Measure Information Form

CMS/The Joint Commission: Suspended
(Effective immediately beginning with July 1, 2014 discharges)

Measure Set: Surgical Care Improvement Project (SCIP)

Set Measure ID #: SCIP-Inf-4

Performance Measure Name: Cardiac Surgery Patients With Controlled Postoperative Blood Glucose

Description: Cardiac surgery patients with controlled postoperative blood glucose (less than or equal to 180 mg/dL) in the timeframe of 18 to 24 hours after Anesthesia End Time.

Rationale: Hyperglycemia has been associated with increased in-hospital morbidity and mortality for multiple medical and surgical conditions. In a study by Zerr, et al (1997), the risk of infection was significantly higher for patients undergoing coronary artery bypass graft (CABG) if blood glucose levels were elevated. Studies have shown there is an independent rise in the risk of surgical infection with blood glucose levels > 180 mg/dL (Van den Berghe, 2001). Latham, et al (2001), found that hyperglycemia in the immediate postoperative phase increases the risk of infection in both diabetic and nondiabetic patients and the higher the level of hyperglycemia, the higher the potential for infection in both patient populations. A study conducted in Leuven, Belgium (Van den Berghe, 2001), demonstrated that intensive insulin therapy not only reduced overall in-hospital mortality but also decreased blood stream infections, acute renal failure, red cell transfusions, ventilator support, and intensive care. Hyperglycemia is a risk factor that, once identified, could minimize adverse outcomes for cardiac surgical patients. Guidelines highlight the need for perioperative (particularly intraoperative and postoperative) glucose control in cardiac surgery patients. The Society of Thoracic Surgeons Workforce guidelines (Lazar, 2009) recommended cardiac surgery patients, with and without diabetes, maintain serum glucose of < 180 mg/dL. It is acknowledged that controlling the blood glucose in the immediate time period after surgery may be challenging (due to changing medications, use of inotropes, etc.), however, cardiac care teams should be able to reasonably control the blood sugar to levels of 180 mg/dL or less within the 18 – 24 hour post-operative time frame.

Type of Measure: Process

Improvement Noted As: An increase in the percentage.

Numerator Statement: Cardiac surgery patients with controlled postoperative blood glucose (less than or equal to 180 mg/dL) in the timeframe of 18 to 24 hours after Anesthesia End Time.
Included Populations: Not applicable

Excluded Populations: None

Data Elements:
- Glucose

Denominator Statement: Cardiac surgery patients with no evidence of prior infection.

Included Populations:
- An ICD-9-CM Principal Procedure Code of selected surgeries (as defined in Appendix A, Table 5.10 for ICD-9-CM codes)
  AND
- An ICD-9-CM Principal Procedure Code of selected surgeries (as defined in Appendix A, Table 5.11 for ICD-9-CM codes)

Excluded Populations:
- Patients less than 18 years of age
- Patients who have a length of stay greater than 120 days
- Patients who had a principal diagnosis suggestive of preoperative infectious disease (as defined in Appendix A, Table 5.09 for ICD-9-CM codes)
- Burn and transplant patients (as defined in Appendix A, Tables 5.14 and 5.15 for ICD-9-CM codes)
- Patients enrolled in clinical trials
- Patients whose ICD-9-CM principal procedure occurred prior to the date of admission
- Patients with physician/advanced practice nurse/physician assistant (physician/APN/PA) documented infection prior to surgical procedure of interest
- Patients who undergo CPR or surgery, discharge, expire, or leave Against Medical Advice (AMA) prior to 24 hours after Anesthesia End Time.

Data Elements:
- Anesthesia Start Date
- Admission Date
- Birthdate
- Clinical Trial
- Discharge Date
- ICD-9-CM Principal Diagnosis Code
- ICD-9-CM Principal Procedure Code
- Infection Prior to Anesthesia

Risk Adjustment: No

Data Collection Approach: Retrospective data sources for required data elements include administrative data and medical record documents. Some hospitals may prefer
to gather data concurrently by identifying patients in the population of interest. This approach provides opportunities for improvement at the point of care/service. However, complete documentation includes the principal or other ICD-9-CM diagnosis and procedure codes, which require retrospective data entry.

Data Accuracy: Variation may exist in the assignment of ICD-9-CM codes; therefore, coding practices may require evaluation to ensure consistency.

Measure Analysis Suggestions: It is important that blood glucose levels be maintained and documented throughout the entire postoperative period. In the course of quality improvement efforts, hospitals may find it useful to drill down to the response for the data element Glucose. Further insight may be gained by examining the consistency and values of blood glucose diagnostics and documentation within the organization.

Sampling: Yes, please refer to the measure set sampling requirements and for additional information see the Population and Sampling Specifications Section.

Data Reported As: Aggregate rate generated from count data reported as a proportion.

Selected References:

SCIP-Inf-4: Cardiac Surgery Patients With Controlled Postoperative Blood Glucose

Numerator: Cardiac surgery patients with controlled postoperative blood glucose (less than or equal to 180 mg/dL) in the timeframe of 18 to 24 hours after anesthesia and time.

Denominator: Cardiac surgery patients with no evidence of prior infection.
### SCIP Infection (Inf) 4: Cardiac Surgery Patients With Controlled Postoperative Blood Glucose

**Numerator:** Cardiac surgery patients with controlled postoperative blood glucose (less than or equal to 180 mg/dL) in the time frame of 18 to 24 hours after anesthesia end time.

**Denominator:** Cardiac surgery patients with no evidence of prior infection.

**Variable Key:** Patient Age, Surgery Days

1. Start processing. Run cases that are included in the Surgical Care Improvement Project (SCIP) Initial Patient Population and pass the edits defined in the Transmission Data Processing Flow: Clinical through this measure.

2. Calculate Patient Age. The Patient Age, in years, is equal to the Admission Date minus the Birthdate. Use the month and day portion of the admission date and the birthdate to yield the most accurate age.

3. Check Patient Age
   a. If Patient Age is less than 18 years, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   b. If Patient Age is greater than or equal to 18 years, continue processing and proceed to ICD-9-CM Principal Procedure Code.

4. Check ICD-9-CM Principal Procedure Code
   a. If the ICD-9-CM Principal Procedure Code is not on Table 5.11, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   b. If the ICD-9-CM Principal Procedure Code is on Table 5.11, continue processing and proceed to ICD-9-CM Principal Diagnosis Code.

5. Check ICD-9-CM Principal Diagnosis Code
   a. If the ICD-9-CM Principal Diagnosis Code is on Table 5.09, 5.14 or 5.15, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   b. If the ICD-9-CM Principal Diagnosis Code is not on Table 5.09, 5.14 or 5.15, continue processing and proceed to Clinical Trial.

6. Check Clinical Trial
   a. If Clinical Trial is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b. If Clinical Trial equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
c. If Clinical Trial equals No, continue processing and proceed to Anesthesia Start Date.

7. Check Anesthesia Start Date
   a. If Anesthesia Start Date is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Anesthesia Start Date equals Unable to Determine, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
   c. If Anesthesia Start Date equals a Non Unable to Determine Value, continue processing and proceed to the Surgery Days calculation.

8. Calculate Surgery Days. Surgery Days, in days, is equal to the Anesthesia Start Date minus the Admission Date.

9. Check Surgery Days
   a. If Surgery Days is less than zero, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   b. If Surgery Days is greater than or equal to zero, continue processing and proceed to Infection Prior to Anesthesia.

10. Check Infection Prior to Anesthesia
    a. If Infection Prior to Anesthesia is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
    b. If Infection Prior to Anesthesia equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
    c. If Infection Prior to Anesthesia equals No, continue processing and proceed to Glucose.

11. Check Glucose
    a. If Glucose is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
    b. If Glucose equals 5, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
    c. If Glucose equals 3 or 4, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
d. If Glucose equals 1 or 2, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.