Measure Abbreviation: AKI 01 (QCDR Measure ID: ASPIRE19)

Data Collection Method: This measure is calculated based on data extracted from the electronic medical record combined with administrative data sources such as professional fee and discharge diagnoses data. This measure is explicitly not based on provider self-attestation.

Description: Percentage of cases that the baseline creatinine does not increase more than 1.5 times within 7 postoperative days or the baseline creatinine level does not increase by ≥ 0.3 mg/dL within 48 hours postoperatively.*

NQS Domain: Effective Clinical Care

Measure Type: Outcomes

Scope: Measured on a per case basis.

Measure Summary: AKI 01 identifies when there is an increase of 1.5 times the baseline serum creatinine observed in first 7 postoperative days OR when the baseline creatinine increases greater than or equal to 0.3 mg/dl in 48 hours after anesthesia end. Baseline serum creatinine is defined as the most recent serum creatinine resulted in the last 60 days preoperatively.

Rationale: Acute kidney injury is a serious complication following non-cardiac surgery and is associated with an increased risk of in-hospital mortality. The development of AKI is known to increase patient care demands, accounting for 20% of intensive care unit (ICU) admissions, and significantly increasing hospital cost, length of stay, and mortality. Definitions and classification schema for AKI vary across current literature; most commonly, these include the Risk/Injury/Failure/Loss/End-stage (RIFLE), Acute Kidney Injury Network (AKIN), and Kidney Disease-Improving Global Outcomes (KDIGO) criteria.

Inclusions: All anesthetic cases

Exclusions:

- ASA 5 & 6
- Patients with pre-existing renal (stage 4 or 5) failure based upon BSA-Indexed EGFR < 30 mL/min/1.73 m^2
- Patients undergoing procedures affecting kidneys
    - Urologic surgery on kidney/ureter – *CPT 00862, 00864, 00870, 00872, 00873, 00865, 00908, 00910, 00912, 00914, 00916, 00918, 00860, 00942*
    - Renal & Liver Transplants – *CPT 00868, 00796*
- Non-Operative Procedures:
    - Obstetric Non-Operative Procedures – *CPT 01958, 01960, 01967*
    - Pain Procedures – *CPT 01991, 01992, 01996*
    - Electroconvulsive Therapy – *CPT 00104*
- Patients where a creatinine lab is not available within 7 postoperative days.

- Patients that do not have a baseline creatinine within 60 days preoperatively
- For patients with more than one case in a 7-day period, the first case will be excluded if a postop creatinine is not documented for that first case. For example, a patient that has surgery twice in a 7-day period, the first surgery is excluded if a creatinine is not drawn in between cases.
- Case duration less than 45 minutes. See 'Other Measure Build Details' for Case Duration algorithm.

MPOG Concept IDs Required:

Race MPOG Concept IDs		**Ht/Wt MPOG Concept IDs**		**Creatinine Lab Concept ID**	
4000	Unknown Race	**70257**	Physical Exam - Height (cm)	**5002**	Formal lab - Creatinine, Serum/Plasma
4001	Hispanic, White	**70258**	Physical Exam - Height (in)		
4002	Hispanic, Black	**70264**	Physical Exam - Weight (kg)		
4003	Hispanic, Color Unknown	**70265**	Physical Exam - Weight (lb)		
4004	Black, not of Hispanic Origin				
4005	White, not of Hispanic Origin				
4006	American Indian or Alaska Native				
4007	Asian or Pacific Islander				
4008	Bi or Multi Racial				
4009	Middle Eastern				
4050	Other Race Not Listed				
18117	Column Mapping - AIMS_Race_Text				

Data Diagnostics Affected:

- Percentage of Cases with Professional Fee Procedure Codes
- Percentage of Cases in which the Patient has a Known Patient Race
- Percentage of Cases in which the Patient has a Known Patient Gender
- Percentage of Cases with Patient Weight
- Percentage of Cases with Patient Height
- Percentage of Cases with Preoperative and Postoperative Creatinine

Collations Used:

- AKI
- Case Duration
- Primary Provider
- BP 01 Measure
- Staff Roles
- Anesthesia Duration
- Preop EGFR

Other Measure Build Details:

Only *valid* creatinine values (≥0.2 mg/dL and ≤25.00 mg/dL) used.

Method for calculating EGFR dependent on age and availability of patient race data:

<u>Adult patients >18 years old:</u>

- Sites with race data:

  CKD-EPI EGFR = $141 \times min(S_{cr}/\kappa, 1)^{\alpha} \times max(S_{cr}/\kappa, 1)^{-1.209} \times (0.993)^{Age} \times (1.018 \text{ if female}) \times (1.159 \text{ if black})$
  - S_{cr} indicates the serum creatinine in mg/DL
  - κ = 0.7 for females, 0.9 for males; for missing gender data, assume female
  - α = -0.329 for females, -0.411 for males; for missing gender data, assume female
  - Age = age in years
  - *min* indicates the minimum of S_{cr}/κ or 1
  - *max* indicates the maximum of S_{cr}/κ or 1
- Sites without race data:

  Cockcroft-Gault EGFR = ((140 – Age in years) x (Weight in kg) x 0.85 if female)/(72 x Plasma Creatinine in mg/dL)
  - EGFR normalized to 1.73 m^2 of body surface area (BSA) by multiplying by (1.73 / BSA)
  - BSA calculated by Du Bois and Du Bois formula = $(\text{weight in kg})^{0.425} \times (\text{height in cm})^{0.725} \times 0.007184$.
  - BSA assumed = 1.73 m^2 if height data unavailable
  - If weight data unavailable, use CKD-EPI equation above, and assume race is non-black.

<u>Pediatric Patients ≤18 years old:</u>

- Bedside Schwartz EGFR = 0.413 x [(height in cm)/(serum creatinine in mg/dL)]
- If height is missing, see adult algorithm for EGFR calculation.

- Algorithm for determining Case Duration:

  Case Start:
  1. Anesthesia Induction End. If not available, then
  2. Anesthesia Induction Begin. If not available, then
  3. Procedure Start. If not available, then
  4. Patient in Room. If not available, then
  5. Anesthesia Start

  Case End:
  1. Patient Extubated. If not available, then
  2. Procedure End. If not available, then
  3. Patient Out of Room. If not available, then
  4. Anesthesia End.

Success:

1. The creatinine level does not go above 1.5x the baseline creatinine within 7 days post-op
2. The creatinine level does not increase by ≥ 0.3 mg/dL obtained within 48 hours post-op (anesthesia end).

Threshold: 90% success.

Responsible Provider:

1. The provider signed in during the case when the BP 01 measure failed (it is possible to have more than one provider).
2. If there is no failure for the BP 01 measure, then the responsible provider is the provider signed in the longest between Case Start and Case End. See 'Other Measure Build Details' section of this specification to view the algorithm used for determining case duration.

Risk Adjustment (for outcome measures):

To evaluate provider-level risk adjustment we will calculate the observed to expected outcomes ratio (O/E). The O/E is calculated using a logistic regression model and predicts (given a set list of dependent patient and hospital level variables) the expected probability of having a kidney injury. We adjust for surgery risk score, emergent procedures, ASA, gender, age, body mass index, laboratory values, and teaching versus private hospital. Patient specific comorbidities are evaluated as well.

*Only Stage 1 Acute Kidney Injuries were included for the 2016 performance year. Stage 1, 2, and 3 Acute Kidney Injuries were included for 2017.

<u>AKI Stages:</u>

Stage 1: Creatinine increase of ≥50% baseline creatinine (≥1.5 times baseline) within 7 days postoperatively.

Stage 2: Creatinine increase of ≥100% baseline creatinine (≥2.0 times baseline) within 7 days postoperatively.

Stage 3: Creatinine increase of ≥200% baseline creatinine (≥3.0 times baseline) or >4.0 mg/dL within 7 days postoperatively.

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