



Improving Acute Kidney Injury Outcomes Following Percutaneous Coronary Intervention Procedures Through Targeted Clinical and Documentation Improvements



M. NGO ¹, H. DONALDSON ¹, J. SOUTHARD ¹, R. SITUALA ¹, A PAWLIKOWSKI ² and E. MERSEREAU ²

¹ University of California Davis Health

² Biome Analytics

INTRODUCTION

Acute kidney injury (AKI) is a serious complication following percutaneous coronary intervention (PCI), resulting in increased morbidity, prolonged hospitalization, and higher healthcare costs. In 2023, the University of California Davis (UCD) Heart & Vascular Center identified a PCI-related AKI rate above national benchmarks (9.88%; observed-to-expected [O/E] ratio 1.16), prompting a multidisciplinary quality improvement initiative.

BACKGROUND

The project aimed to reduce AKI through evidenced-based clinical practice while improving risk-adjusted performance by enhancing documentation of patient comorbidities. Accurate risk capture and standardized preventative care were identified as key opportunities to improve patient outcomes and ensure fair performance measurement within the ACC NCDR CathPCI Registry.

METHODS

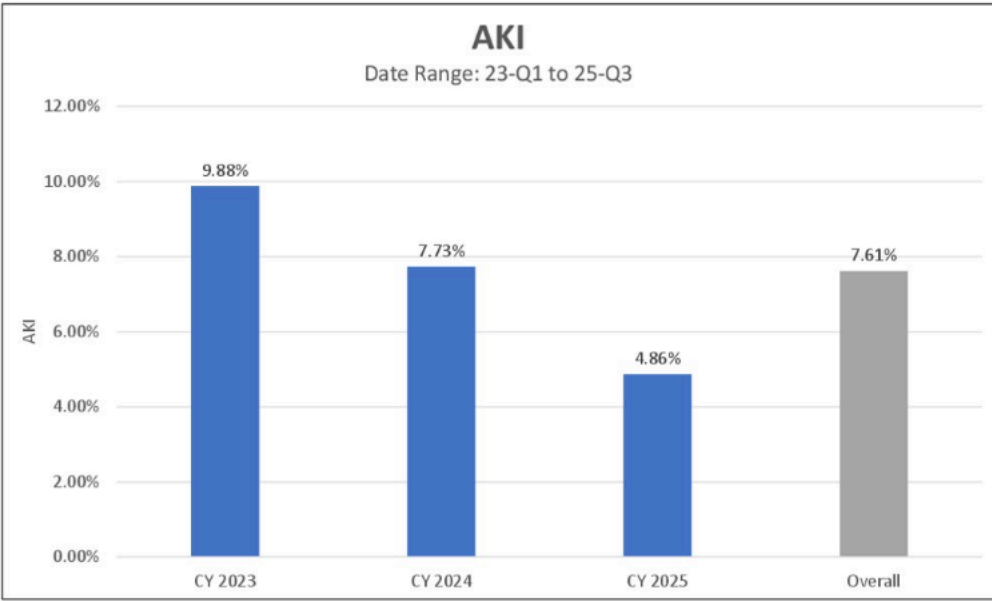
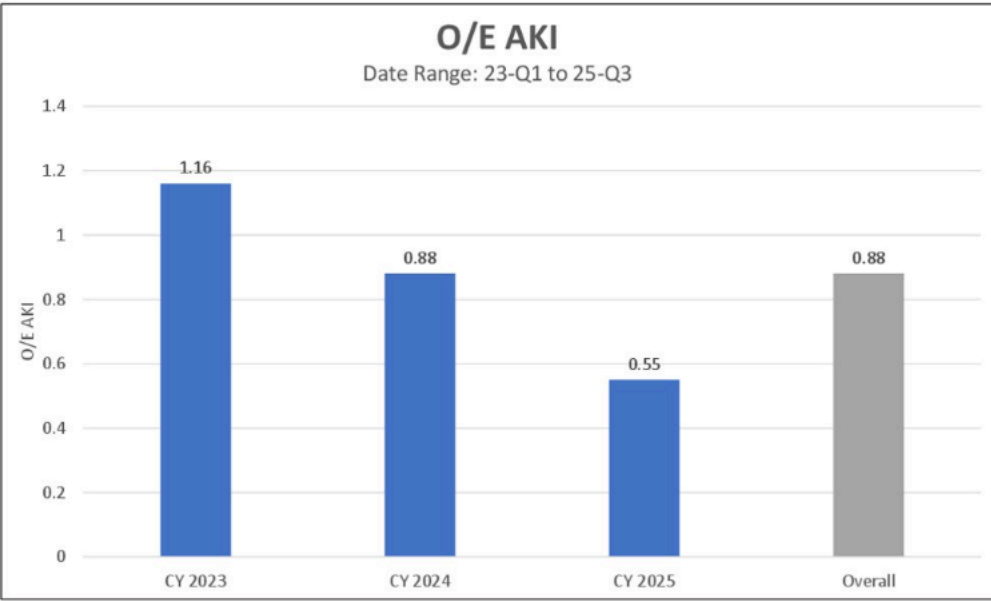
A multidisciplinary team implemented a two-pronged intervention:

1. Standardized pre- and post-PCI hydration protocols, staff education, and routine audits of order compliance and fluid administration
2. Systematic review of documentation using Biome Risk Audit to identify missed comorbidities, improve registry abstraction, and enhance provider documentation

Clinical outcomes and registry performance were monitored using ACC NCDR Cath PCI Registry Data.

RESULTS

Observed AKI decreased from **9.88% (2023)** to **7.73% (2024)** and **4.86% (Jan-Sept 2025)**, representing approximately **23 fewer AKI cases annually**. The AKI O/E ratio improved from **1.16 to 0.55**, indicating outcomes better than expected after risk adjustment. Predicted AKI risk increased slightly (8.49% to 8.80%), reflecting improved documentation and risk capture. Reduced AKI translated to an estimated **154 hospital bed days saved** and approximately **\$729,100 in annual direct cost avoidance**.



CONCLUSION

Combining evidence-based clinical interventions with structured documentation improvement significantly reduced PCI-related AKI while improving risk-adjusted performance. Continuous auditing, multidisciplinary collaboration, and standardized workflows were essential for sustaining improvements. This approach enhanced patient safety, reduced healthcare utilization, and demonstrated the value of integrating quality improvement with accurate clinical documentation.

REFERENCES

Nelson, D., Erickson, L., Zilinski, J. L., & Niazi, I. (2023). **The long-term consequences of acute kidney injury after PCI on mortality, readmission and costs in the United States.** *Journal of the American College of Cardiology*. [https://doi.org/10.1016/S0735-1097\(23\)01388-8](https://doi.org/10.1016/S0735-1097(23)01388-8).

VALUE PROPOSITION

Patients: Standardized hydration protocols reduced the incidence of PCI-related AKI, improving patient safety and decreasing complications associated with prolonged hospitalization, kidney injury, and recovery.

Providers: Evidence-based workflows, multidisciplinary collaboration, and routine auditing improved adherence to best practices while strengthening documentation and accurate capture of patient risk factors. These efforts supported more reliable quality measurement and informed future improvement initiatives.

Health System: Fewer AKI events resulted in shorter hospital stays, improved bed availability, and an estimated annual direct cost avoidance of approximately **\$729,100** and **154** inpatient bed days saved, increasing operational efficiency and resource utilization.

Society: Preventing avoidable complications improves the quality and efficiency of cardiovascular care, advances value-based healthcare, and promotes responsible stewardship of limited healthcare resources

ACKNOWLEDGEMENTS

The author extends sincere gratitude to every member and leadership of the Heart and Vascular Center of UC Davis Health. Special thanks to our advanced practice providers, whose guidance and knowledge have been invaluable in this project

DISCLOSURES

- Biome Analytics partnered with the University of California Davis Health to provide clinical analytics and performance improvement support of this quality improvement initiatives
- Biome team members are co-authors on this project
- The authors report no other relevant financial relationships or conflict of interests.

