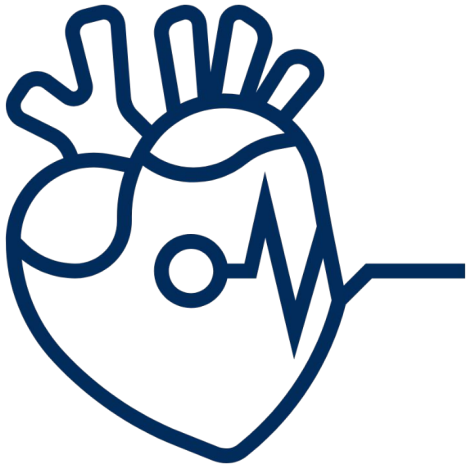
MPOG Cardiac Anesthesia Subcommittee Meeting
April 20, 2022

Agenda

- Welcome & quick summary of progress
- Cardiac measure institutional thresholds for inclusion in performance reporting
- **Hyper**thermia avoidance (TEMP-07) update and

  review of validation
- Glucose management measure specification discussion
- Next steps



Introductions

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

- Cardiac Anesthesiology Representatives joining us from around the US!

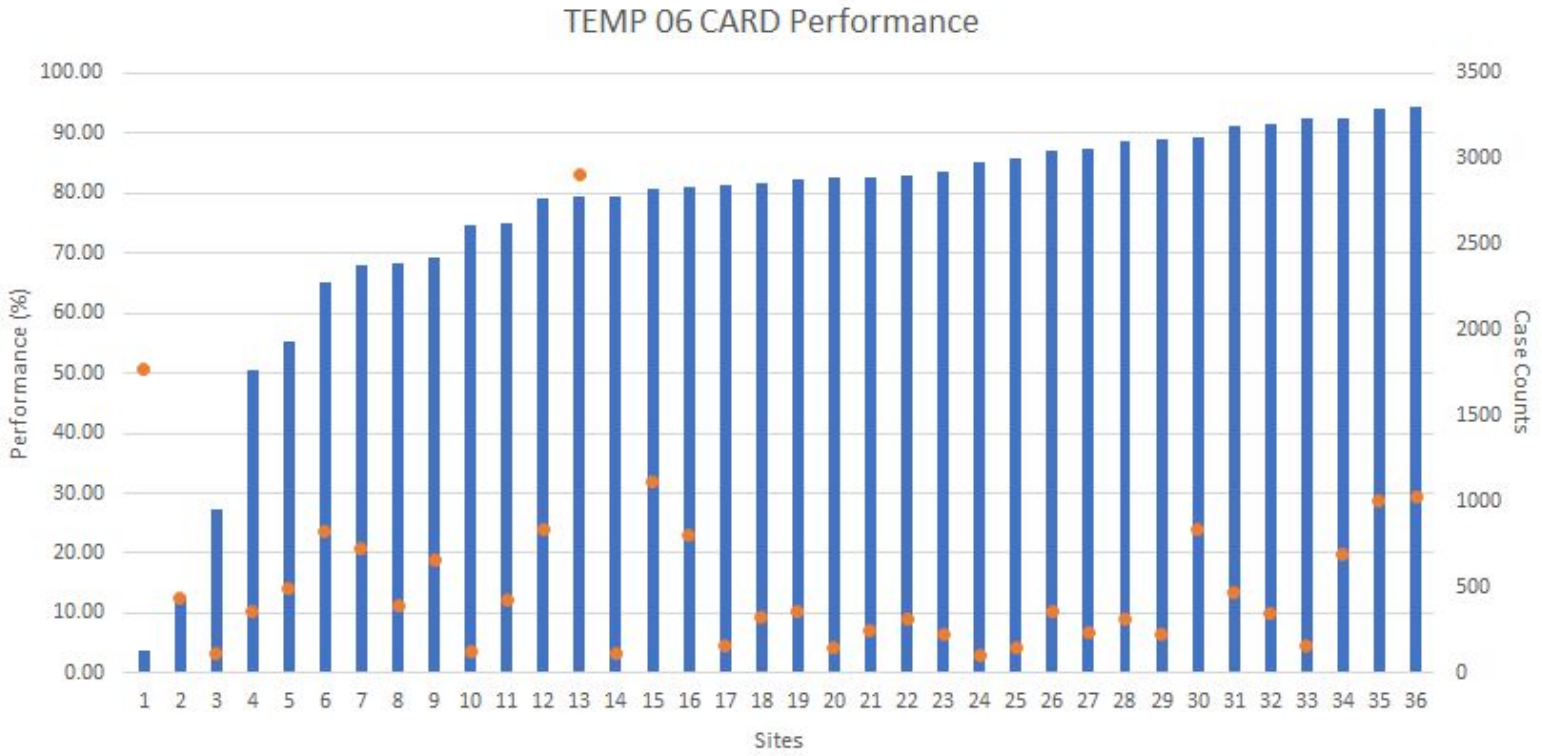
TEMP-06 is Live

TEMP-06 was released in December, 2021

- Check out your personal and site performance on your dashboards
- If you see any issues, please reach out to: ajanda@umich.edu

Thank you for all of your input!

TEMP-06 Performance (past 12 months)



*plan to report “N/A” on dashboard for institutions with <75 cases/year meeting inclusion criteria

Institutional Thresholds for Inclusion in Reporting

We propose not reporting performance of cardiac measures for institutions with less than 75 cases/year meeting inclusion criteria

- This impacts 14/55 sites for TEMP-06 & TEMP-07
- Will also exclude measures on individual clinician dashboards for sites with <75 cases/year meeting inclusion criteria
- Objections?

Hyperthermia Avoidance Measure (TEMP-07)

- Specification details discussed at our last meeting in December
- Incorporated perfusionist input from the Perfusionist Workgroup meeting earlier this month, thank you!
  - If you haven't nominated a perfusionist for the Perfusionist Workgroup, or discussed this measure with your site's perfusion team, please do so soon
- Will formally approve details at this meeting and release the measure shortly after

TEMP-07 Perfusionist Input

- **Call answered for additional perfusionist input:**
  - The Perfusionist Work Group met earlier this month and made some suggestions that have been incorporated, thank you!
    - Artifact algorithm change to include any changes over >1 degree C/minute instead of >1 degree C/two minutes
    - Temperature hierarchy change to incorporate arterial bypass cannula temperatures when available
    - Shortened the duration of hyperthermia to 5 minutes
    - **Recommended discussing with your institutional teams prior to presenting the measure data**

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 5 consecutive minutes
  - **Is inverting this measure most appropriate?**

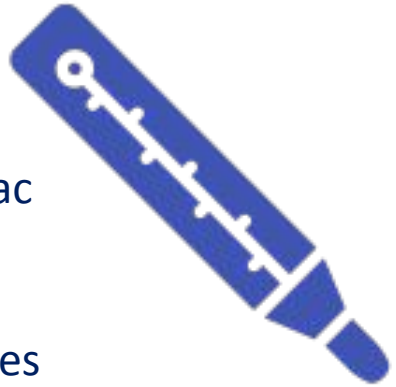
- **Timing:**
  - Cardiopulmonary Bypass Start until Cardiopulmonary Bypass End, for those cases with a cardiopulmonary start time documented, but no cardiopulmonary bypass end time, will use Anesthesia End

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 >1.0°C equivalent.
  - Example: 0.25°C /15s, 0.5°C / 30s, 1°C / 1min

- **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



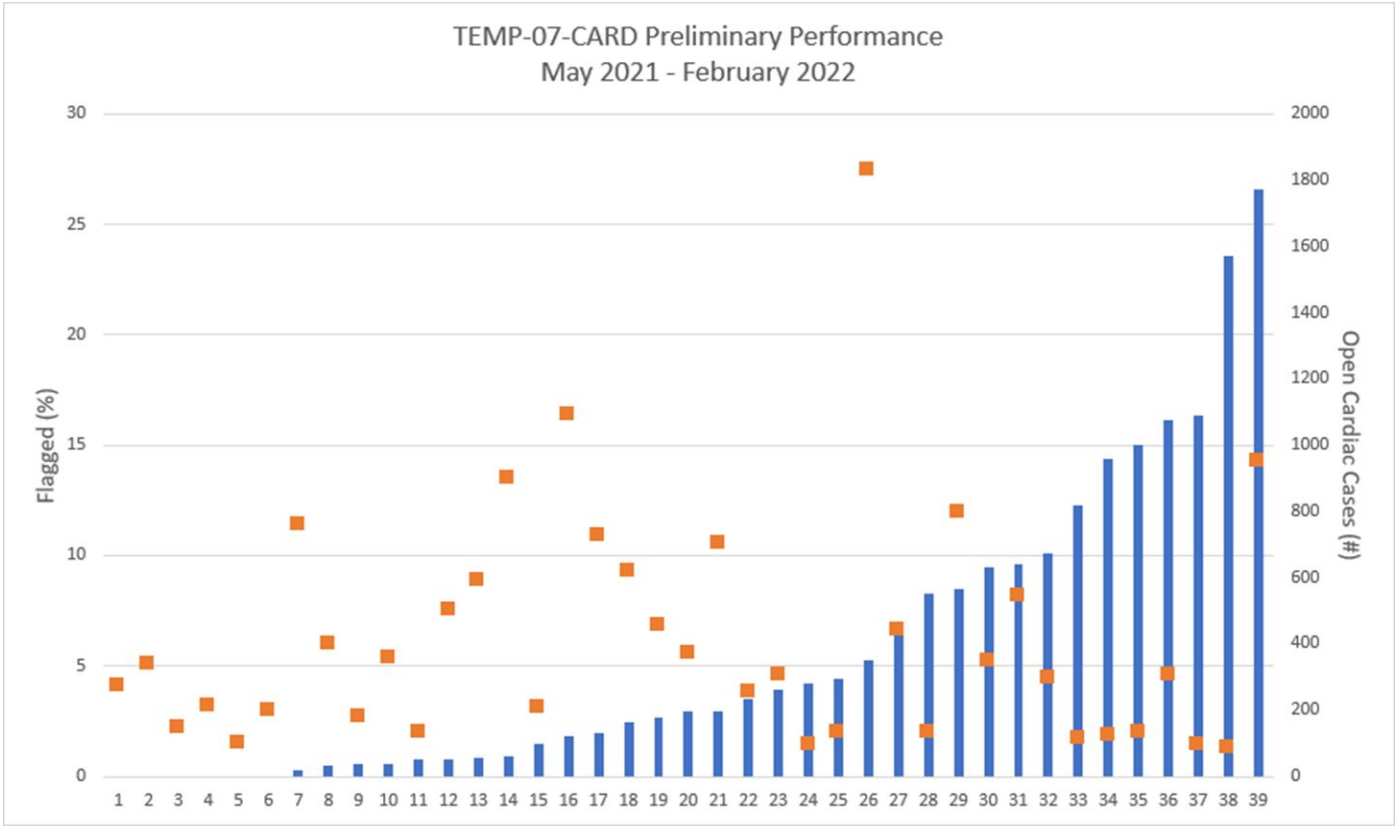
- **Inclusions:**
  - All patients, 18 years of age or older, who undergo open cardiac surgical procedures using cardiopulmonary bypass (as determined by Procedure Type: Cardiac Open phenotype and Cardiopulmonary Bypass phenotype) under GA of ≥120 minutes

- **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

Hyperthermia Avoidance Measure Details

- **Exclusions/Limitations:**
  - If starting temp on initiation of bypass is >37.5, exclude the first 30 minutes of the bypass period
  - If gaps exist for temperature documentation, a given temperature will count for 5 minutes following that documentation time or until the next temperature is documented, whichever is earlier
- **Temperature priority:**
  - Arterial Bypass Cannula Temperature
  - Nasopharyngeal
  - Esophageal
  - Blood or PA catheter
  - Bladder
  - Rectal
  - Zero flux thermometer
  - Other non-core routes (axillary, oral, skin, temporal, tympanic, unspecified)

TEMP-07 Preliminary Performance (Inverse Measure)



Next Cardiac Measure: Glucose Management

- **Current GLU-01 Measure:**
  - % of cases with perioperative glucose > 200 mg/dL with administration of insulin or glucose recheck within 90 minutes of original glucose measurement
    - Attribution: The provider signed in at the first glucose recheck or first administration of insulin. If neither occurred, then the responsible provider is the one signed in 90 minutes after the high glucose measurement
- **Considerations:**
  - Lower glucose threshold?
  - Set a shorter threshold for rechecks or are we just concerned with treatment?
  - Initiation of an insulin infusion or treatment requirement?
  - Exclusions for specific cardiac cases?
  - Attribution?

Glucose Measure Literature/Guidelines:

- In a study of 510 patients undergoing cardiovascular surgery and found the incidence of AKI to be higher in patients with high HbA1c levels **preoperatively**; Every 1% increase over 6% in HgA1c levels increased the risk of renal complications by 24% [1]

- Glycemic variability, a standard deviation of all POC-BG readings, is associated with increased postoperative LOS-ICU, rise in creatinine, and AKI [2]

- A study including 761 cardiac surgery patients and found that diabetics were at increased risk of infection and glucose control (120-160 mg/dL) reduced the risk of wound infection in diabetics [3]

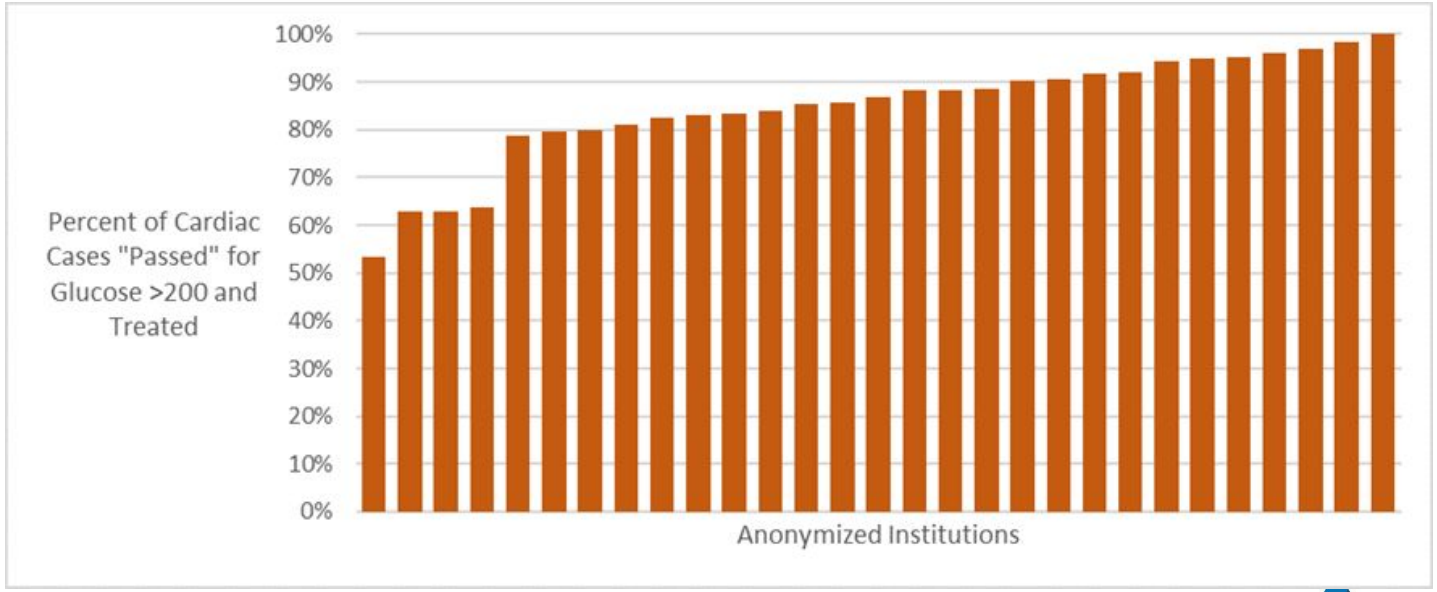
- In a randomized controlled trial, moderate glucose control defined as 127-179 mg/dl was found to be preferable to tight control ≤ 126 in patients undergoing CABG [4]

Glucose Measure Literature/Guidelines Continued:

- Incidence of AKI was higher in patients with time-weighted average intraop glucose of >150mg/dl (8%) as compared to patients with blood glucose 110-150 mg/dl (3%) [5]
- KDIGO - recommends maintaining blood glucose between 110 - 149 mg/dL in critically ill patients [6]
- Tight glucose control (<150mg/dl) is seen as controversial as risks of hypoglycemia are significant: NICE-SUGAR meta-analysis [7]
- Society of Thoracic Surgeons (STS) Practice Guidelines recommend **maintaining serum glucose levels ≤ 180 mg/dL for at least 24 hours after cardiac surgery** [8]
- Guidelines for Perioperative Care in Cardiac Surgery from the Enhanced Recovery After Surgery Society **recommends treatment of blood glucose >160-180mg/dL with an insulin infusion** [9]

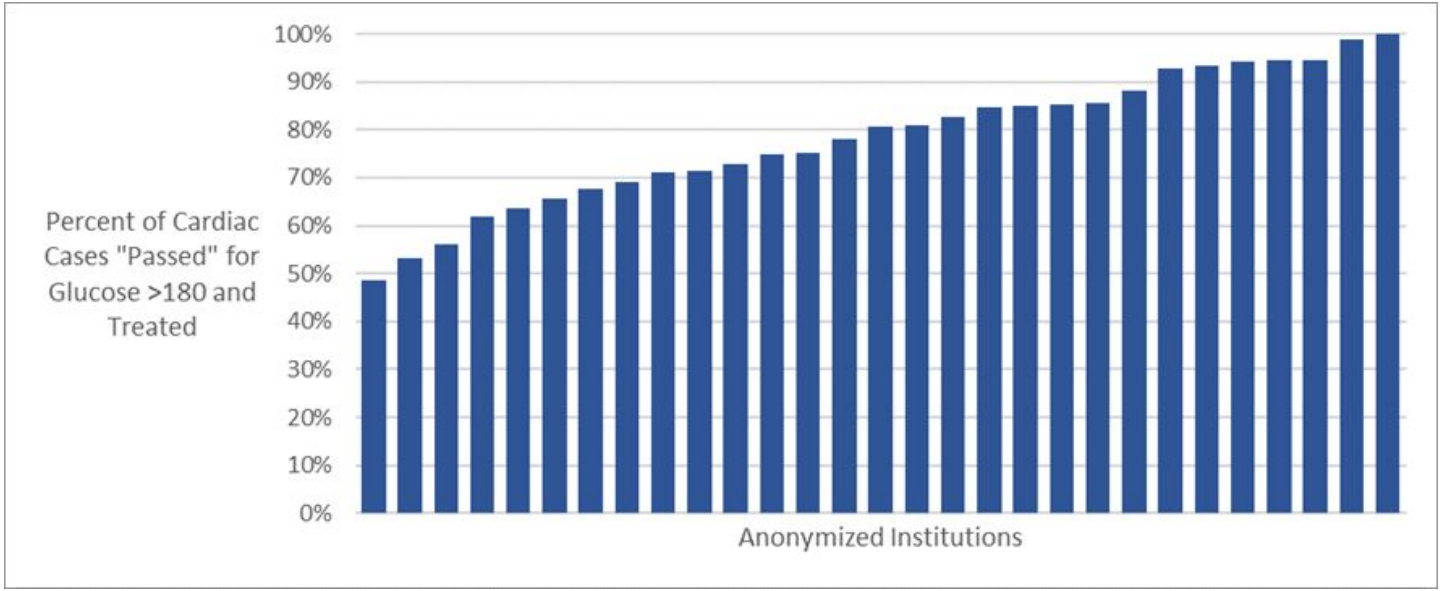
Example of Glucose Variation Data

- 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%



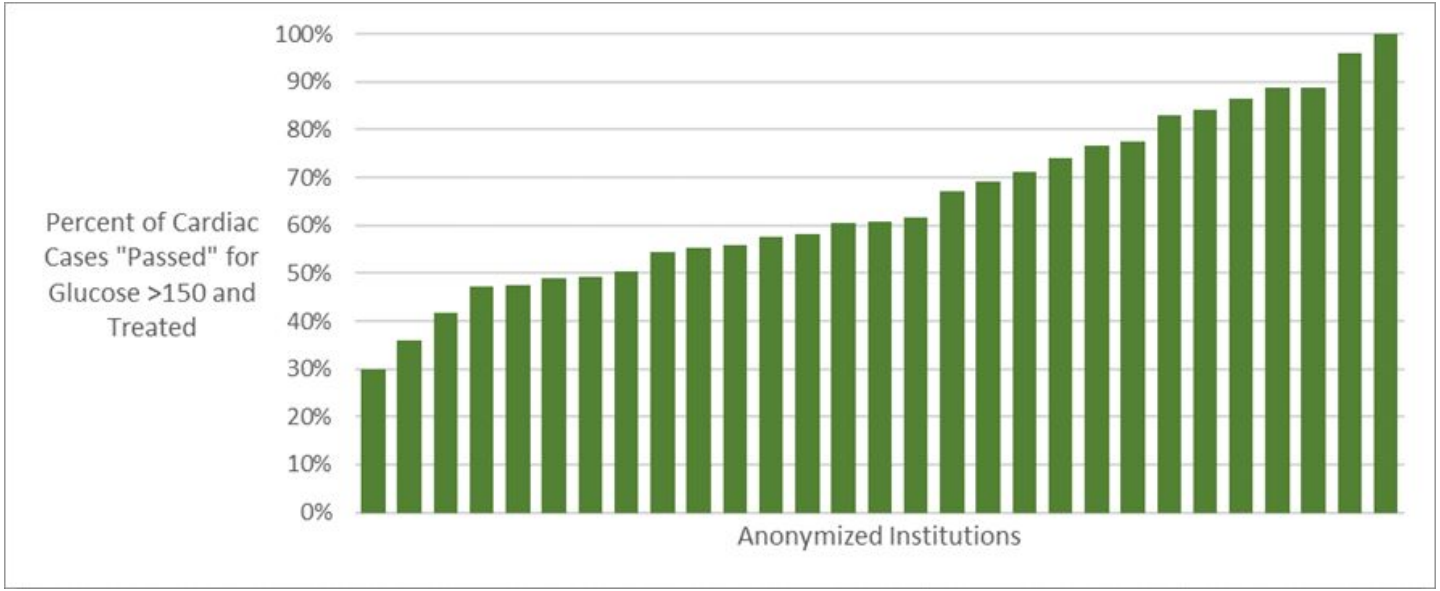
Example of Glucose Variation Data

- 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%



Glucose Measure Considerations:

- Threshold?
- Timing?
- Exclusions for specific cardiac cases?
- Attribution?

Goals

- Build 1 cardiac-specific measure in 2021 (completed)
  - Post-bypass **hypo**thermia avoidance
- Build 1 cardiac-specific measure in early 2022 (nearly completed)
  - On-bypass **hyper**thermia avoidance
- Plan and build next measure in mid-2022 (in progress)
  - Glucose management

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
  - Summer 2022 Meeting: July/August 2022
  - Fall 2022 Meeting: November 2022

- Thank you for using the forum for discussion between meetings

References

1. Gumus F, Polat A, Sinikoglu SN, Yektas A, Erkalp K, Alagol A: Use of a lower cut-off value for HbA1c to predict postoperative renal complication risk in patients undergoing coronary artery bypass grafting. J Cardiothorac Vasc Anesth 2013; 27:1167–73

2. Bansal B, Carvalho P, Mehta Y, Yadav J, Sharma P, Mithal A, Trehan N: Prognostic significance of glycemic variability after cardiac surgery. J Diabetes Complications 2016; 30:613–7

3. Hruska LA, Smith JM, Hendy MP, Fritz VL, McAdams S. Continuous insulin infusion reduces infectious complications in diabetics following coronary surgery. Journal of cardiac surgery. 2005;20(5):403-407.

4. Bhamidipati CM, LaPar DJ, Stukenborg GJ, Morrison CC, Kern JA, Kron IL, Ailawadi G: Superiority of moderate control of hyperglycemia to tight control in patients undergoing coronary artery bypass grafting. J Thorac Cardiovasc Surg 2011; 141:543–51

5. Song JW, Shim JK, Yoo KJ, Oh SY, Kwak YL: Impact of intraoperative hyperglycaemia on renal dysfunction after off-pump coronary artery bypass. Interact Cardiovasc Thorac Surg 2013; 17:473–8

References

6. KDIGO. 2012. “KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease.” https://kdigo.org/wp-content/uploads/2017/02/KDIGO_2012_CKD_GL.pdf.

7. NICE-SUGAR Study Investigators, Finfer S, Chittock DR, Su SY-S, Blair D, Foster D, Dhingra V, Bellomo R, Cook D, Dodek P, Henderson WR, Hébert PC, Heritier S, Heyland DK, McArthur C, McDonald E, Mitchell I, Myburgh JA, Norton R, Potter J, Robinson BG, Ronco JJ: Intensive versus conventional glucose control in critically ill patients. N Engl J Med 2009; 360:1283–97

8. Lazar HL, McDonnell M, Chipkin SR, Furnary AP, Engelman RM, Sadhu AR, Bridges CR, Haan CK, Svedjeholm R, Taegtmeyer H, Shemin RJ, Society of Thoracic Surgeons Blood Glucose Guideline Task Force: The Society of Thoracic Surgeons practice guideline series: Blood glucose management during adult cardiac surgery. Ann Thorac Surg 2009; 87:663–9

9. 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

Thank you!

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MULTICENTER PERIOPERATIVE OUTCOMES GROUP