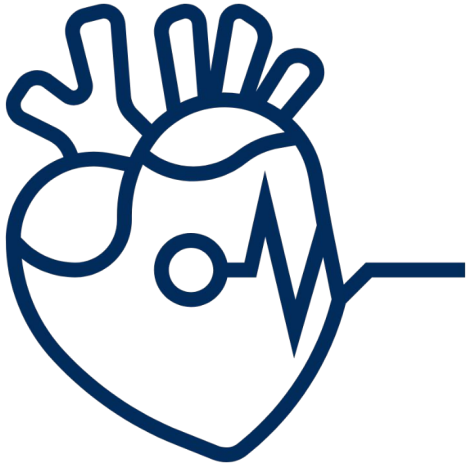
MPOG Cardiac Anesthesia Subcommittee Meeting
December 22, 2021

Agenda

- Welcome & quick summary of progress
- Cardiac procedure type phenotype update
- **Hypo**thermia avoidance (TEMP-06) update and review of validation
- **Hyper**thermia avoidance measures specification discussion
- Future measure discussion of preliminary data
- Next steps



Introductions

- **ASPIRE Quality Team**
  - **Allison Janda, MD** – MPOG Cardiac Anesthesia Subcommittee Lead
  - **Michael Mathis, MD** – MPOG Director of Research
  - **Kate Buehler, MSN** – Clinical Program Manager

- Cardiac Anesthesiology Representatives joining us from around the US!

General QI Committee Cardiac Considerations

TRAN-01: Percentage of cases with a blood transfusion that have a hemoglobin or hematocrit value documented prior to transfusion

- Exclude peds < 18y
- Exclude cardiac cases
- Exclude transfusion cases with profound/prolonged hypotension requiring vasopressor
- Massive Transfusion Exclusion: Update default PRBC unit definition change from 350 300mL

TRAN-02: Percentage of cases with a post transfusion hemoglobin or hematocrit value greater than or equal to 10 g/dL or 30%

- Exclude Patients < 18yo (per pediatric subcommittee)
- Exclude cardiac cases

General QI Committee Cardiac Considerations

NMB-01: Percentage of cases with a documented Train of Four (TOF) after last dose of non-depolarizing neuromuscular blocker

- Remove cardiac exclusion

NMB-02: Administration of Neostigmine, Sugammadex, and/or Edrophonium before extubation for cases with non-depolarizing neuromuscular blockade

- Remove cardiac exclusion

Cardiac Procedure Type Phenotype

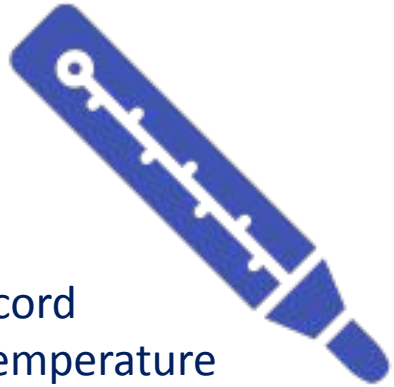
- **Schema:**
  - Sequentially bins cases based on utilized fields if present

- **Current Status:**
  - Public, continuing to test internally

Post-bypass Hypothermia Avoidance

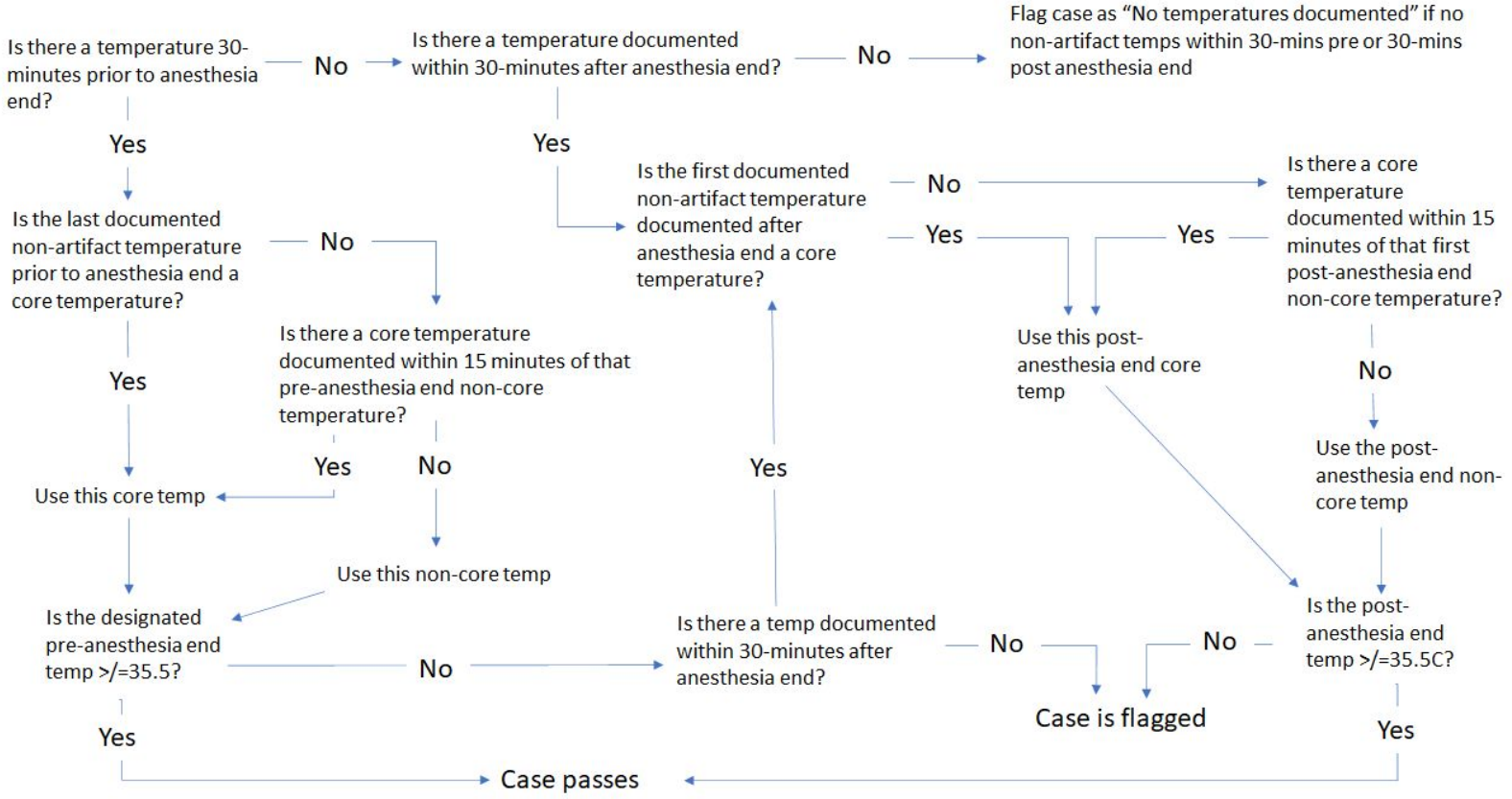
- **Current** TEMP-03 Measure:
  - % of patients, with procedures >60 minutes under GA/neuraxial, with at least one body temperature ≥ 36^{o}C
  - Excludes cardiac surgeries
- **New** TEMP-06 Measure:
  - % of patients, ≥ 18 years age, who undergo open cardiac surgical procedures under general anesthesia of >120 minutes for whom last non-artifact body temperature prior to anesthesia end was ≥ 35.5^{o}C

TEMP-06 Measure Details

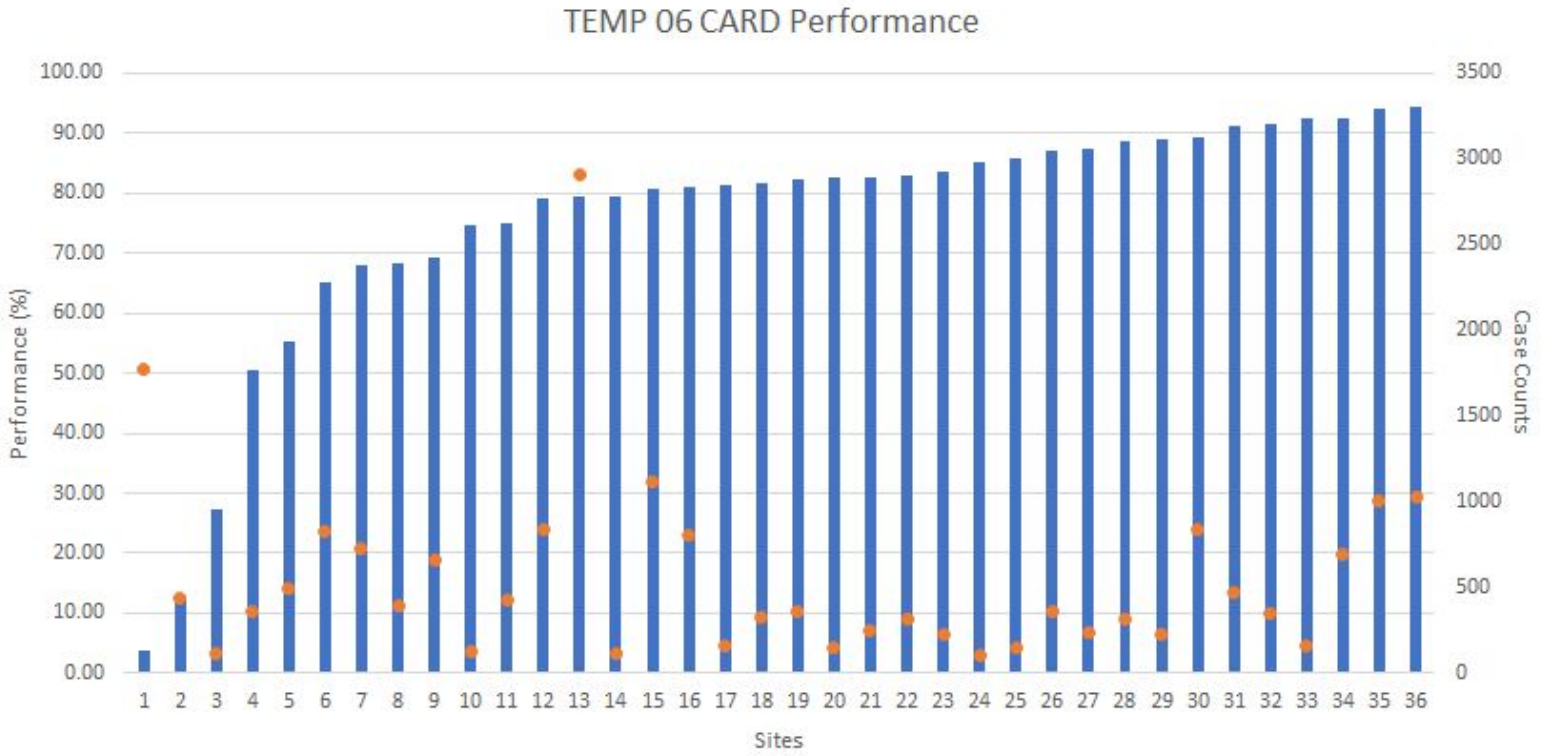


- Including open cardiac cases
- Last non-artifact temperature documented, if more than one, preferentially use **core temperature**
  - Use core temperature measure if present in the anesthesia record within 15 minutes of the last documented non-artifact body temperature
  - If no temp. documented or temp below 35.5C pre-anesthesia end, will accept temps up to 30 mins post-anesthesia end to account for identification and correction of hypothermia by the anesthesia team

TEMP-06 Measure Temperature Flow Chart



TEMP-06 Preliminary Performance (past 12 months)



*plan to report “N/A” on dashboard for institutions with <100 cases/year meeting inclusion criteria

TEMP-06 – Next Steps

- Currently in PROD (as of today)
- Refining the measure will continue after we launch, please let us know if you see inappropriately flagged or passed cases on your dashboards

Hyperthermia Avoidance – Literature Review

- 2020 Updates from the Adult Cardiac Anesthesiology Section of STS [1]
  - Avoidance of temp >37 while on bypass
- Guidelines for perioperative care in cardiac surgery: enhanced recovery after surgery recommendations [2]
  - Avoid >37C for arterial outlet blood temperature while on bypass
- STS Practice Guidelines for temperature management while on bypass [3]
  - Avoid >37C for arterial outlet blood temperature while on bypass

1. 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
2. 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
3. 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

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Hyperthermia Avoidance – Literature Review

- ERAS cardiac recommendations [4]
  - Avoid >37.9C while on bypass
- Current cardiac **hyper**thermia avoidance Anesthesia Quality Institute measure [5]
  - AQI65, for cerebral hyperthermia avoidance defines hyperthermia as ≥37C while on bypass
- On-bypass Hyperthermia Avoidance AmSECT Guidelines[6]
  - Limit arterial outlet blood temperature to <37C to avoid cerebral hyperthermia. (Class I, Level C)

4. 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
5. https://www.aqihq.org/files/MIPS/2020/2020%20QCDR%20Measure%20Book.pdf
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

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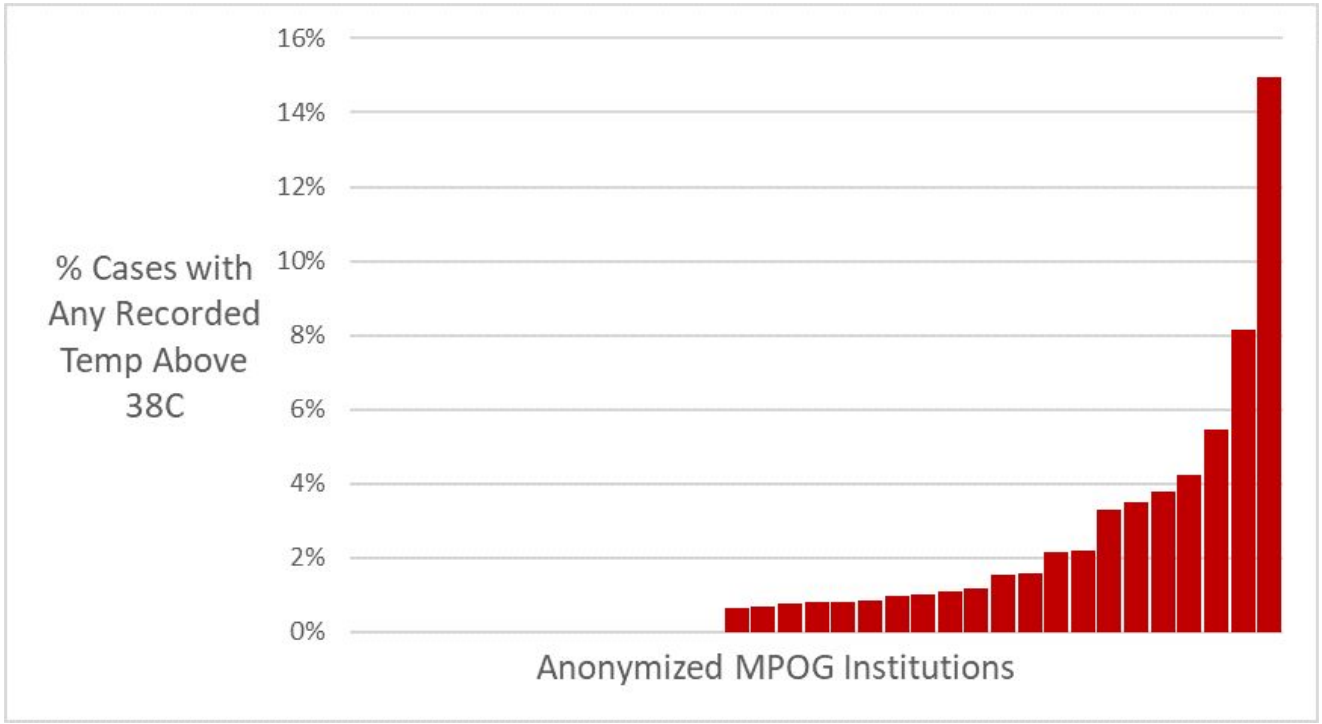
Prelim MPOG data: Hyperthermia avoidance >38°C



Hyperthermia Avoidance Measure Details

- **TEMP-07:**
  - % of patients, ≥ 18 years age, who undergo open cardiac surgical procedures using cardiopulmonary bypass under general anesthesia of >120 minutes for whom the temperature did not rise above 37.5 degrees Celsius while on bypass for over 10 consecutive minutes

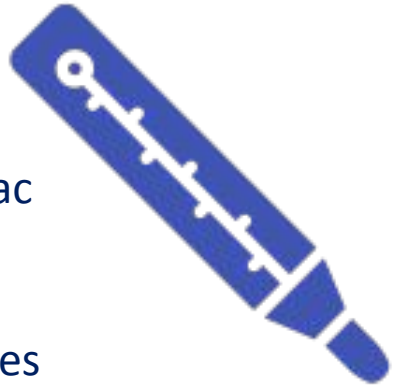
- **Timing:**
  - Cardiopulmonary Bypass Start until Cardiopulmonary Bypass End (phenotypes exist but need improvement)

Hyperthermia Avoidance Measure Details

- **Artifact algorithm:**
  - Less than 32.0°C (89.6F)
  - Greater than 40.0°C (104.0F)
  - Any minute-to-minute jumps >0.5°C equivalent
  - Example: 0.125°C /15s, 0.25°C / 30s, 1°C / 2mins

- **Attribution:**
  - Any provider signed in for ≥40 minutes from bypass start until bypass end (or the provider signed in for the greatest number of minutes during this period, if this period is <40 minutes) per staff role

Hyperthermia Avoidance Measure Details



- **Inclusions:**
  - All patients, 18 years of age or older, who undergo open cardiac surgical procedures using cardiopulmonary bypass (as determined by Procedure Type: Cardiac Open phenotype and Cardiopulmonary Bypass phenotype) under GA of ≥120 minutes

- **Exclusions:**
  - ASA 6
  - Organ harvest (CPT: 01990)
  - Non-cardiac cases as defined as those cases not meeting criteria for the cardiac case type phenotype
  - Within the general cardiac case type phenotype, exclude: Transcatheter/Endovascular, EP/Cath groups and Other Cardiac
  - Non-CPB cases
  - Cases with age <18

TEMP-07 Perfusionist Input

- **TEMP-07:**
  - % of patients, ≥ 18 years age, who undergo open cardiac surgical procedures using cardiopulmonary bypass under general anesthesia of >120 minutes for whom the temperature did not rise above 37.5 degrees Celsius while on bypass for over 5 consecutive minutes

- **Exclusions/Limitations:**
  - If starting temp on initiation of bypass is >37.5, consider excluding that case, or excluding potentially the first 30 minutes of the bypass period

TEMP-07 Perfusionist Input

- **Call for additional perfusionist input:**
  - Please email me (ajanda@med.umich.edu) with the contact information of any potentially interested perfusionists

- **Next perfusionist workgroup meeting:**
  - End of January/early February
  - Will be invited to our next subcommittee meeting

Future Measure Planning

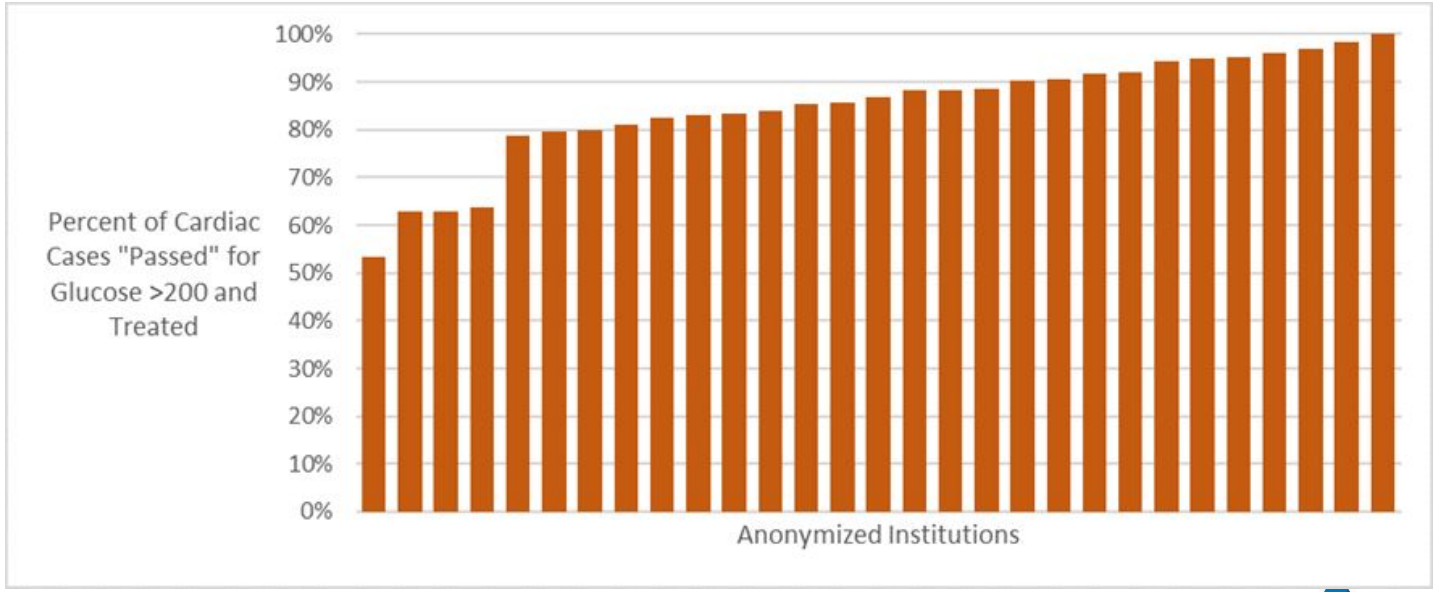
- **Top ranked topics:**
  - **AKI avoidance**
    - 75% ranked in top 3
    - AKI-01 version with just cardiac open cases?
      - Sharing data in next slide
  - **Postop. pulmonary complication avoidance**
    - 67% ranked in top 3
    - PUL-02 version with just open cardiac cases?
    - Extubation data in import manager would require a deep dig
      - Deeper dig: data is poor
  - **Glucose management** and **hypotension avoidance**
    - Both with 42% ranked in top 3
    - High variation with glucose performance
    - May be challenging to establish thresholds and exclusion periods for hypotension measures

Cardiac AKI Variation Data

- Adapted AKI-01: Percentage of cases that did not have AKI (the baseline creatinine increased more than 1.5 times within 7 postoperative days or the baseline creatinine level increased by = 0.3 mg/dL within 48 hours postoperatively) for open cardiac cases

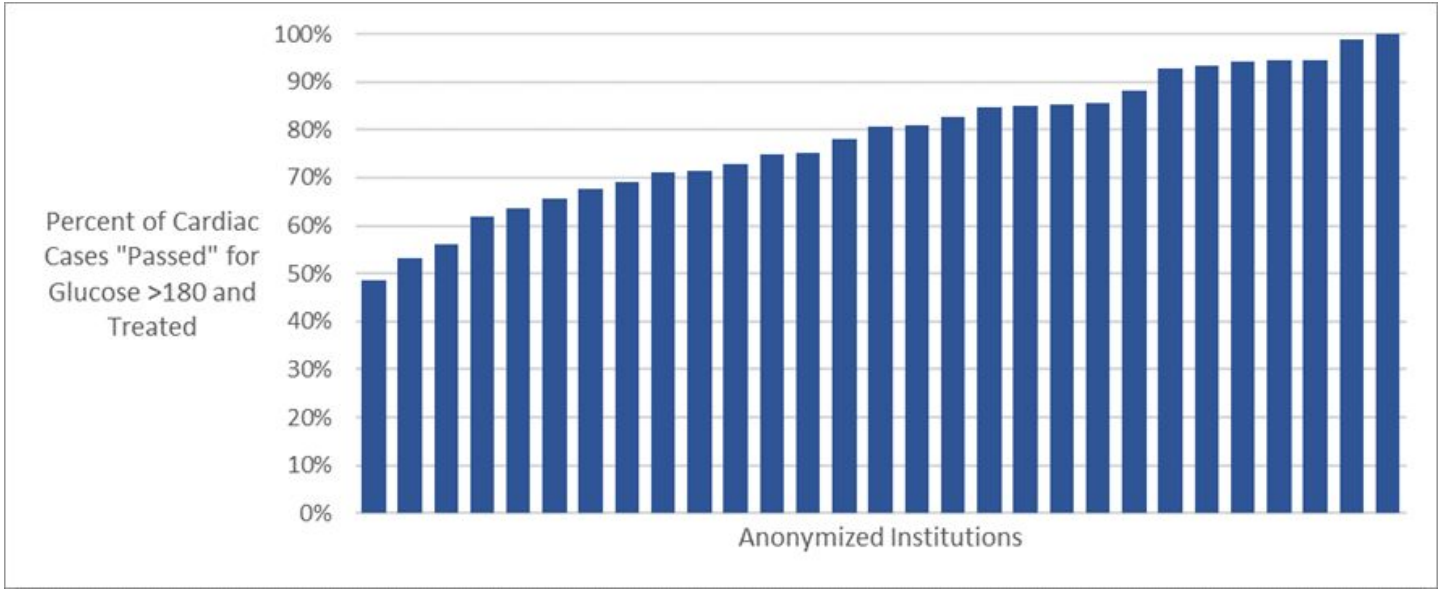
Example of Glucose Variation Data

- Adapted GLU-01 Measure:
  - % of cases with perioperative glucose > 200 mg/dL with administration of insulin or glucose recheck within 60 minutes of original glucose measurement
  - Mean: 85% SD: 11%



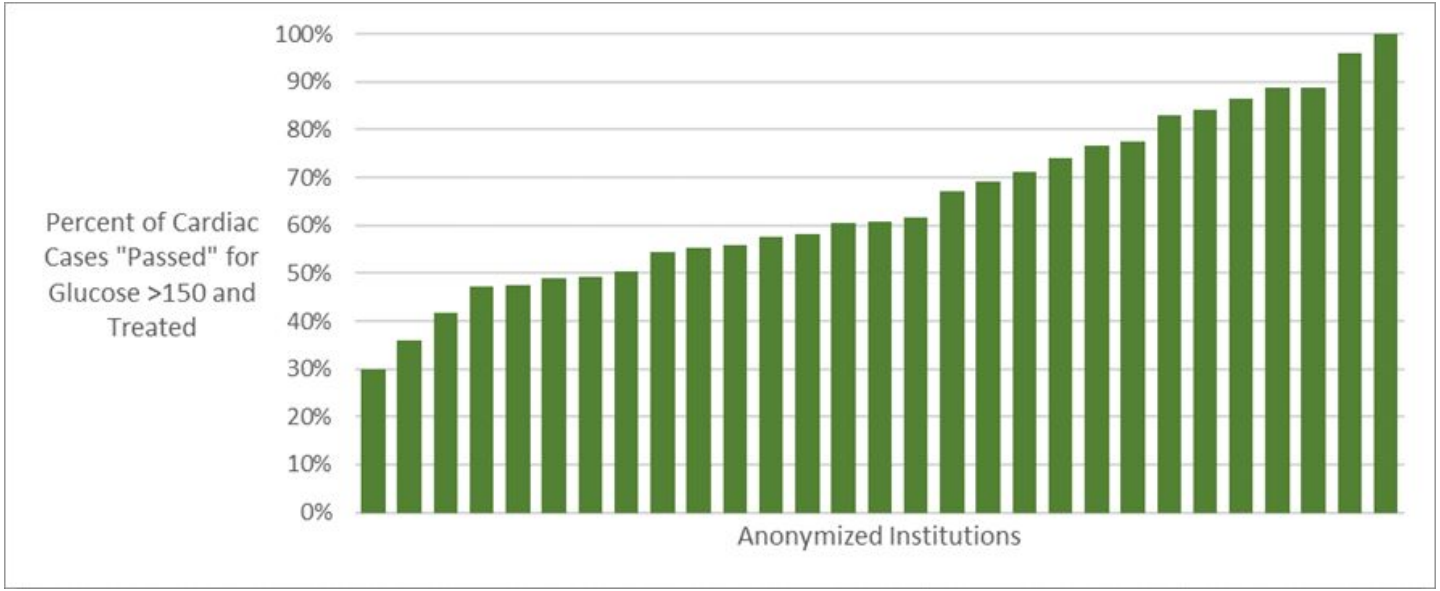
Example of Glucose Variation Data

- Adapted GLU-01 Measure:
  - % of cases with perioperative glucose > 180 mg/dL with administration of insulin or glucose recheck within 60 minutes of original glucose measurement
  - Mean: 79% SD: 14%



Example of Glucose Variation Data

- Adapted GLU-01 Measure:
  - % of cases with perioperative glucose > 150 mg/dL with administration of insulin or glucose recheck within 60 minutes of original glucose measurement
  - Mean: 64% SD: 18%



Goals

- Build 1 cardiac-specific measure in 2021
  - Post-bypass **hypo**thermia avoidance
- Build 1 cardiac-specific measure in early 2022
  - On-bypass **hyper**thermia avoidance
- Plan and build next measure in mid-2022
  - AKI avoidance?
  - Glucose management?
  - Other?

Cardiac Anesthesia Subcommittee Membership

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

- Proposed 2022 Meeting Schedule
  - Winter 2022 Meeting: February/Early March 2022
  - Summer 2022 Meeting: June 2022
  - Fall 2022 Meeting: November 2022

- Thank you for using the forum for discussion between meetings