MPOG Cardiac Anesthesia Subcommittee Meeting
March 14th, 2025

Agenda

- Introduction & announcements
- Measure Reviews:
  - TEMP-06-C: Hypothermia Avoidance, Cardiac
  - TEMP-07-C: Hyperthermia Avoidance, Cardiac
- Measure Update:
  - AKI-02-C: Acute Kidney Injury, Cardiac
  - ABX-03-C: Antibiotic Re-dosing, Open Cardiac
  - ABX-04-C: Antibiotic Selection, Open Cardiac
- Preliminary Data for New Measure
  - BP-07-C: Hypothermia Avoidance (MAP < 55 mmHg), Induction, Open Cardiac
  - TRAN-05-C: Coagulation Monitoring
- Summary and next steps

Introductions

- **ASPIRE Quality Team**
  - **Allison Janda, MD** – MPOG Cardiac Anesthesia Subcommittee Chair
  - **Michael Mathis, MD** – MPOG Director of Research
  - **Henrietta Addo, MSN, RN** – MPOG Cardiac Subcommittee Facilitator

- Cardiac Anesthesiology Representatives joining us from around the US!

Seeking Cardiac Subcommittee Vice-Chair

- 2-year term
- Help shape direction of Cardiac Subcommittee
- Measure performance review, new measure development, measure revision
- Identify and participate in research opportunities
- Work with Allison, Henrie, and the MPOG team
- Be able to devote 2 - 4 hours per month to this role
- Cardiac Subcommittee Vice-Chair Description: here
- Interested faculty should submit their interest to MPOG QI Director (Nirav Shah) at nirshah@med.umich.edu and MPOG Cardiac Subcommittee Chair (Allison Janda) at ajanda@med.umich.edu

Measure Review Process

- Review literature for given measure topic and provide review using MPOG Measure Review Template
- Present review of literature and recommendations at Cardiac Subcommittee meetings
- Reviewers names will be added to measure specifications as well as MPOG Measure Reviewer website

Measure Reviewers

MPOG Measure Reviewers are clinical and quality improvement experts that critique our QI Measures. They review the best available evidence and current standards of care to ensure that our measures stay relevant.

Please select this link for additional detail on our measure review process.

Sharon Abramovitz MD
Associate Professor of Anesthesiology
Weill Cornell

GA-01-OB – *General Anesthesia During Cesarean Deliveries*
GA-02-OB – *General Anesthesia after Neuraxial in Cesarean Deliveries*

Michael Andrawes, MD
Program Director, Adult Cardiothoracic Anesthesiology Fellowship
Massachusetts General Hospital

CARD 02 – *Myocardial Infarction*
CARD 03 – *Myocardial Infarction, High Risk Patients*

Ben Andrew, MD
Assistant Professor of Anesthesiology
Duke University

PONV-04-Peds – PONV Prophylaxis: Pediatrics

Dan Biggs, MD
Associate Professor of Anesthesiology
University of Oklahoma

BP-04-OB – *SBP < 90 in Cesarean Deliveries*

Alex Bouwhuis, MD
Anesthesiologist
Holland Hospital

TOC 01 – *Intraoperative Transfer of Care*

Mike Burns, MD
Clinical Assistant Professor of Anesthesiology
University of Michigan

OME – *Opioid Equivalency*

Upcoming Cardiac-Focused Measure Reviews

Measure	Review Date	Reviewers
TEMP-06-C: Hypothermia Avoidance	March 2025	Mariya Geube, Cleveland Clinic
TEMP-07-C: Hyperthermia Avoidance	March 2025	Ashan Grewal, UMaryland
GLU-06-C: Hyperglycemia Management	June 2026	Josh Billings, Vanderbilt
GLU-07-C: Hypoglycemia Management	June 2026	Rob Schonberger, Yale
GLU-08-C: Hyperglycemia Treatment	June 2026	Josh Billings, Vanderbilt

Thank you in advance for ensuring MPOG Cardiac-specific measures remain relevant & consistent with published recommendations!

Contact Allison with any questions: ajanda@med.umich.edu

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Measure Review

Measure Review: TEMP-06-C

Mariya Geube, MD
Cleveland Clinic

TEMP-06-C Hypothermia Avoidance

Cardiac Anesthesia QI Subcommittee

March 14th, 2025

Mariya Geube, MD; Cleveland Clinic

Definition: Hypothermia avoidance

Percentage of adult patients undergoing an open cardiac procedure for whom any core temperature at the end of the case < 35.5 C

Measure start at initiation of CPB

Measure end at 30 minutes after Anesthesia End

- **Outcome** metric

- **Threshold** : < 10%

Hypothermia avoidance

- **Clinical rationale:**

Perioperative hypothermia is defined as a core temperature < 36 degrees Celsius by the National Institute of Health and the American Heart Association.

It can result in adverse effects including surgical site infections, cardiovascular events, impaired wound healing and increased hospital length of stay in both the non-cardiac and cardiac surgical populations.

Such adverse effects are prevented through maintenance of normothermia intraoperatively.

Hypothermia avoidance

- **Assessment of current clinical rationale:**

The literature is consistent regarding potential adverse effects of hypothermia on major outcomes such as surgical wound infections, increased length of hospital stay and cardiac adverse events (postoperative MI)

In cardiac surgery, there is a strong support for normothermia in the enhanced pathway algorithms, aiming to promote fast recovery and early extubation. In addition, hypothermia may exacerbate postoperative bleeding and delay recovery from neuromuscular blockade.

Evaluation of inclusion and exclusion criteria

- Inclusion criteria:

Adult patients undergoing open cardiac surgery

- Exclusion criteria:

Noncardiac, transcatheter/endovascular/EP/Cath lab procedures

Appropriate

Measure source

- Temperature measurements are prioritized with hierarchy applied in the following order:
  - Bladder (core)
  - Rectal (core)
  - Blood (core) or PA catheter (core)
  - Naso-pharyngeal (core)
  - Esophageal (core)
  - Zero flux thermometer (near core)
  - Other non-core routes (axillary, oral, skin, temporal, tympanic)

Evaluation of definition of success and flagged cases

- **Last core T within 30 minutes before Anesthesia End and after CPB end.**

- Core T > 35.5 C case passes
- Core T < 35.5 C case flagged
- If no core T available look for non-core T source
- If no T available within 30 minutes before Anesthesia End

Move to last core T within 30 minutes after Anesthesia End

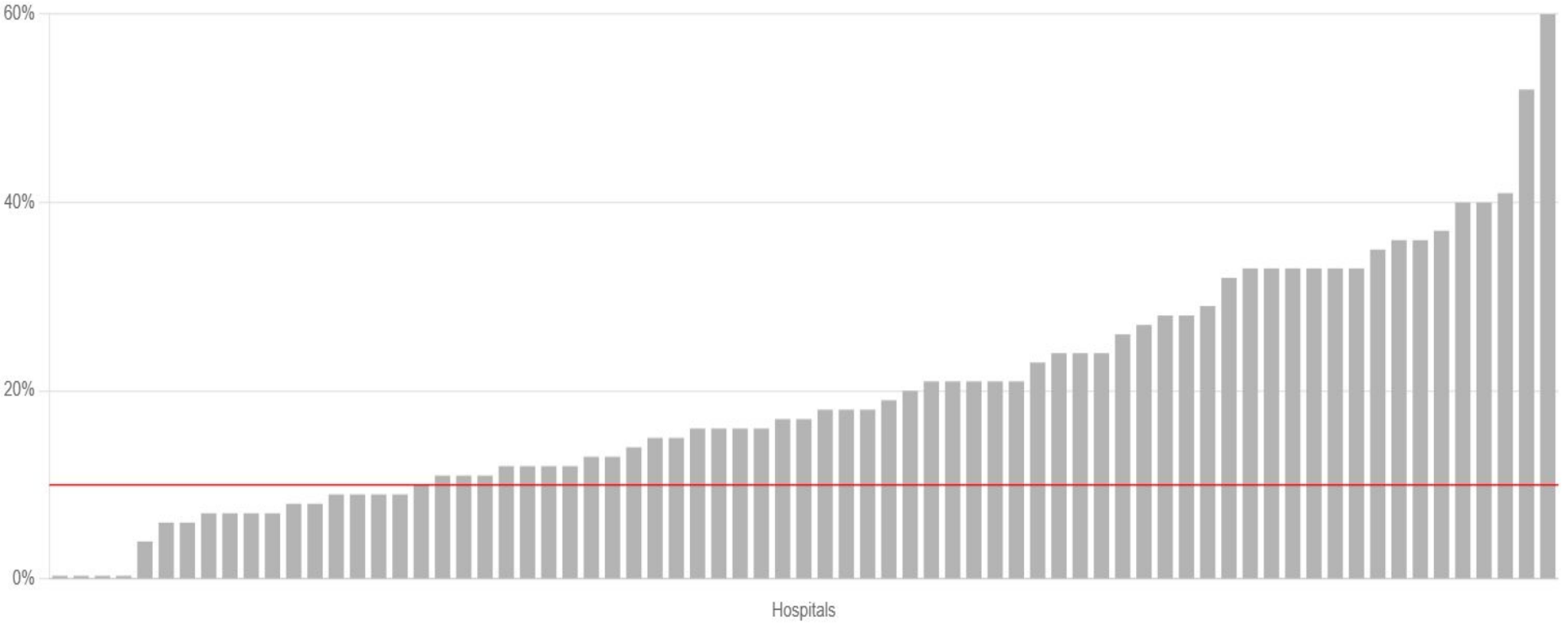
- No T found case flagged (T not documented)

Appropriate

MPOG

Recommendation for Temp-06-C

Recommendation	
Keep as is without changes	✔ **Keep unchanged**
Modify: specify changes	
Retire: Eliminate entirely from dashboard	



Temp-06-C Hypothermia avoidance

01/01/2024 – 01/01/2025

1. National Collaborating Centre for N, Supportive C. National Institute for Health and Clinical Excellence: Guidance. *The Management of Inadvertent Perioperative Hypothermia in Adults*. London: Royal College of Nursing (UK)National Collaborating Centre for Nursing and Supportive Care.; 2008.

2. Yi J, Liang H, Song R, Xia H, Huang Y. Maintaining intraoperative normothermia reduces blood loss in patients undergoing major operations: a pilot randomized controlled clinical trial. *BMC anesthesiology.* 2018;18(1):126.

3. Rajagopalan S, Mascha E, Na J, Sessler DI: The effects of mild perioperative hypothermia on blood loss and transfusion requirement. Anesthesiology 2008; 108:71–7

4. Del Rio JM, Abernathy JJ 3rd, Taylor MA, Habib RH, Fernandez FG, Bollen BA, Lauer RE, Nussmeier NA, Glance LG, Petty JV 3rd, Mackensen GB, Vener DF, Kertai MD: The Adult Cardiac Anesthesiology Section of STS Adult Cardiac Surgery Database: 2020 Update on Quality and Outcomes. Anesth Analg 2020 doi:10.1213/ANE.0000000000005093

5. Engelman DT, Ben Ali W, Williams JB, Perrault LP, Reddy VS, Arora RC, Roselli EE, Khoynezhad A, Gerdisch M, Levy JH, Lobdell K, Fletcher N, Kirsch M, Nelson G, Engelman RM, Gregory AJ, Boyle EM: Guidelines for Perioperative Care in Cardiac Surgery: Enhanced Recovery After Surgery Society Recommendations. JAMA Surg 2019 doi:10.1001/jamasurg.2019.1153

6. Engelman R, Baker RA, Likosky DS, Grigore A, Dickinson TA, Shore-Lesserson L, Hammon JW: The Society of Thoracic Surgeons, The Society of Cardiovascular Anesthesiologists, and The American Society of ExtraCorporeal Technology: Clinical Practice Guidelines for Cardiopulmonary Bypass--Temperature Management During Cardiopulmonary Bypass. J Cardiothorac Vasc Anesth 2015; 29:1104–13

7. Gregory AJ, Grant MC, Manning MW, Cheung AT, Ender J, Sander M, Zarbock A, Stoppe C, Meineri M, Grocott HP, Ghadimi K, Gutsche JT, Patel PA, Denault A, Shaw A, Fletcher N, Levy JH: Enhanced Recovery After Cardiac Surgery (ERAS Cardiac) Recommendations: An Important First Step-But There Is Much Work to Be Done. J Cardiothorac Vasc Anesth 2020; 34:39–47

8. Karalapillai D, Story D, Hart GK, Bailey M, Pilcher D, Cooper DJ, Bellomo R: Postoperative hypothermia and patient outcomes after elective cardiac surgery. Anaesthesia 2011; 66:780–4

9. Hannan EL, Samadashvili Z, Wechsler A, Jordan D, Lahey SJ, Culliford AT, Gold JP, Higgins RSD, Smith CR: The relationship between perioperative temperature and adverse outcomes after off-pump coronary artery bypass graft surgery. J Thorac Cardiovasc Surg 2010; 139:1568–75.e1

10. Hofer CK, Worn M, Tavakoli R, Sander L, Maloigne M, Klaghofer R, Zollinger A: Influence of body core temperature on blood loss and transfusion requirements during off-pump coronary artery bypass grafting: a comparison of 3 warming systems. J Thorac Cardiovasc Surg 2005; 129:838–43

Relevant New Literature

- Engelman et al. Guidelines for Perioperative Care in Cardiac Surgery: ERACS Recommendations JAMA 2019

  - Postoperative T > 36.0 C

- Grant et al. Perioperative Care in Cardiac Surgery: Expert Consensus Statement. Ann Thorac Surg 2024

  - Postoperative T > 36.0 C included in the Surgical site infection prevention bundle

- Del Rio et al. Adult Cardiac Anesthesia Section of STS: 2020 Update on Quality and Outcomes

  - Hypothermia not included. Data shown on most commonly used intraoperative T sources

Relevant New Literature

- Sessler et al. Intraoperative warming vs routine thermal management during non-cardiac surgery: PROTECT trial
  - Superiority trial; active intraoperative warming group – T 37.1 C;
  - Standard thermal management group – 35.6 C
  - No difference in the 30 day composite cardiovascular outcomes
  - Intraoperative T goal > 35.5 C enough for commonly cited complications

Relevant New Literature

- Shou et al. Impact of intraoperative blood products, fluids and persistent hypothermia on reexploration for bleeding in cardiac surgery. J Thorac Cardiovasc Surg 2024
  - Retrospective cohort ~ 4000 patients
  - Re-exploration rate 3.7%
  - Associations: Intraoperative crystalloid and postoperative hypothermia < 36.0 C
- Stuart et al. Perioperative Hypothermia in Robotic-Assisted Thoracic Surgery. J Thorac Cardiovasc Surg 2024
  - Retrospective cohort ~ 300 patients
  - Factors associated with T < 35.5 C – age, low BMI, increased OR time
  - Associated with higher surgical wound infections and pneumonia

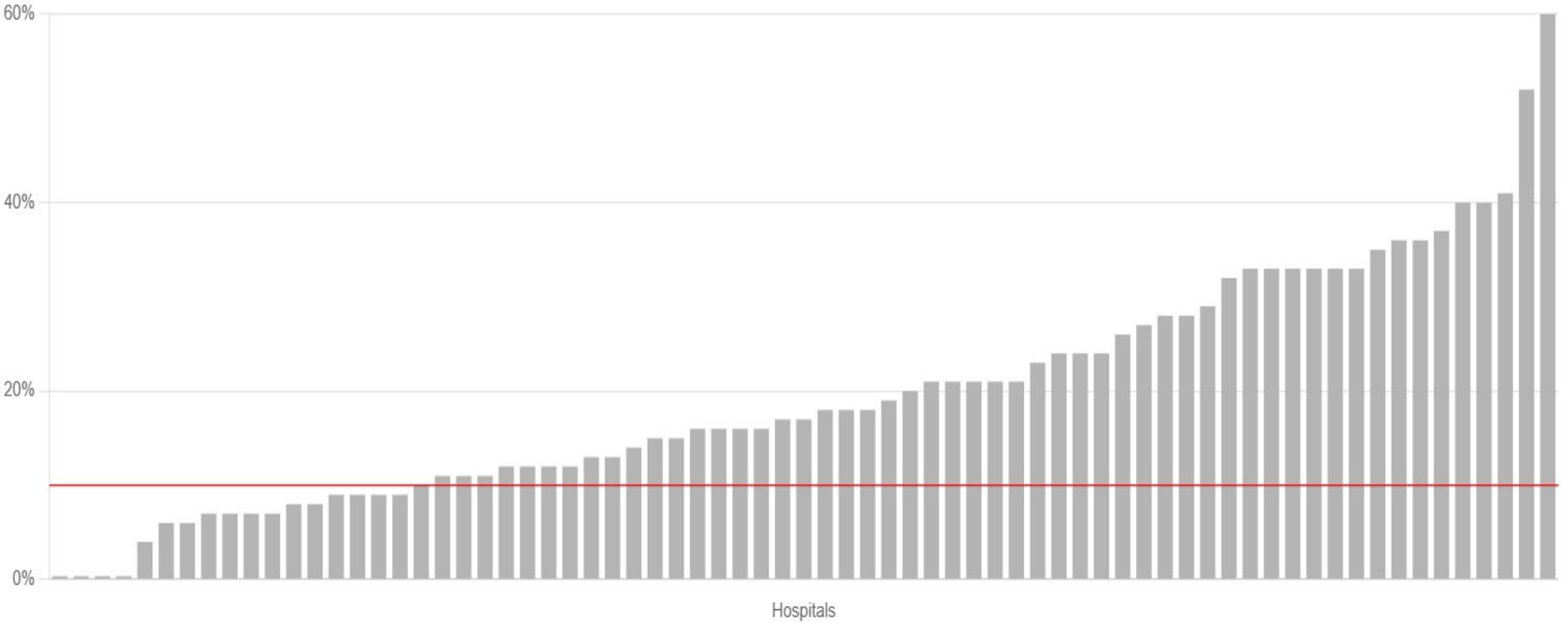
TEMP-06-C: Hypothermia Avoidance, Cardiac

- **Description:**
  - Percentage of adult patients undergoing an open cardiac surgery for whom any core temperature at the end of the case was < 35.5 °C (95.9 °F)
- **Timing:**
  - Measure start:
    - Cardiopulmonary bypass initiated (ID:50410), if not present,
    - Cardiopulmonary bypass start phenotype
  - Measure end:
    - 30 minutes after Anesthesia End
    - *For cases without bypass: Anesthesia End 30 minutes after Anesthesia End
- **Success:**
  - Last non-artifact body temperature ≥ 35.5 °C (95.9 °F) at Anesthesia End (prioritizes core temperature measurements)

TEMP-06-C: Hypothermia Avoidance, Cardiac

- **Core Temperature Measurements will be prioritized over near-core temperature measurements with hierarchy applied in the following order:**
  - Bladder (core)
  - Rectal (core)
  - Blood (core) or PA catheter (core)
  - Nasal (core)
  - Esophageal (core)
  - Zero Flux thermometer (near core)
  - Other non-core routes (axillary, oral, skin, temporal, tympanic)

TEMP-06-C: Performance Across MPOG



March 2024 - January 2025 (0 - 60%)

TEMP-06-C: Hypothermia Avoidance, Cardiac

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

Measure Review: TEMP-07-C

Ashan Grewal, MD
University of Maryland

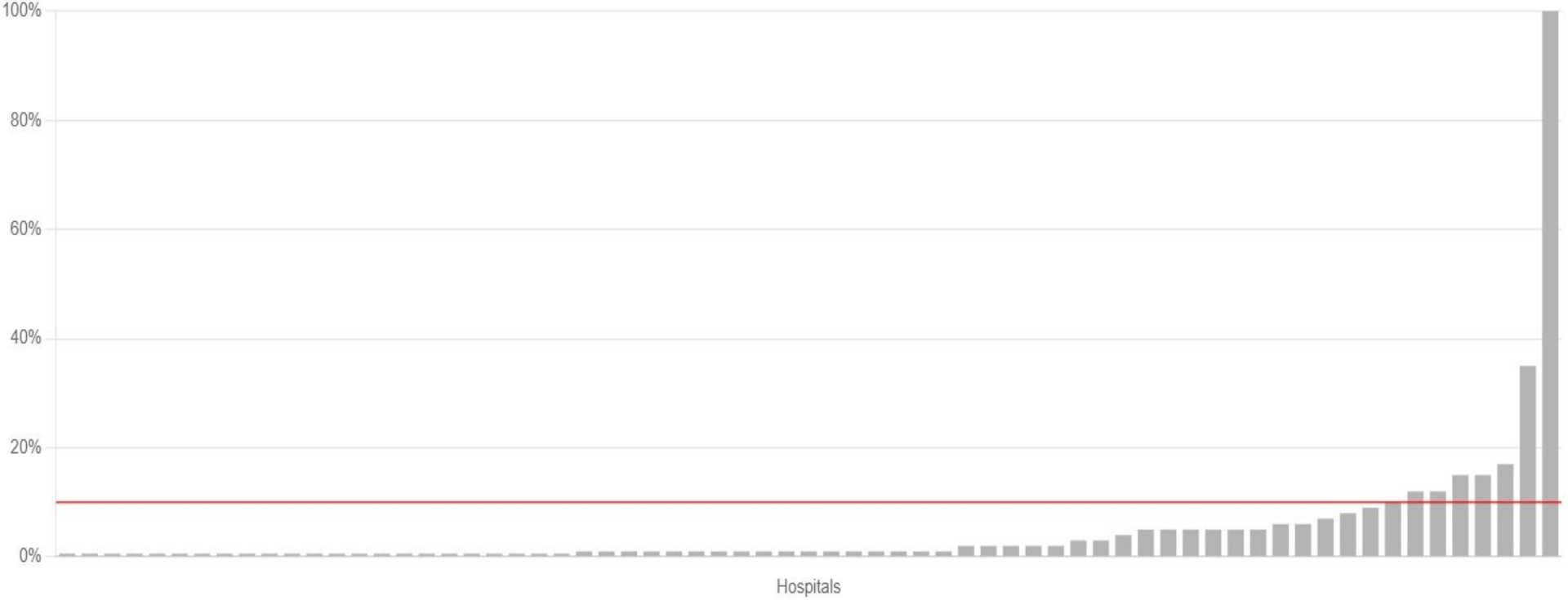
TEMP-07-C: Hyperthermia Avoidance, Cardiac

- **Description:**
  - Percentage of adult patients undergoing an open cardiac surgery for whom core temperature was > 37.5 ◦C (99.5 ◦F)
- **Timing:**
  - Measure start:
    - Cardiopulmonary bypass initiated (ID:50410), if not present,
    - Cardiopulmonary bypass start phenotype
  - Measure end:
    - Cardiopulmonary bypass terminated (ID:50409), if not present,
    - Cardiopulmonary bypass end phenotype, if not present
    - Anesthesia End
- **Success:**
  - Less than 5 consecutive minutes of non-artifact body temperature > 37.5 °C (99.5 °F) between cardiopulmonary bypass start and cardiopulmonary bypass end (prioritizes core temperature measurements)

TEMP-07-C: Hyperthermia Avoidance, Cardiac

- **Core Temperature Measurements will be prioritized over near-core te measurements with hierarchy applied in the following order:**
  - Arterial bypass cannula temperature (Concept ID:3263)
  - Nasopharyngeal (Concept ID:3059)
  - Esophageal (Concept ID:3055)
  - Blood (Concept ID:3056) or keyword PA catheter
  - Bladder (Concept ID:3058)
  - Rectal(Concept ID:3061)
  - Zero flux thermometer (non-core) via keyboard search of temperature routes
  - Other non-core routes (axillary, oral, skin, temporal, tympanic, unspecified)

TEMP-07-C: Performance Across MPOG



March 2024 - January 2025 (0 - 100%)

TEMP-07-C: Dr. Grewal's review

- No new literature/data found that would advise against goals of this measure
- No new data or guidelines found contradicting the rationale for the development of this measure
- Measure includes all patients undergoing open cardiac surgical procedures requiring CPB. This is in line with the goal and does not require modification.
- Logic correctly attributes to providers that are signed in for the greatest number of minutes during CPB

TEMP-07-C: Dr. Grewal's review

- The measure prioritizes arterial bypass cannula temperature measurement when available. There is usually a differential between the arterial bypass cannula temperature and the nasopharyngeal temperature (NPT) measurement, with NPT possibly being lower. I wonder if the measure results for the sites that have the arterial bypass cannula temperature measurement available would be different (more flagged measurements) compared to NPT measurements.

- **Overall Summary of Recommendations:**
  - Modify to analyze whether the sites with arterial bypass cannula temperature measurement would have different measure results if nasopharyngeal temperature (NPT) measurement was used. If so, then consideration should be given to preferentially using NPT over arterial bypass cannula temperature.

TEMP-07-C: Hyperthermia Avoidance, Cardiac

1 vote/ site

Continue as is/ modify/ retire

Need > 50% to retire measure

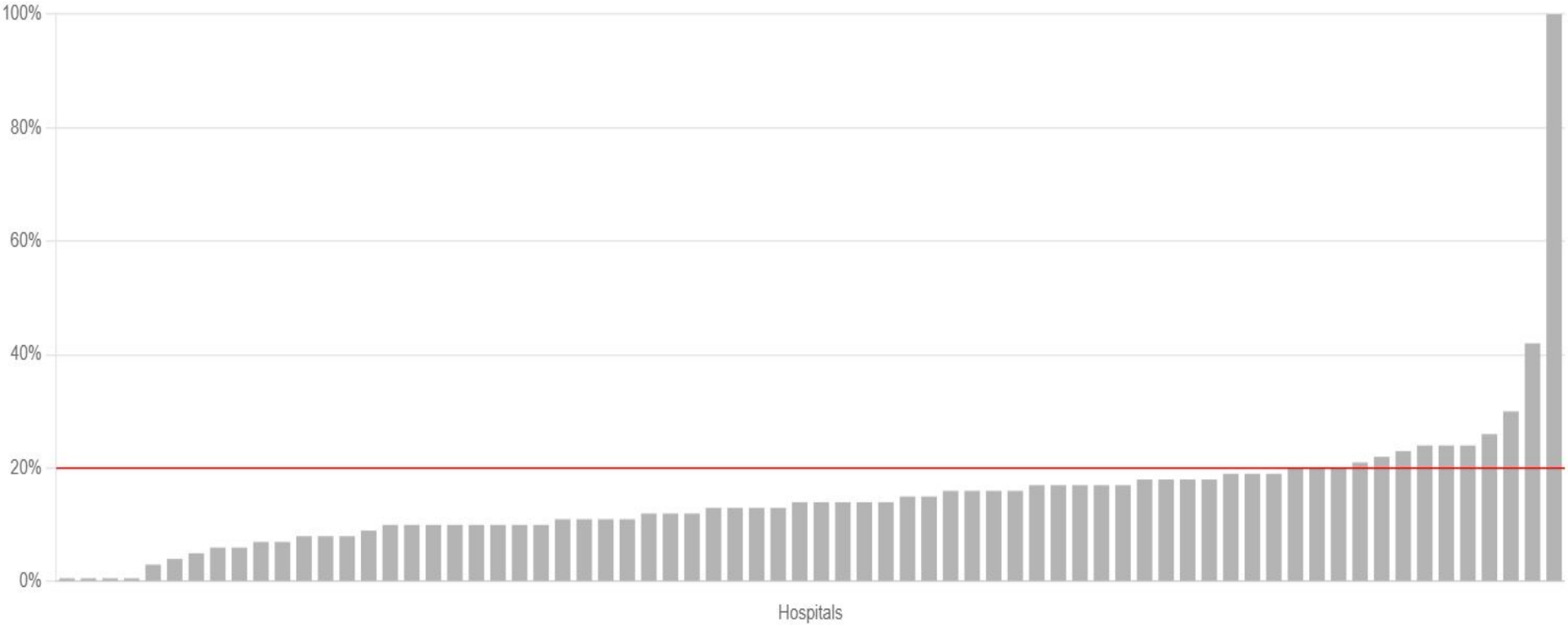
Coordinating center will review all votes after meeting to ensure no duplication

Measure Updates

AKI-02-C: Acute Kidney Injury, Cardiac

- **Description:**
  - Percentage of adult patients undergoing open cardiac surgery with more than a 1.5x increase in baseline creatinine within 7 postoperative days or the baseline creatinine level increases by ≥ 0.3 mg/dL within 48 hours postoperatively.
- **Timing:**
  - Up to 7 days after Anesthesia End
- **Success Criteria:**
  - The creatinine level does not go above 1.5x the baseline creatinine within 7 days postop
  - The creatinine level does not increase by ≥ 0.3 mg/dL obtained within 48 hours after anesthesia end
- **Recent updates:**
  - **Increased measure threshold to ≤ 20% from the original threshold of ≤ 10%**
  - **Update is live in QI Reporting Tool (dashboards) now!**

AKI-02-C: Performance Across MPOG with ≤ 20% threshold



March 2024 - January 2025 (0 - 100%)

MPOG

ABX-03-C: Antibiotic Re-dosing, Open Cardiac Procedures

- **Description:**
  - Percentage of adult patients undergoing open cardiac surgery with an antibiotic redose initiated within four hours after initial antibiotic administration (cephalosporins only).
- **Timing:**
  - 120 minutes prior to Anesthesia Start through Surgery End. If Surgery End is not available, Anesthesia End
- **Success Criteria:**
  - Documentation of cephalosporin redose within 165-255 minutes after each cephalosporin administration
- **Upcoming update:**
  - **The measure will consider the most recent dose administered before surgical incision start/ procedure start as initial dose**
  - **Score changes were minimal (<1%)**
  - **Update will reflect on your dashboard on April 7th**

ABX-04-C: Antibiotic Selection, Open Cardiac Procedures

- **Description:**
  - Percentage of adult patients undergoing open cardiac surgery with the recommended antibiotic agents administered for surgical site infection prophylaxis.
- **Timing:**
  - 120 minutes prior to Anesthesia Start through Anesthesia End
- **Success Criteria:**
  - Documentation of appropriate antibiotics administered preoperatively or intraoperatively

ABX-04-C: Antibiotic Selection, Open Cardiac Procedures

Acceptable Antibiotics:

*Newly added antibiotics

Antibiotic Combinations for Open Cardiac Procedures
Vancomycin (ID: 10444) + Cephalosporin (IDs: 10106, 10107, 10108, 10109, 10110, 10111, 10112, 10113, 10114, 10115)
Vancomycin (ID: 10444) + Aminoglycoside (ID: 10202, 10023, 10433)
Vancomycin (ID: 10444) + Any gram negative (IDs: 10029, 10030, 10032, 10033, 10049, 10126, 10178, 10226, 10245, 10285, 10365, 10415)
Cephalosporin Only (IDs: 10106, 10107, 10108, 10109, 10110, 10111, 10112, 10113, 10114, 10115)

Antibiotics and Concepts

Aminoglycoside:

10023 Amikacin

10433 Tobramycin

Other gram negative:

10029 Amoxicillin

10030 Amoxicillin/Clavulanate

10032 Ampicillin

10033 Ampicillin/Sulbactam

10049 Aztreonam

10126 Ciprofloxacin

10178 Ertapenem

10226 Imipenem/Cilastatin

10245 Levofloxacin

10285 Meropenem

10365 Piperacillin/Tazobactam

10415 Sulfamethoxazole/Trimethoprim

ABX-04-C: Antibiotic Selection, Open Cardiac Procedures

Summary of changes:

- **Upcoming update:**
  - **Updated the rationale section for the measure to reflect the addition of prophylactic gram negative antibiotics**
  - **Added 2 new antibiotics to the Vancomycin + Aminoglycoside combination**
  - **Added a combination of Vancomycin + Any gram negative**
- **Score changes anticipated to be minimal for most sites. However, sites with a primary regimen of Vanco + Gram negative antibiotic will see upwards of 25% improvement in scores**
- **Change will reflect on your dashboard on April 7th**

ABX-04-C: Antibiotic Selection, Open Cardiac Procedures

Question for the group:

- If there is documentation of ‘Patient on Scheduled Antibiotics, ’ should the case be excluded or should we include and assess for appropriate antibiotics administered?
  - Finding cases where vancomycin + gram negative antibiotic administered but case is excluded due to documentation of scheduled antibiotic.

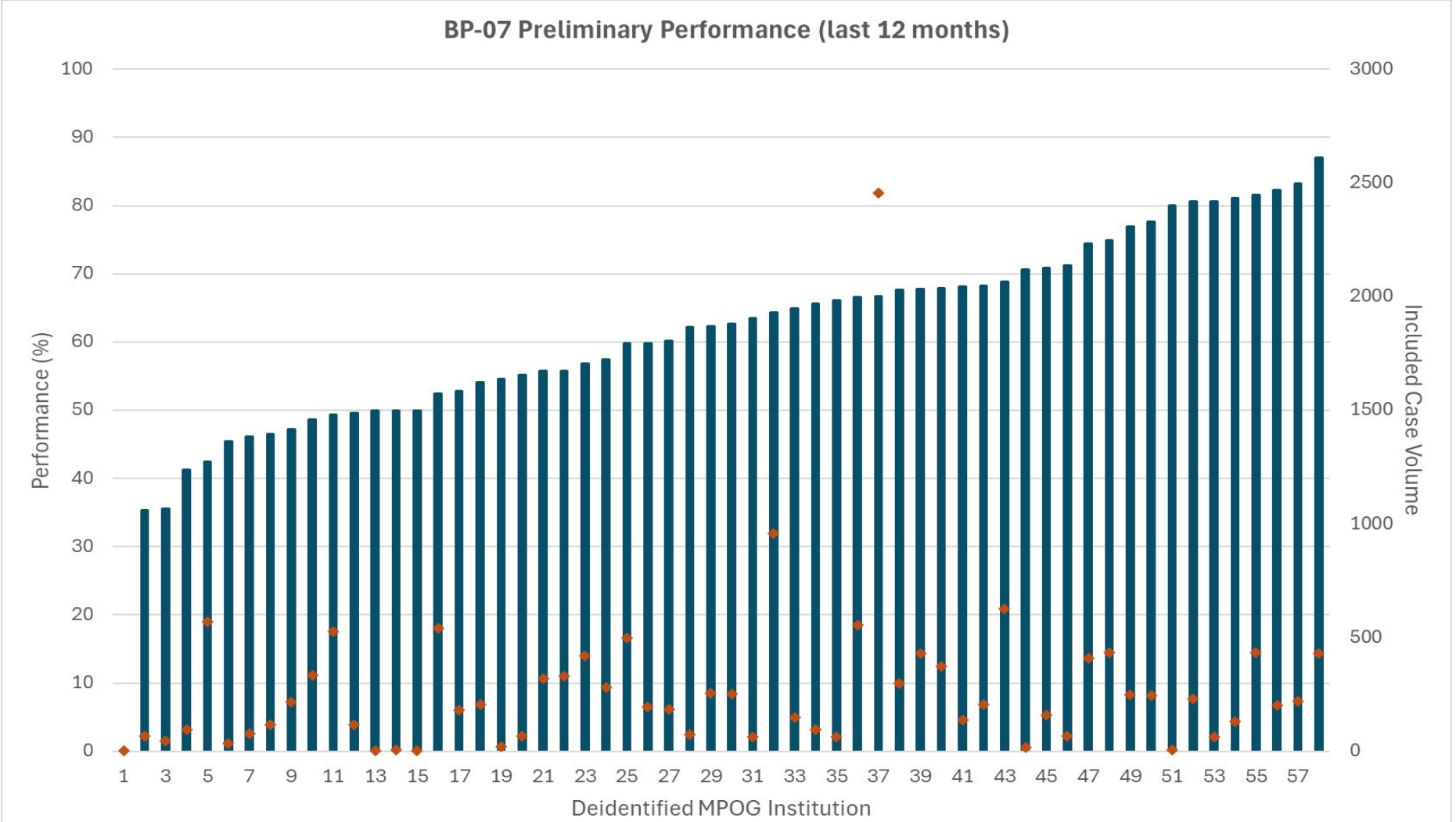
Preliminary Measures

BP-07-C: Hypotension Avoidance (MAP < 55 mmHg), Induction, Open Cardiac

- **Description:**
  - Percentage of adult patients undergoing open cardiac procedures where hypotension (defined as MAP < 55 mmHg) was avoided during the induction period until surgery start.
- **Timing:**
  - Anesthesia Start through Surgery Start
- **Inclusions:**
  - Adult patients undergoing open cardiac procedures (determined by Procedure Type: Cardiac value code: 1)
- **Success Criteria:**
  - **MAP > 55 mmHg throughout induction period until surgery start**

BP-07-C: Hypotension Avoidance (MAP < 55 mmHg), Induction, Open Cardiac

- **Exclusions:**
  - Age < 18
  - ASA 6 including Organ Procurement (CPT:01990)
  - Non-cardiac, Transcatheter/Endovascular, EP/Cath, and Other Cardiac cases as defined by the Procedure Type: Cardiac phenotype (value codes: 0, 2, 3, and 4)
  - Lung transplants


BP-07 Preliminary Performance (last 12 months)
Performance (%)
Included Case Volume
Deidentified MPOG Institution
100
90
80
70
60
50
40
30
20
10
0
3000
2500
2000
1500
1000
500
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57

Discussion

- Any questions or comments with this specification?
  - Any duration thresholds?

- Any concerns with moving forward with BP-07-C?

- Should we move this to a vote?
  - Yes
  - No

TRAN-05-C: Coagulation Monitoring

Description:

- Percentage of adult patients undergoing open cardiac surgery who received transfusion and had a TEG or ROTEM checked with administration of blood and/or blood components

Timing:

- Anesthesia Start through Anesthesia End

Inclusions:

- Adult patients undergoing open cardiac procedures (determined by Procedure Type: Cardiac value code: 1)

Success Criteria:

- **TEG or ROTEM checked with administration of blood and blood components**

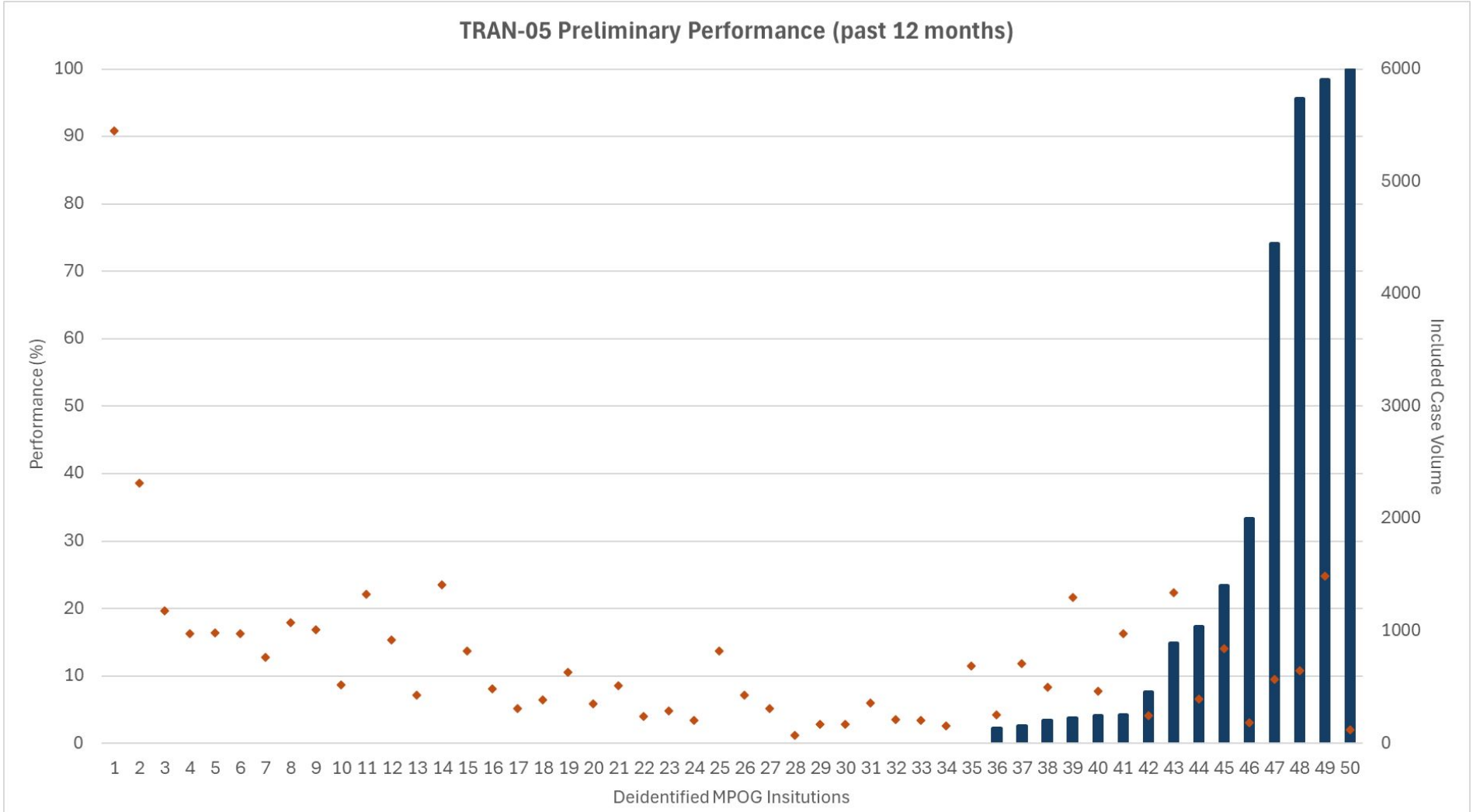
TRAN-05-C: Coagulation Monitoring

Exclusions:

- Age < 18
- ASA 6 including Organ Procurement (CPT:01990)
- Patients who did not receive a transfusion

Transfusion defined as:

- Packed Red Blood Cells
- Whole Blood
- Fresh Frozen Plasma
- Cryoprecipitate
- Platelets
- Categorized Note - Blood Products
- Cases are excluded with only administration of autologous or salvaged blood
- Cases are included if autologous or salvaged blood is administered with any of the above transfusions


TRAN-05 Preliminary Performance (past 12 months)
Performance (%)
Included Case Volume
Deidentified MPOG Insitutions
0
10
20
30
40
50
60
70
80
90
100
0
1000
2000
3000
4000
5000
6000
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

Discussion

- Any questions or comments with this specification?
  - Any ROTEM/TEG between anesthesia start and end or on the day of surgery?
  - Considerations for how these labs are charted across all sites

- Any concerns with moving forward with TRAN-05-C?

- Vote?
  - Yes, publish this measure
  - No, give sites time to improve their mapping?

TRAN-06-C: Balanced Transfusion

Description:

- Percentage of adult patients undergoing open cardiac surgery who received transfusion and a 1:1:1 ratio of blood products was administered

Timing:

- Anesthesia Start through Anesthesia End

Inclusions:

- Adult patients undergoing open cardiac procedures (determined by Procedure Type: Cardiac value code: 1)

Success Criteria:

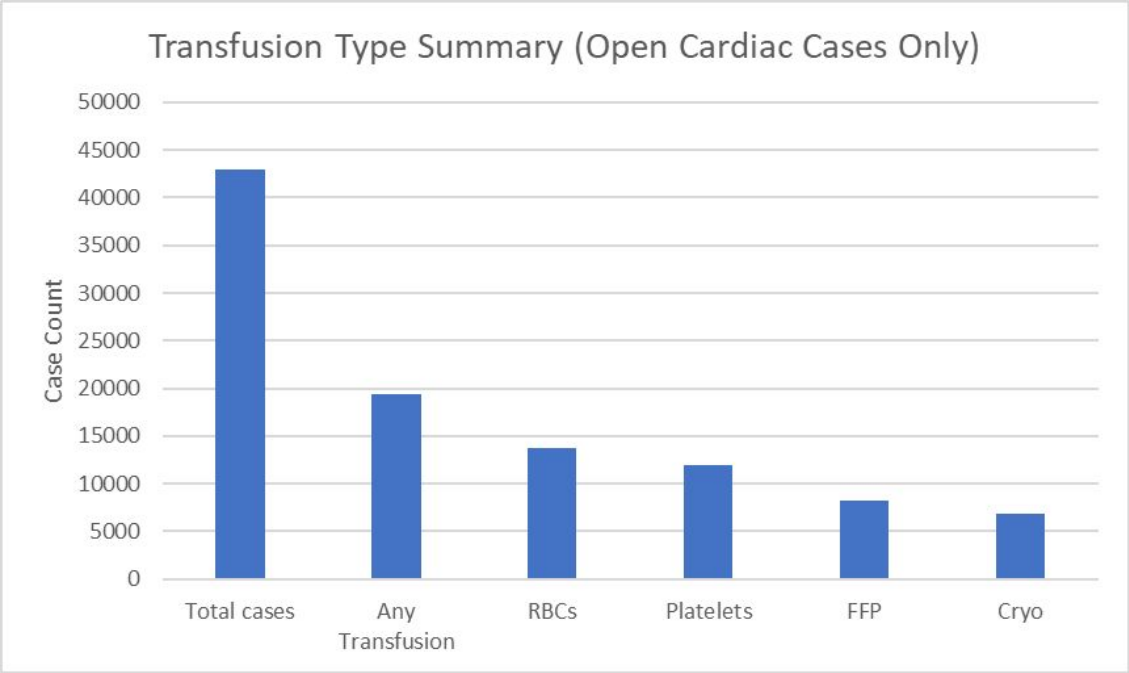
- **1:1:1 ratio of red blood cells to FFP to platelets were administered**

TRAN-06-C: Balanced Transfusion

Questions/Concerns:

- Is a 1:1:1 ratio clinically superior to a laboratory-driven transfusion strategy?

Preliminary Data:



Next Steps

- Open to all anesthesiologists or those interested in improving cardiothoracic measures
  - Do not have to practice at an active MPOG institution

- Meeting Schedule
  - June 2025
  - November 2025

- Thank you for using the forum for discussion between meetings

Thank you!

Allison Janda, MD
MPOG Cardiac Anesthesia
Subcommittee Chair
ajanda@med.umich.edu

Seeking Cardiac Subcommittee Vice-Chair

- 2-year term
- Help shape direction of Cardiac Subcommittee
- Measure performance review, new measure development, measure revision
- Identify and participate in research opportunities
- Work with Allison, Henrie, and the MPOG team
- Cardiac Subcommittee Vice-Chair Description: here