The American College of Cardiology National Cardiovascular Data Registry (NCDR) utilizes statistical models to provide both risk adjusted and risk standardized outcomes to participating hospitals. The results of these models can be used to benchmark performance and guide quality improvement efforts.

The NCDR CathPCI Registry® has several approved risk models that are currently reported as executive level metrics. These risk models include in-hospital risk standardized mortality, risk standardized bleeding, risk adjusted acute kidney injury and 30-day risk standardized mortality.

In 2021, an ACC NCDR workgroup was established to:

- Provide guidance on developing a hierarchical acute kidney injury model in patients undergoing percutaneous coronary intervention (PCI)
- Provide guidance on the model eligibility including inclusion and exclusion criteria
- Recommend updates and adjustments to the risk model clinical variables utilizing the CathPCI Registry® v5.0 dataset
- Develop a model useful for internal benchmarking for healthcare facilities

At this time, we are pleased to share the proposed **In-hospital Risk Standardized Acute Kidney Injury Model in patients undergoing Percutaneous Coronary Intervention** for your review and welcome your comments.

## Risk Model Summary

### Model Specifications:

- Outcome: Post-PCI acute kidney injury is defined as ***any one*** of the following:
  - Increase in serum creatinine of ≥ 0.3 mg/dL from baseline*
  - Increase in serum creatinine of 50% or more from baseline*
  - New requirement for dialysis
- Inclusion Criteria:
  - Patients with a PCI procedure performed during the episode of care
- Exclusion Criteria:
  - Patients missing a pre-procedure creatinine ***or*** post-procedure creatinine ***and*** post-procedure New Requirement for Dialysis = No
  - Patients that are on dialysis prior to the procedure
  - Patients discharged on the same day as the index PCI procedure

*Acute Kidney Injury Network (AKIN) stage 1 or greater

## Risk Variables:

| FULL MODEL | |
|---|---|
| Age | Cardiovascular Instability |
| Hypertension | Salvage PCI or Refractory Cardiogenic Shock |
| Diabetes Mellitus | Cardiogenic Shock (not refractory) without Salvage PCI |
| Anemia | Other Clinical Instability |
| Severe Frailty | PCI Status |
| Heart Failure | ST-Elevation MI |
| CKD Stage | Non ST-Elevation MI/Unstable Angina |
| Cardiac Arrest | Mechanical Ventricular Support |
| Cardiac Arrest and Responsive | In place at start of procedure |
| Cardiac Arrest and Unresponsive | Inserted during procedure and prior to intervention |
| Concomitant Procedure(s) | PCI of Proximal LAD |

## Model Type

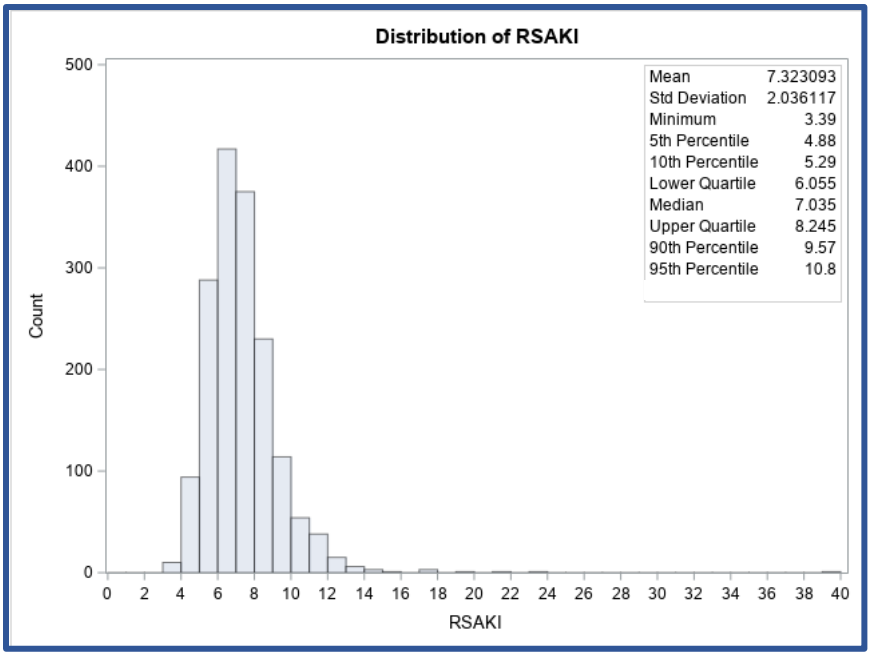
This proposed model is a multivariate hierarchical logistic regression model.

## Model Performance

Model discrimination was excellent in the validation dataset for predicting in-hospital acute kidney injury (c-statistic = 0.797).

## Performance Estimates

### Distribution of Hospital Risk Standardized Acute Kidney Injury Rates (All Patients)



## Draft Metrics and Detail lines

In efforts to support facility level quality improvement efforts, the workgroup has proposed the following metric and detail lines.

## Executive Summary View


## Detail Lines

The proposal includes the reporting of both the risk standardized and risk adjusted values for the new metric in the detail lines. This aligns with the currently reported detail lines for both risk standardized mortality and risk adjusted mortality.

| PCI In-hospital Risk Standardized Acute Kidney Injury (all patients) |
|---|
| Eligible patients |
| Observed acute kidney injury (among eligible) |
| Risk standardized acute kidney injury ratio |
| PCI In-hospital risk standardized acute kidney injury (all patients) |
| Lower 95% confidence interval |
| Upper 95% confidence interval |
| **PCI In-hospital Risk Adjusted Acute Kidney Injury (all patients)** |
| Eligible patients |
| Observed acute kidney injury (among eligible) |
| Expected acute kidney injury (among eligible) |
| Observed/expected acute kidney injury ratio |
| PCI In-hospital risk adjusted acute kidney injury (all patients) |
| Registry aggregate observed acute kidney injury rate (%) |
| Lower 95% confidence interval |
| Upper 95% confidence interval |

| PCI In-hospital Risk Standardized Dialysis (all patients) |
|---|
| Eligible patients |
| Observed dialysis (among eligible) |
| Risk standardized dialysis ratio |
| PCI In-hospital risk standardized dialysis (all patients) |
| Lower 95% confidence interval |
| Upper 95% confidence interval |
| **PCI In-hospital Risk Adjusted Dialysis (all patients)** |
| Eligible patients |
| Observed dialysis (among eligible) |
| Expected dialysis (among eligible) |
| Observed/expected dialysis ratio |
| PCI In-hospital risk adjusted dialysis (all patients) |
| Registry aggregate observed dialysis rate (%) |
| Lower 95% confidence interval |
| Upper 95% confidence interval |