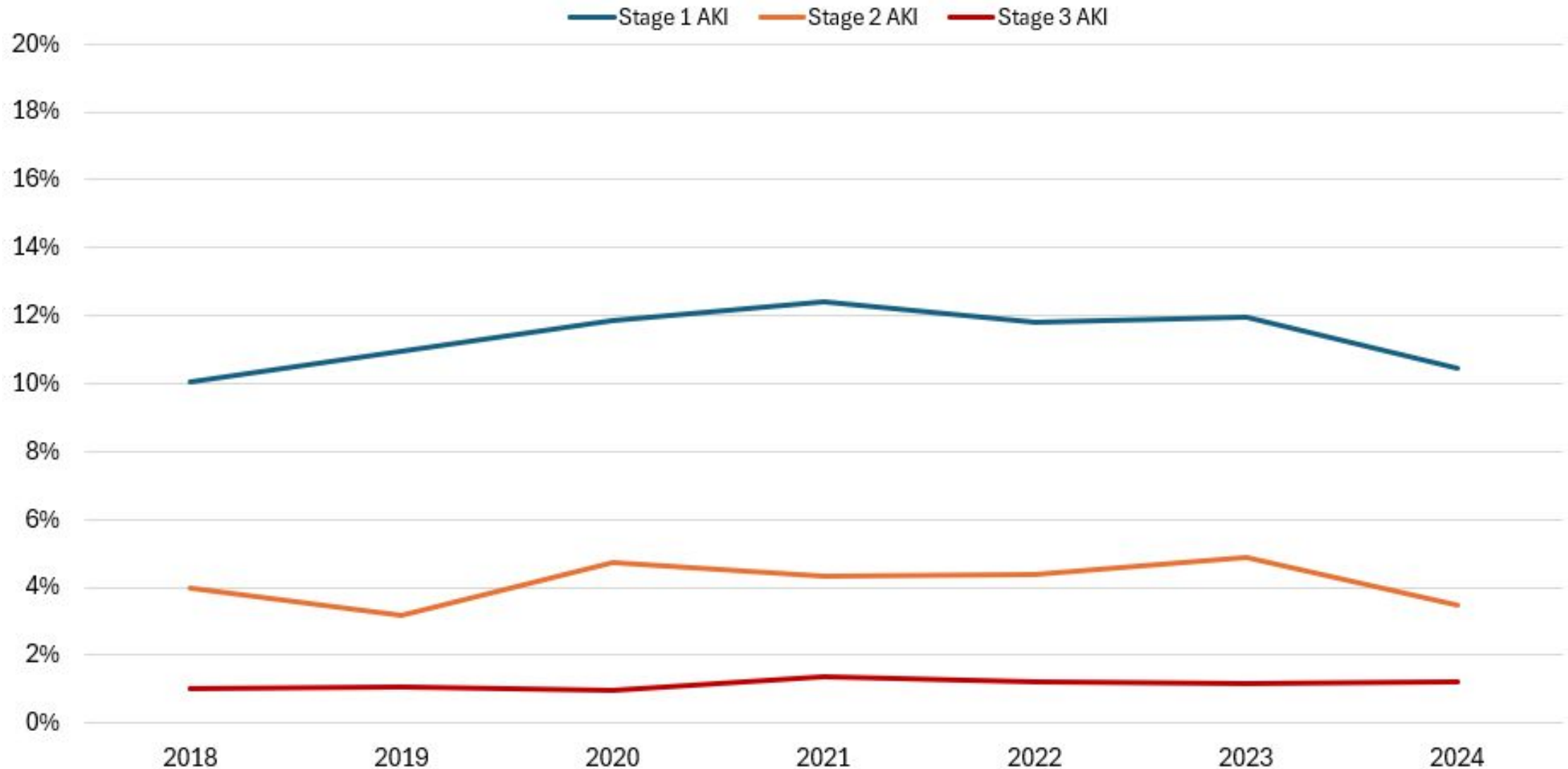
- **Last met February 2025**
  - Reviewed new peds cardiac procedure phenotype
  - Can now separate cases with or without bypass

- **New Measure Build - AKI-03-Peds**
  - Percentage of cases with AKI after congenital cardiac surgery requiring cardiopulmonary bypass



Acute Kidney Injury - Cardiac Bypass Procedure

Pediatrics 1 - 18y



Pediatric Committee Meeting Recap - November 2024

PONV-04-Peds Measure Review

- Update success criteria to at least a single agent for all patients (0 risk factors), with combination therapy of two agents for those at higher risk (≥ 1 risk factor).
- Modify definition of opioid risk factor to Multiple doses of any opioid between induction and PACU end.
- Consider Hydrocortisone IV as an antiemetic
- Add Anticholinesterase administration intraop as a risk factor
- Update age inclusion of Infants (*pending MPOG central data analysis)

Decision: Will send out poll for MPOG pediatric site champions to vote after 2025 Consensus guidelines are published.

Preterm Neonate

Result	0	1	2	3
Excluded	261 (57.5%)	457 (49.4%)	100 (57.5%)	2 (100%)
Failed	2 (0.4%)	7 (0.8%)	0 (0%)	0 (0%)
Passed	191 (42.1%)	461 (49.8%)	74 (42.5%)	0 (0%)
Total	454	925	174	2

Amongst Failures

Attribute	0	1
Antiemetic Received	1 (50%)	0 (0%)
PONV Reported	1 (50%)	7 (100%)
Total	2	7

Term Neonate

Result	0	1	2	3
Excluded	531 (54.9%)	1204 (40.5%)	367 (44.8%)	0 (0%)
Failed	4 (0.4%)	55 (1.8%)	6 (0.7%)	0 (0%)
Passed	432 (44.7%)	1715 (57.7%)	447 (54.5%)	1 (100%)
Total	967	2974	820	1

Amongst Failures

Attribute	1	0	2
Antiemetic Received	1 (1.8%)	0 (0%)	0 (0%)
PONV Reported	54 (98.2%)	4 (100%)	6 (100%)
Total	55	4	6

Infants (28d - 12m)

Result	0	1	2	3	4
Excluded	1043 (14.3%)	4051 (12.6%)	1713 (19.5%)	16 (5.8%)	0 (0%)
Failed	195 (2.7%)	870 (2.7%)	369 (4.2%)	20 (7.2%)	1 (50%)
Passed	6077 (83.1%)	27148 (84.7%)	6710 (76.3%)	240 (87%)	1 (50%)
Total	7315	32069	8792	276	2

Amongst Failures

Attribute	0	1	2	3	4
Antiemetic Received	95 (48.7%)	335 (38.5%)	166 (45%)	9 (45%)	1 (100%)
PONV Reported	94 (48.2%)	467 (53.7%)	163 (44.2%)	7 (35%)	0 (0%)
PONV Reported and Antiemetic Received	6 (3.1%)	68 (7.8%)	40 (10.8%)	4 (20%)	0 (0%)
Total	195	870	369	20	1

Toddlers (13m - 23m)

Result	0	1	2	3	4
Excluded	174 (2.2%)	762 (4.1%)	388 (6.5%)	11 (1.2%)	0 (0%)
Failed	228 (2.9%)	635 (3.4%)	291 (4.9%)	43 (4.7%)	0 (0%)
Passed	7576 (95%)	17341 (92.5%)	5268 (88.6%)	866 (94.1%)	9 (100%)
Total	7978	18738	5947	920	9

Amongst Failures

Attribute	0	1	2	3
Antiemetic Received	134 (58.8%)	386 (60.8%)	158 (54.3%)	15 (34.9%)
PONV Reported	79 (34.6%)	183 (28.8%)	97 (33.3%)	19 (44.2%)
PONV Reported and Antiemetic Received	15 (6.6%)	66 (10.4%)	36 (12.4%)	9 (20.9%)
Total	228	635	291	43

Children (24m - 3y)

Result	0	1	2	3	4
Excluded	329 (2.7%)	1173 (4.1%)	545 (4.1%)	22 (0.6%)	0 (0%)
Failed	558 (4.6%)	1138 (3.9%)	579 (4.3%)	175 (4.6%)	2 (4.4%)
Passed	11157 (92.6%)	26539 (92%)	12328 (91.6%)	3586 (94.8%)	43 (95.6%)
Total	12044	28850	13452	3783	45

Amongst Failures

Attribute	0	1	2	3	4
Antiemetic Received	414 (74.2%)	688 (60.5%)	293 (50.6%)	68 (38.9%)	1 (50%)
PONV Reported	91 (16.3%)	318 (27.9%)	178 (30.7%)	71 (40.6%)	1 (50%)
PONV Reported and Antiemetic Received	53 (9.5%)	132 (11.6%)	108 (18.7%)	36 (20.6%)	0 (0%)
Total	558	1138	579	175	2

Measure Review: NMB-03-Peds

Dr. Chuck Schrock (WashU, St. Louis Children's)

- Review of what NMB-03 measures
- How the performance measure was recently updated
- Why NMB monitoring matters
  - Literature
  - Data from SLCH

- Open discussion
  - How have institutions achieved high success with this measure

The outcome measured

- Percentage of pediatric patients <= 5 years who receive appropriate initial dose of non-depolarizing NMB

- Rationale:
  - Infants should receive lower doses than older children
  - Lower doses produce similar onset time and efficacy
  - Benefits of larger doses are questionable
  - Consequences of larger doses potentially greater
  - Adequate monitoring can be more challenging

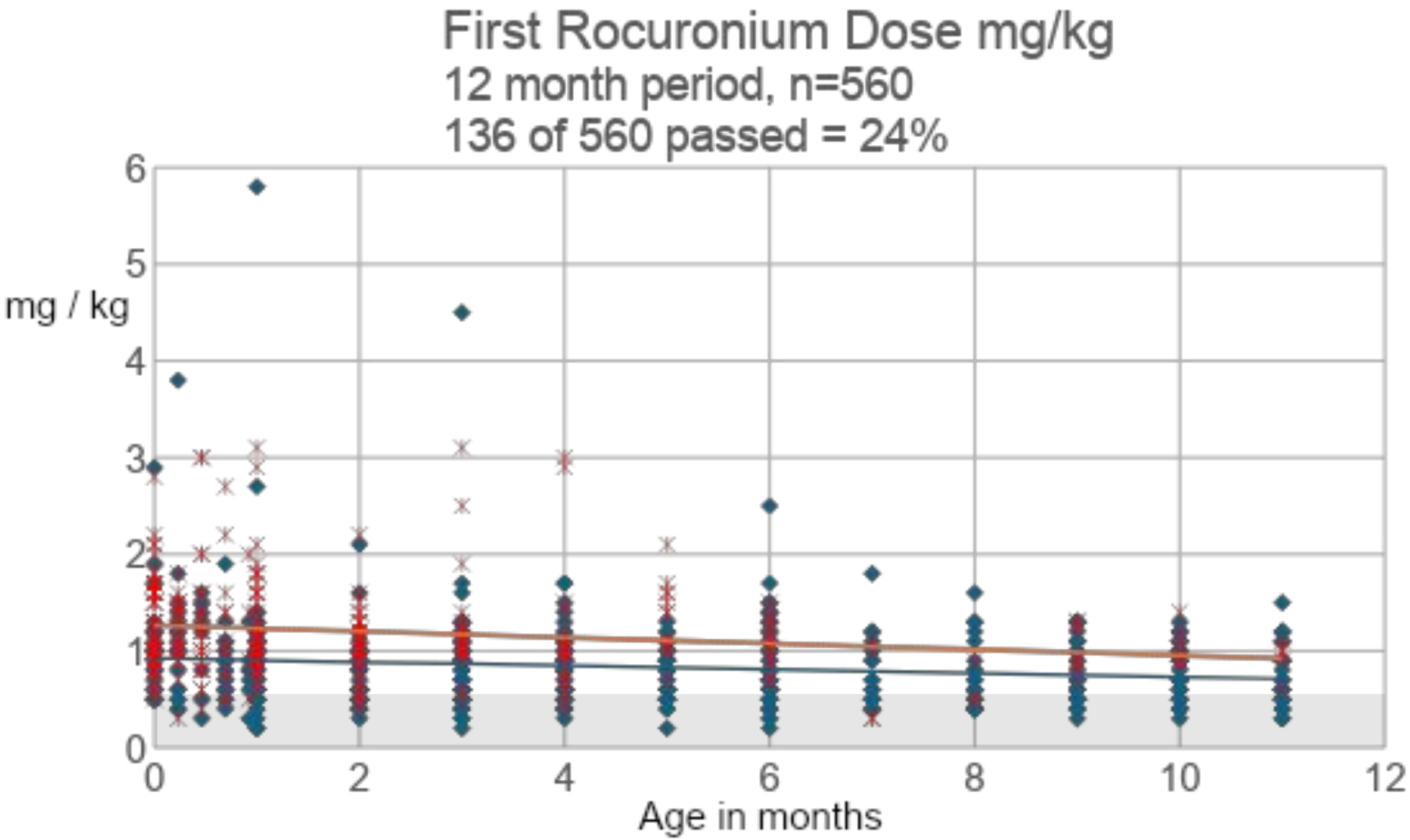
Inclusions

- Patients ≤ 5 years of age (as determined by Age Group value codes < 6)
- Patients who receive a bolus of non-depolarizing NMB during the measure time period

Exclusions

- Age > 5 years
- ASA 6 including Organ Procurement (CPT: 01990)
- Patients who do not receive non-depolarizing NMB during the measure time period
- Patients who receive non-depolarizing infusion during the measure time period
- Patients without documented weight
- Patients who were not extubated before Anesthesia End.

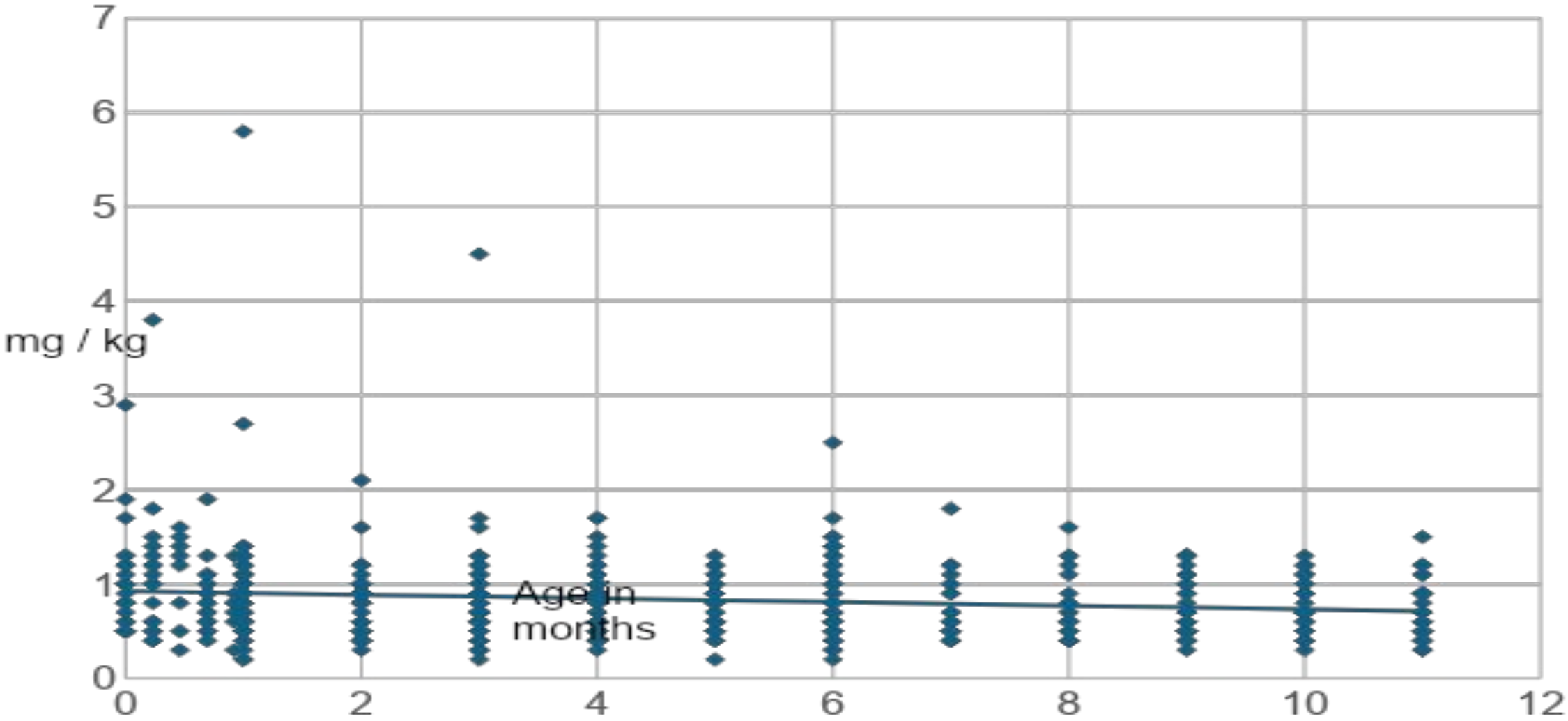
	Infants (mg/kg) AgeGroup value_code 1,2,3	**Children (mg/kg)** AgeGroup value_code 4,5
Cisatracurium	≤ 0.1	≤ 0.2
Atracurium	≤ 0.5	≤ 0.5
Rocuronium	≤ 0.5	≤ 1.2
Pancuronium	≤ 0.1	≤ 0.1
Vecuronium	≤ 0.1	≤ 0.1

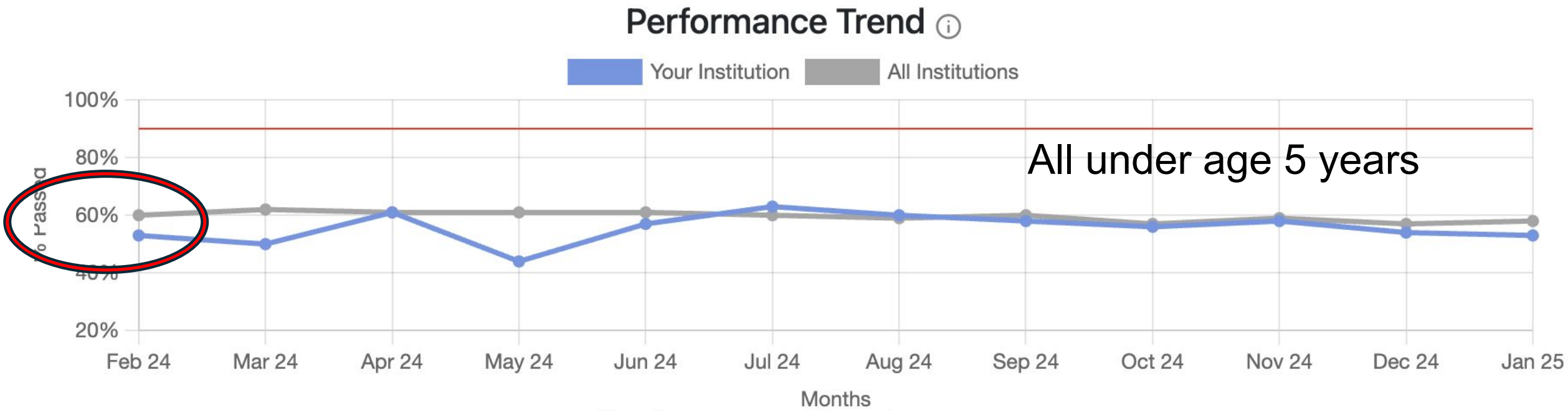

First Rocuronium Dose mg/kg
12 month period, n=560
136 of 560 passed = 24%
mg / kg
0
1
2
3
4
5
6
0
2
4
6
8
10
12
Age in months

First Rocuronium Dose mg/kg

12 month period, n=560

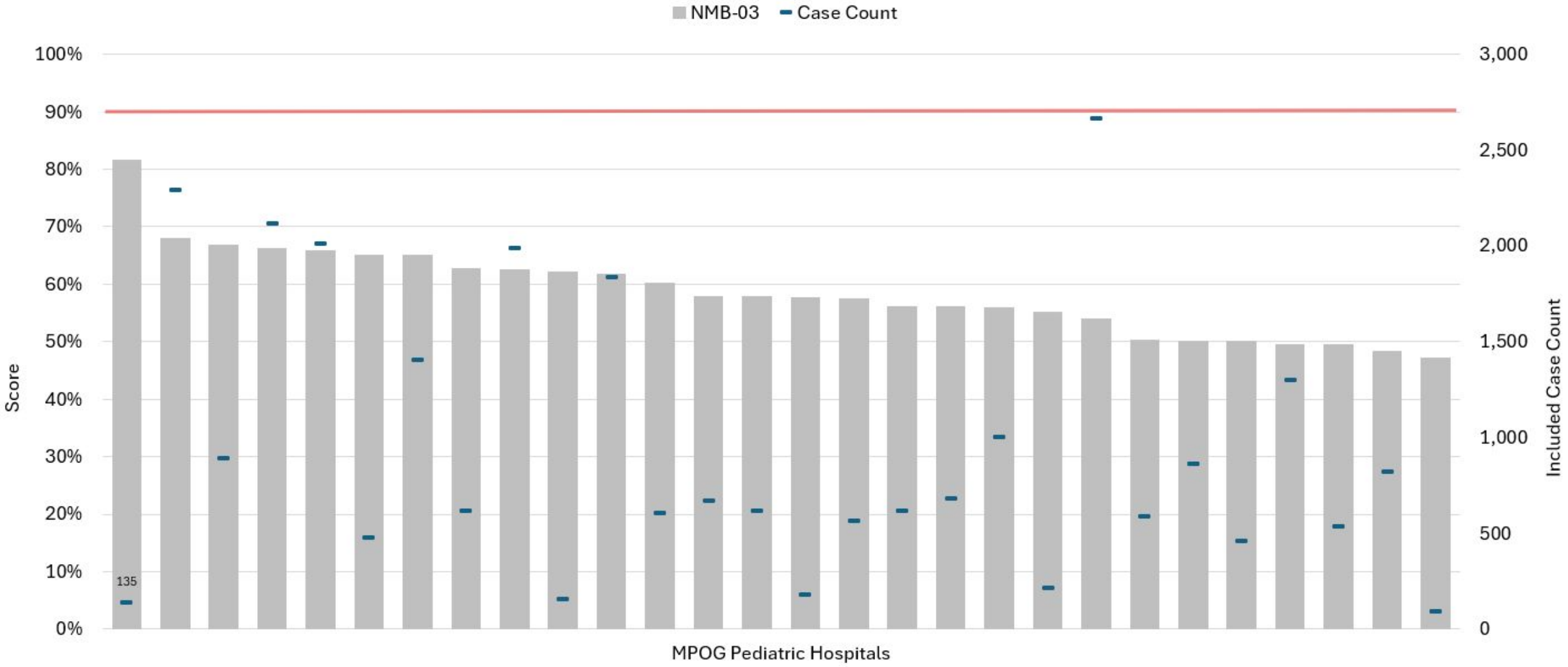
136 of 560 passed = 24%



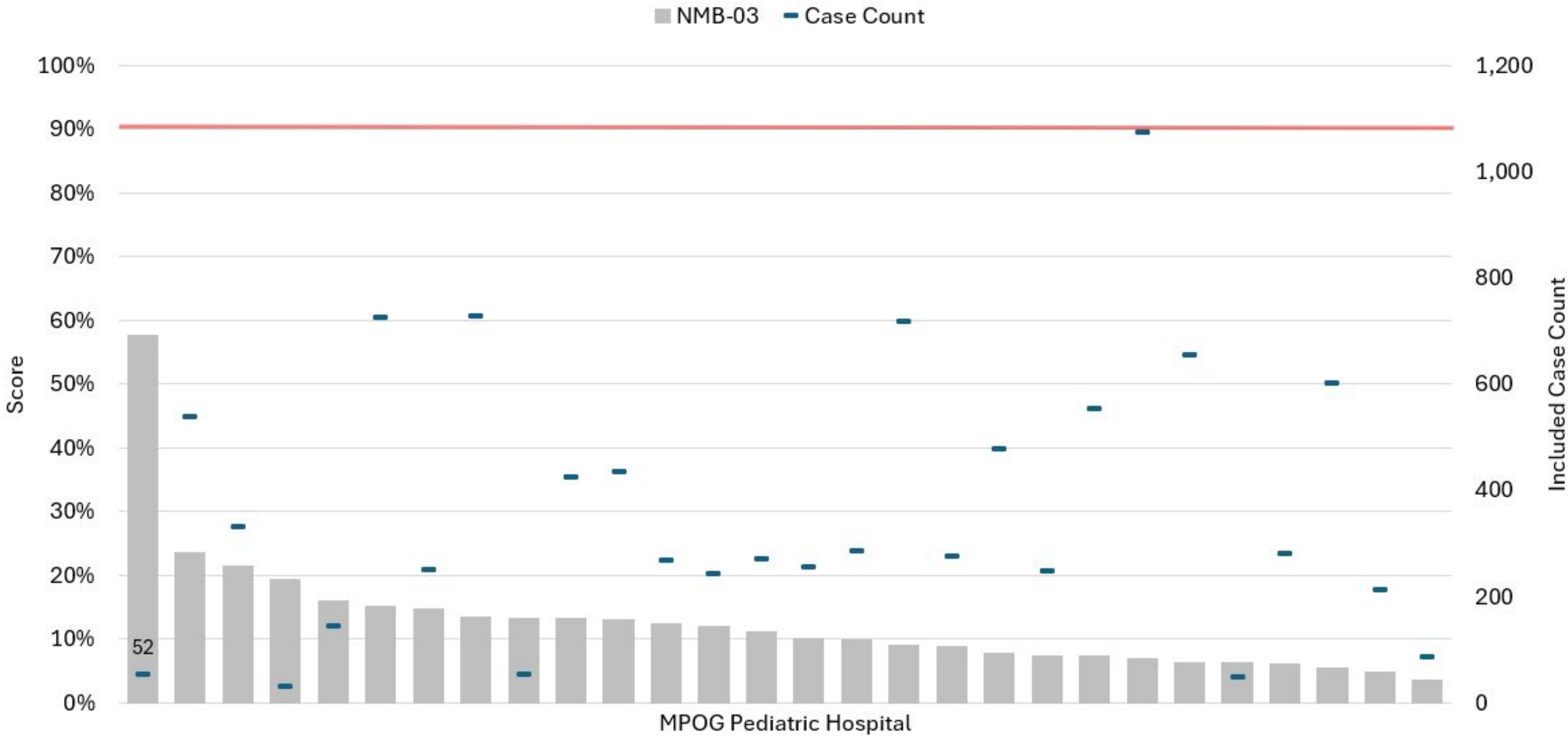

Performance Trend
Your Institution
All Institutions
100%
80%
60%
20%
% Passing
Feb 24
Mar 24
Apr 24
May 24
Jun 24
Jul 24
Aug 24
Sep 24
Oct 24
Nov 24
Dec 24
Jan 25
Months
All under age 5 years


Performance Trend
Your Institution
All Institutions (Loading)
100%
80%
60%
40%
20%
Feb 24
Mar 24
Apr 24
May 24
Jun 24
Jul 24
Aug 24
Sep 24
Oct 24
Nov 24
Dec 24
Jan 25
Months
Infants, <12 months

NMB Dosing, All under 5y



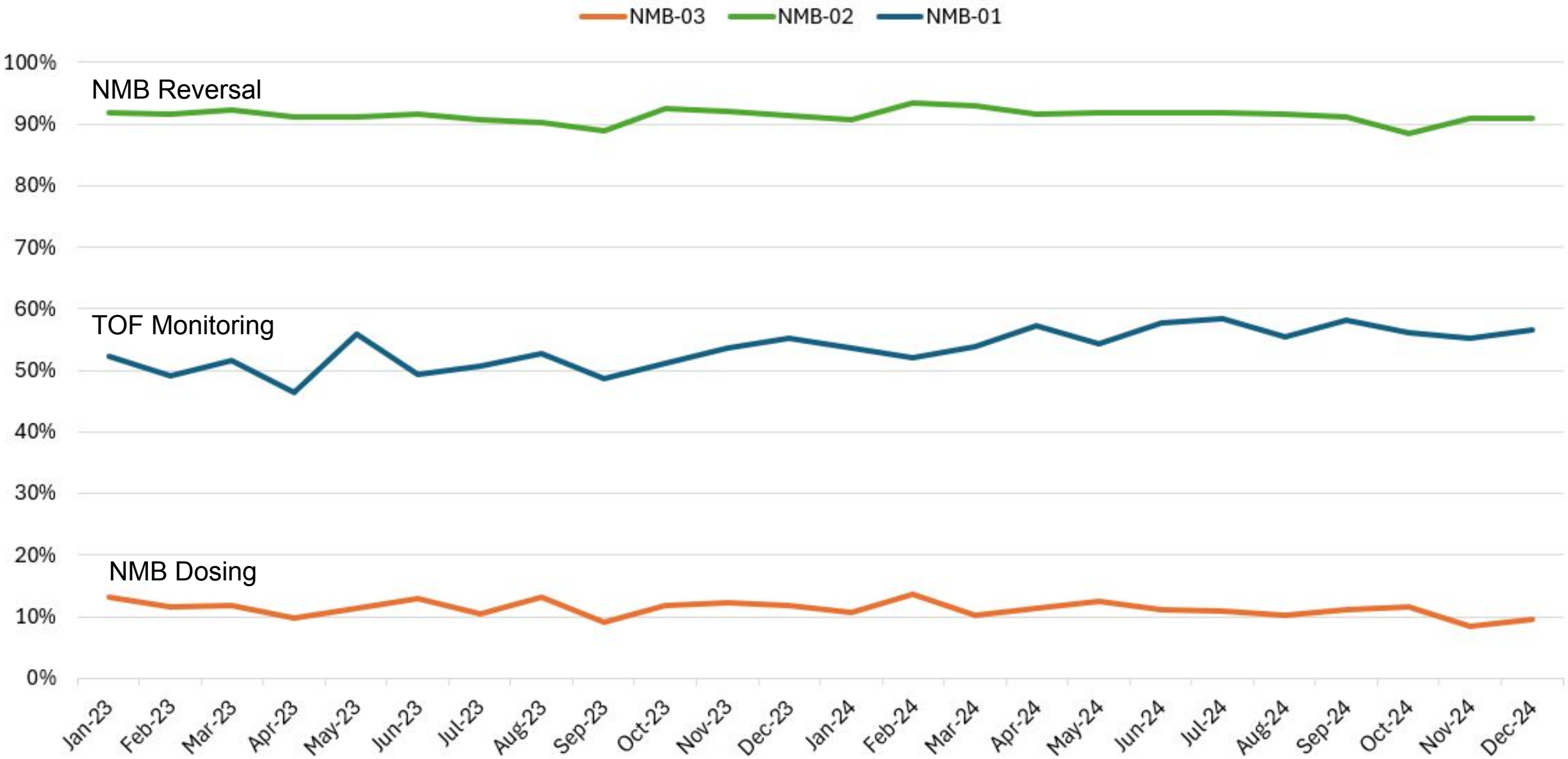
NMB Dosing, Infants < 12m



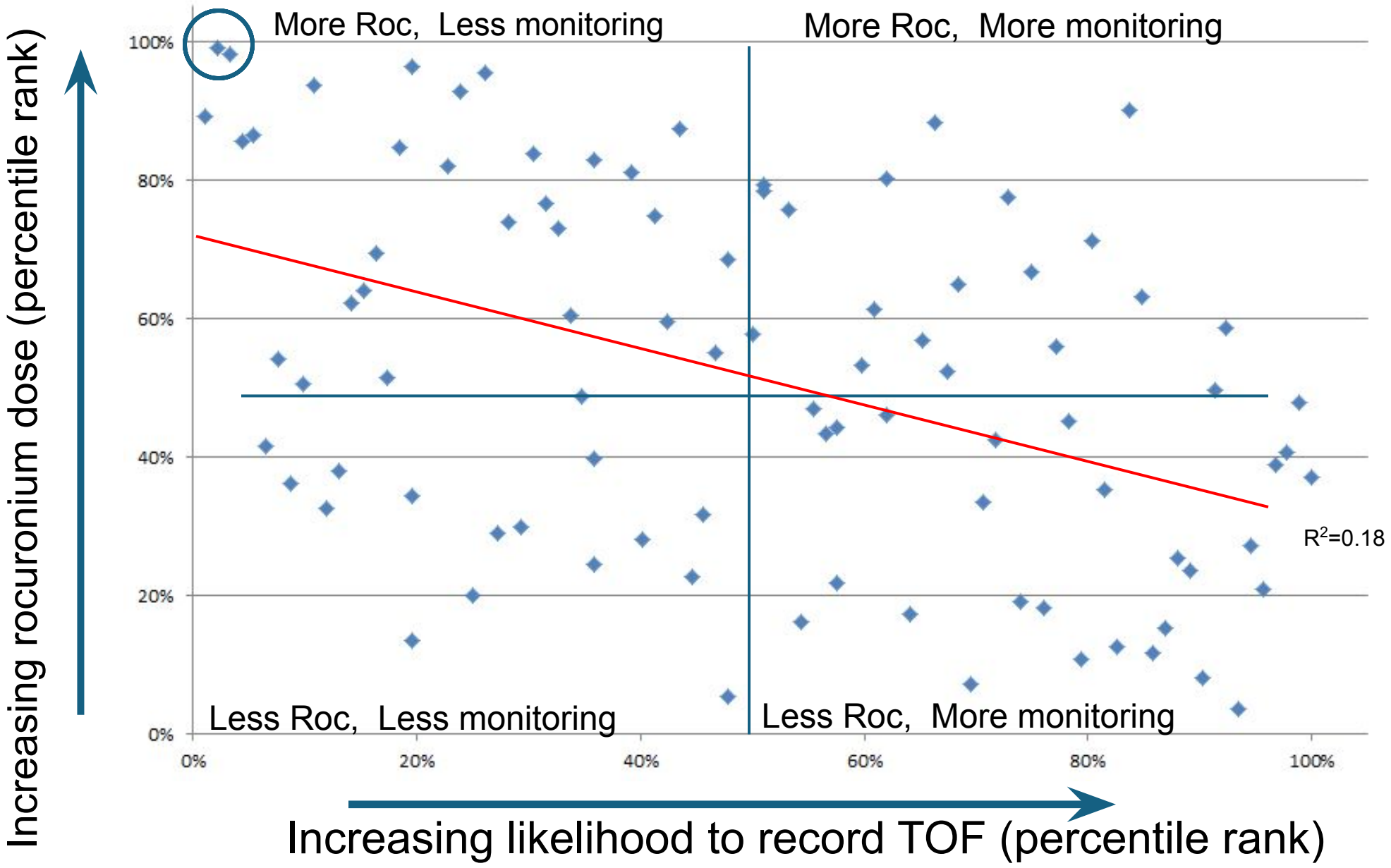
Are we good at NMB monitoring?

- Half of the included (extubated) neonates had any recorded TOF value

Infants, < 12m


NMB-03
NMB-02
NMB-01
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
NMB Reversal
TOF Monitoring
NMB Dosing
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
Jul-23
Aug-23
Sep-23
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24
Oct-24
Nov-24
Dec-24

Does NMB dose correlate with NMB monitoring?



Are we monitoring neonates sufficiently?

Front Pediatr. 2020 Sep 18:8:580. doi: 10.3389/fped.2020.00580. eCollection 2020.

Frontiers in pediatrics

Neurophysiological Assessment of Prolonged Recovery From Neuromuscular Blockade in the Neonatal Intensive Care Unit

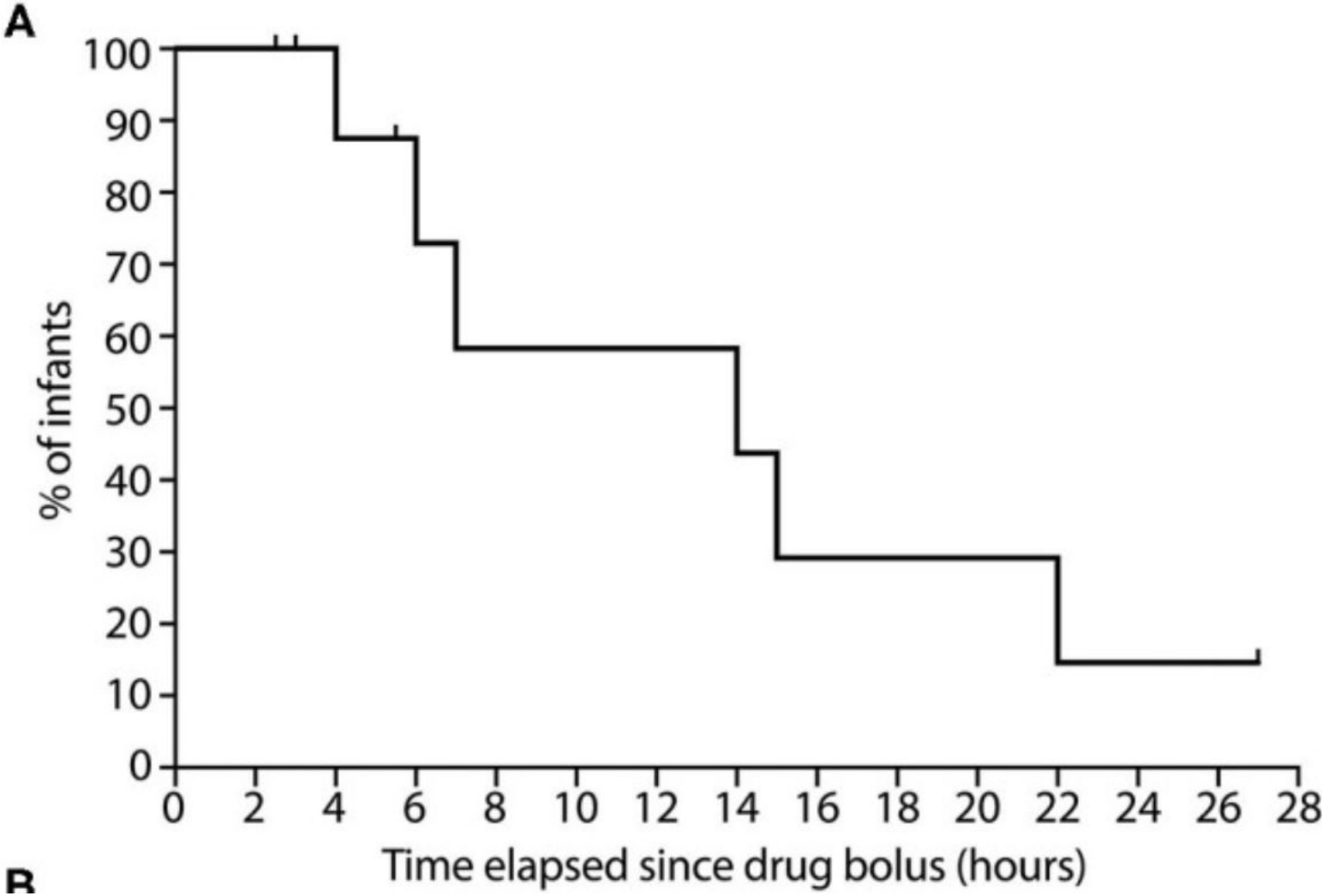
Omri David Soffer [1 2], Angela Kim [3], Ellen Underwood [3], Anne Hansen [1 2], Laura Cornelissen [3 4], Charles Berde [3 4]

NICU observational study.
10 infants following Rocuronium bolus, 1.5mg/kg
9 infants following Vecuronium infusion

Outcome measure, time for recovery of 70% twitch height

Are we monitoring neonates closely enough?

% of infants with TOF <70%

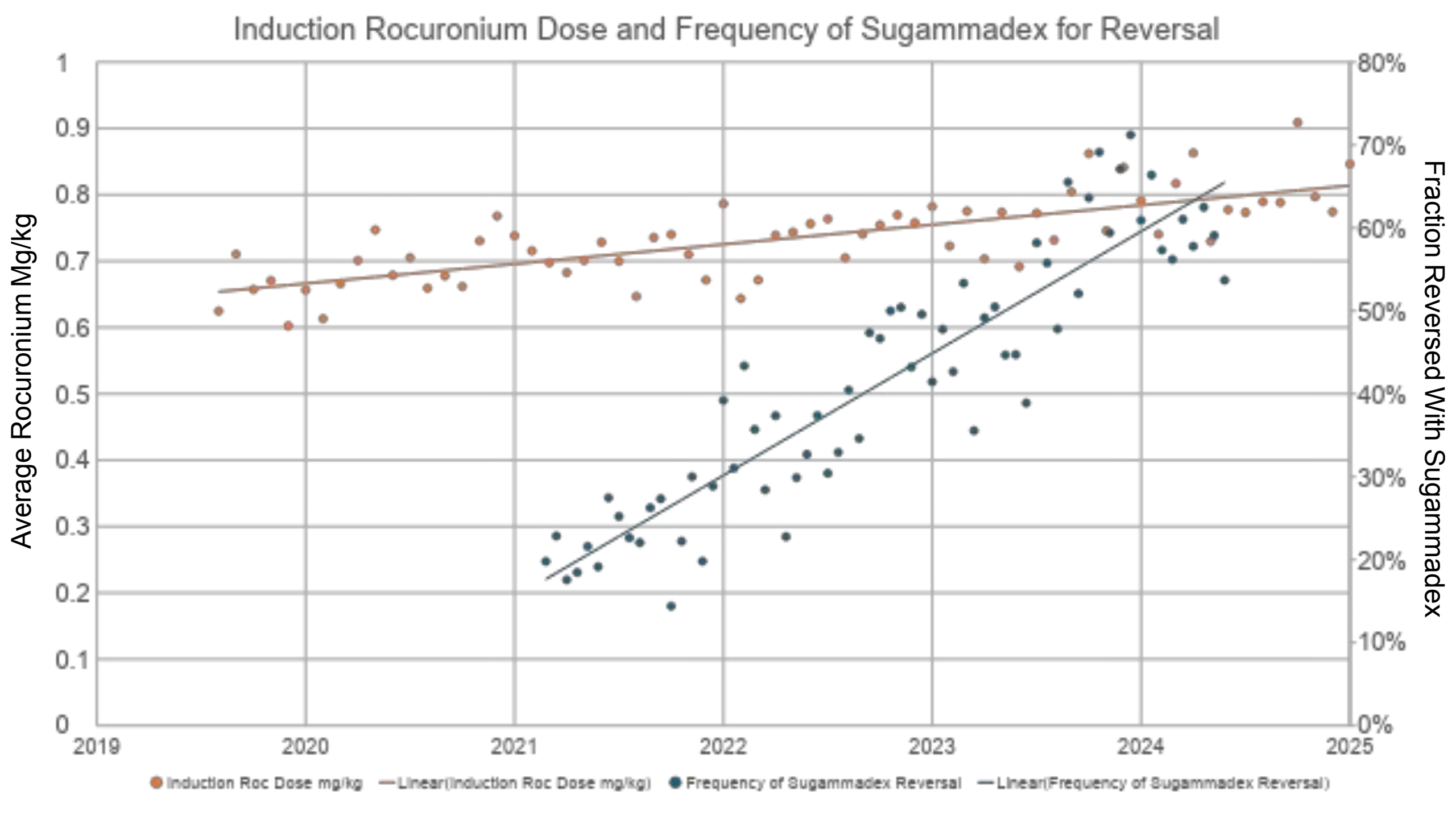


Roc bolus group:

-Median 11 days old

-Weight 3.6 kg

-Convenience sample of patients who would remain intubated after surgery


Induction Rocuronium Dose and Frequency of Sugammadex for Reversal
Average Rocuronium Mg/kg
Fraction Reversed With Sugammadex
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
80%
70%
60%
50%
40%
30%
20%
10%
0%
2019
2020
2021
2022
2023
2024
2025
Induction Roc Dose mg/kg
Linear(Induction Roc Dose mg/kg)
Frequency of Sugammadex Reversal
Linear(Frequency of Sugammadex Reversal)

Does paralytic dose matter?

Effects of high neuromuscular blocking agent dose on post-operative respiratory complications in infants and children

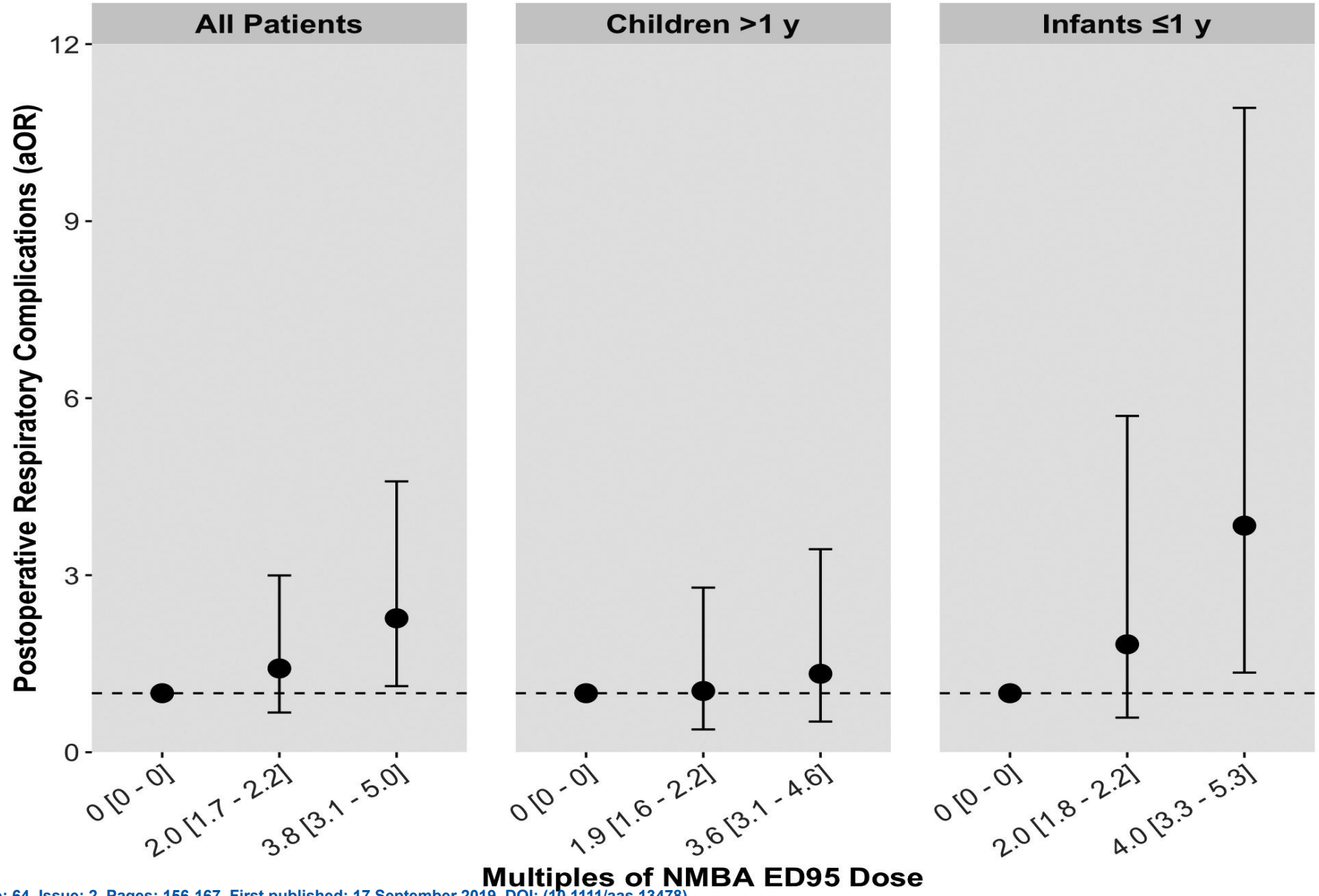
Flora T. Scheffenbichler, Maíra I. Rudolph, Sabine Friedrich, Friederike C. Althoff, Xinling Xu, Aaron C. Spicer, Maria Patrocínio, Pauline Y. Ng, Hao Deng, Thomas A. Anderson, Matthias Eikermann

First published: 17 September 2019 | https://doi.org/10.1111/aas.13478 | Citations: 16

Children 0-10 years of age, N=6,500
Postoperative respiratory complications: resp failure, pul edema, reintubation, pneumonia
Complex analysis, propensity for NMB use, and confounder adjusted analyses

Results: 1.1% of patients experiences postoperative respiratory complications

Effects of high neuromuscular blocking agent dose on post-operative respiratory complications in infants and children



Acta Anaesthesiol Scand, Volume: 64, Issue: 2, Pages: 156-167, First published: 17 September 2019, DOI: (10.1111/aas.13478)

Effect of neuromuscular block on surgical conditions during laparoscopic surgery in neonates and small infants

A randomised controlled trial

Lei Wu, Siwei Wei, Zhen Xiang, Eryou Yu, Zheng Chen, Shuangquan Qu and Zhen Du

- Neonates undergoing laparoscopy Ladd
- Randomized to zero, 0.45mg/kg, 0.6 mg/kg rocuronium
- Surgeons could not appreciate difference
- Anesthesia airway management benefited from low dose

Eur J Anaesthesiol. 2023 Dec 1;40(12):928-935

Residual Weakness and Recurarization After Sugammadex Administration in Pediatric Patients: A Case Series

Amanda N. Lorinc, MD,* Katheryne C. Lawson, MD,† Jonathan A. Niconchuk, MD,*
Katharina B. Modes, MD,* John D. Moore, MD,* and Bruce R. Brenn, MD*

While shown to be safe for administration in pediatric patients, sugammadex has recently been associated with residual weakness or recurarization. We describe 4 additional cases of pediatric patients with residual or recurrent weakness following rocuronium reversal with sugammadex. Two infant patients developed postoperative ventilatory distress, which was possibly related to recurarization after sugammadex reversal. A third patient received sugammadex with apparent waning of clinical effect and subsequently required neostigmine reversal. A fourth patient was observed to have residual weakness, which led to prolonged intubation despite appropriate train-of-four results after reversal with sugammadex. (A&A Practice. 2020;14:e01225.)

weight	Total Roc	Roc mg/kg	Twitches	Package insert sugammadex	Stoichiometric Sugammadex	Sug doses	Sug mg/kg	mg/mg
3.65	7	1.9	4 of 4	7	25	10/5/16	8.5	4.4
4.1	11	2.7	triggering vent	16	40	20/16	8.8	3.3
7.3	20	2.7	triggering vent	28	72	20/15	4.8	1.8
33	40	1.2	3 of 4	65	144	70/70	4.2	3.5

Changes to measure specification

- The calculation for pass/fail now updated to achieve the original goal of this measure

- Can the measure have an easy means of toggling between neonates(<12 months) and children(<5 years). Perhaps both graphs may be displayed simultaneously.

- Questions for group discussion:
    - is anyone using other NMB drugs with any frequency?
    - Comments from institutions that have a high pass rates?

NMB-03: NMB Dosing, Pediatrics

1 vote / site

Continue as is/ modify/ retire

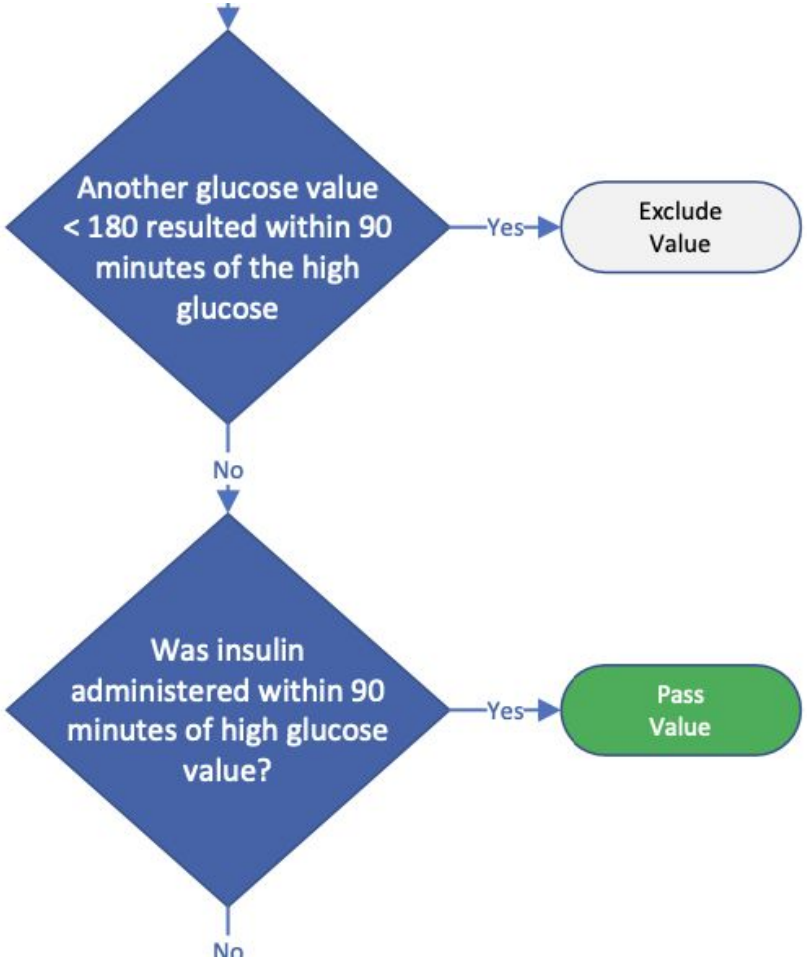
Need > 50% to retire measure

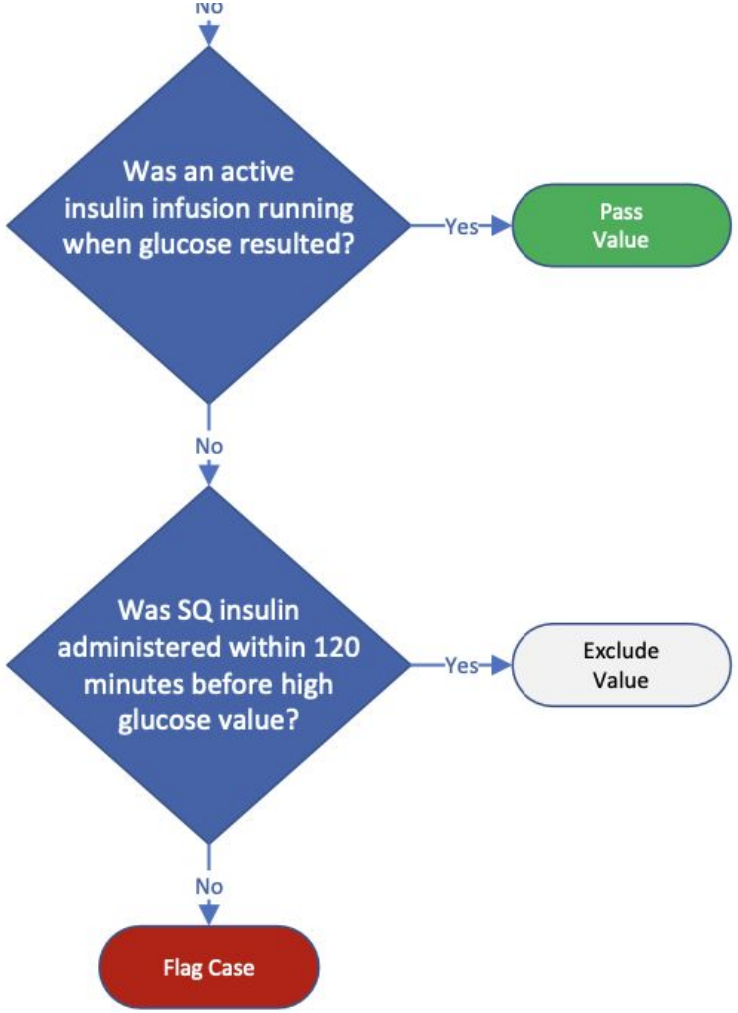
Coordinating center will review all votes after meeting to ensure no duplication

Hyperglycemia Management in Pediatrics

Dr. Ruchika Gupta (UMich, C.S. Mott Children's)

GLU-11: measure details





Management of Perioperative Glucose In Children over 12 (GLU-11 & GLU-10)

- GLU-11 measure started as an adult measure
  - Expanded to include pediatric pt greater than 12 years old
  - Includes cardiac & noncardiac (inpatient > 30 minute & outpatient > 4 hours)
  - Diabetic or non-diabetics
- Good protocols to manage pediatric patients with diabetes
- No pediatric protocols to manage non-diabetic hyperglycemia
- No RCT or observational evidence to support treatment in non-diabetic pediatric patients > 12 years old
- Some evidence to showing very poor outcomes with hypoglycemia
- Hesitancy to treat amongst pediatric anesthesiologists across country

Perioperative Outcomes in Congenital Heart Disease: A Review of Clinical Factors Associated With Prolonged Ventilation and Length of Stay in Four Common CHD Operations

A. Rebecca L. Hamilton, MD, MSc*,†,1, Koichi Yuki, MD, MBA†, Francis Fynn-Thompson, MD‡, James A. DiNardo, MD§, Kirsten C. Odegard, MD, MBA§

Perioperative Management of Pediatric Patients With Type 1 Diabetes Mellitus, Updated Recommendations for Anesthesiologists

Lizabeth D. Martin, MD,* Monica A. Hoagland, MD,† Erinn T. Rhodes, MD, MPH,‡ Joseph I. Wolfsdorf, MB, BCh,‡ and Jennifer L. Hamrick, MD, ASMG,§ on behalf of the Society for Pediatric Anesthesia Quality and Safety Committee Diabetes Workgroup

Pediatric context

- Prepubertal children are more sensitive to insulin
- We have a varied population (syndromes)
- Pediatric surgery this may include: Neuro, Ortho Spine, Long Bowel resections, Cardiac

Recommendations

- EXCLUDE pediatrics for GLU-11 (treatment > 180)
- Focus pediatric QI work on GLU-10 (treatment or recheck of > 180)
  - Recheck *OR* treat within 90 minutes
- Consider diabetic-specific pediatric measure built upon peer-reviewed recommendations

- Offer more conservative guidelines for treatment but limited data
- Identify evidence supporting non-diabetic pediatric hyperglycemia management

GLU-11: Hyperglycemia Treatment, Periop

Description: Percentage of patients with perioperative blood glucose >180 mg/dL with documentation of treatment within 90 minutes.

EXCLUDE patients 12-18y?

Coordinating center will review all votes after meeting to ensure no duplication

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

Next Meeting:
Monday June 23, 2025
4 - 5pm Eastern

Agenda
Measure Reviews:Pediatric Blood Management


Thank You!