

# Improving Percutaneous Coronary Intervention Reduces Adverse Events and Length of Stay



## HEALTHCARE ORGANIZATION

Integrated Delivery System

## PRODUCTS

- Health Catalyst® Data Operating System (DOS™) platform
- Key Process Analysis (KPA)
- Coronary Artery Disease (CAD) Analytics Accelerator

## SERVICES

- Professional Services

## EXECUTIVE SUMMARY

UnityPoint Health evaluated its percutaneous coronary intervention (PCI) performance and identified the opportunity to further improve. The health system decided to identify ways to improve its PCI outcomes. With its data operating system and a robust suite of analytics tools, UnityPoint Health took a data-driven approach to improving its PCI efforts. As a result, the organization has achieved positive clinical and financial improvements.

- \$843K reductions in variable direct costs.
- 67.3 percent relative reduction in major adverse events.
- 65 percent relative reduction in non-major adverse events.

## IMPROVING PERCUTANEOUS CORONARY INTERVENTION COMPLICATION RATES

Improving PCI complication rates is a significant opportunity area for health systems, as PCIs are one of the top ten contributors to healthcare costs, amounting to \$10 billion annually.<sup>1,2</sup> As a nonsurgical procedure used to improve blood flow to the heart, PCIs are not uncommon and, unfortunately, neither are complications for some health systems. UnityPoint Health closely evaluated its PCI performance and identified room for improvement, in order to reduce costs without compromising quality care for patients receiving a PCI.

UnityPoint Health is committed to providing outstanding care across Iowa, western Illinois, and southern Wisconsin. Its health network includes hospitals, clinics, and home care services, with over 6.2 million annual patient visits, providing a full range of care to patients and families using innovative advancements to deliver the best outcome for every patient, every time.



“One of our major learnings has been to use the data to drive our priorities and initiatives. At the beginning of this work, we had a list of standard cardiovascular metrics, and believed we needed to improve our door to balloon time. When we gained access to actionable, meaningful data, the data indicated that wasn't our greatest opportunity. We quickly shifted our improvement work to where the data was telling us we needed to go.”

Sharese Van Sloten, MHA  
Director of Integration &  
Optimization  
UnityPoint Health

## LACK OF DATA HINDERS PCI IMPROVEMENT EFFORTS

UnityPoint Health identified a variation in cost for its patients who received a PCI. The organization understood that this variation in cost suggested a variation in clinical care and a clear opportunity to further improve PCI outcomes through appropriate interventions.

While UnityPoint Health identified a variation in PCI cost and the associated clinical care, it lacked the actionable data the leadership team needed to pinpoint the sources of variation, impeding improvement efforts. The health system established a cardiovascular (CV) clinical service group and a coronary artery disease (CAD) work team—an interdisciplinary team consisting of an executive physician, nurse leaders, interventional cardiologists, analysts, informaticists, subject matter experts, and frontline nursing staff. The interdisciplinary team was responsible for taking a deep dive into the variation, identifying the cause, and creating appropriate interventions to improve outcomes and reduce cost.

However, identifying the cause behind the variation proved to be difficult without the detailed data the disciplinary team needed to effectively understand the problem and, in turn, drive improvement. To improve clinical care, reduce unnecessary variation, and improve cost, UnityPoint Health needed meaningful, actionable data to guide its improvement efforts.

## ACTIONABLE DATA REVEALS VARIATION IN BLEEDING RATES

To gain the comprehensive, clinically meaningful insight required to drive PCI improvement efforts, UnityPoint Health implemented the Health Catalyst® Data Operating System (DOS™) and a robust suite of analytics applications, including the Key Process Analysis (KPA) and the CAD Analytics Accelerator.

The organization used the KPA analytics application to identify cost-driving clinical areas and further understand variation in care processes. UnityPoint Health was able to pinpoint the source of the cost variation: the organization had variation in bleeding rates among its patients undergoing elective outpatient PCI.

With new insight into the sources of the cost variation, UnityPoint Health leveraged the CAD Analytics Accelerator to gain even greater insight into PCI performance (see Figure 1).

## FIGURE 1. CAD ACCELERATOR SAMPLE VISUALIZATION

- 1 Filters to select data of interest, including region, medical condition, readmission within 30-days, and PCI access type.
- 2 Tabs for selecting data of interest (Procedures, Avg LOS (Days), Return to Hospital, etc.).
- 3 Summarized performance data, including mortality, average standard cost, discharge location, and percentage of major and non-major adverse events.



Figure 1: CAD Accelerator sample visualization

The organization used the analytics accelerator to identify all patients receiving PCI and easily visualize mortality, average length of stay (LOS), complication rates, average standard costs, and return to hospital rates for patients undergoing elective outpatient PCI. For the first time, UnityPoint Health was able to understand and quantify the differences in bleeding rates, LOS, and costs for patients who underwent a femoral PCI compared to patients who underwent a radial PCI. Leaders could also visualize and compare differences across the health system's various regions, identifying areas with a high percentage of radial approach and those with low performance.

## COLLABORATIVE APPROACH FOSTERS CREATIVE SOLUTIONS

UnityPoint Health's CAD work team used the data to focus its improvement efforts on engaging interventional cardiologists and frontline staff in transitioning to standard work for PCI, including region-specific goals for a radial-first approach and increasing the number of same-day discharges.

The organization provided education to its interdisciplinary team in its various regions, increasing awareness of the improved patient outcomes associated with a radial approach, and incorporated a radial approach mentoring program with hands-on

Pulling together the disparate databases was a game-changer.

Sharese Van Sloten, MHA  
Director of Integration & Optimization  
UnityPoint Health



“We were able to use analytics to respond to specific questions and concerns from our regions. We can easily visualize the data we need and provide our physicians with answers to their questions.”

Todd Langager, MD, FACC  
Medical Director  
Cardiovascular Service Line  
UnityPoint Health

training to physicians. The training, which interventional cardiologists from various UnityPoint Health regions and product experts provided, was designed to improve the number of PCIs performed using radial access.

The organization addressed concerns regarding potential increases in radiation exposure, ensuring the availability of radiation protection devices and increasing the monitoring and reporting of radiation exposure.

UnityPoint Health incorporated a pre-procedure risk assessment that weighs the patient’s comorbidities and diagnoses, enabling the clinical team to make a pre-procedural determination of clinical suitability for same-day discharge.

The health system also standardized the discharge process—implementing a standardized discharge protocol to streamline throughput, a standard protocol for education and care for the patients—and provided patient education to ensure patients understood, and were comfortable with, same-day discharge.

To improve trust in the CAD data, the organization developed a quality assurance plan, including National Cardiovascular Data Registry monthly training and collaboration among data abstractors to guarantee consistent data abstraction and submission across all regions.

UnityPoint Health leaders and the CAD work team use data from the analytics application to monitor performance—providing ongoing feedback to physicians and nursing staff about their performance and the patients to whom they provided care—clearly linking the result of their newly-applied interventions to patient outcomes.



Previously, it was difficult to access the data required. It's been incredibly powerful to have all of our data, including financial data and clinical procedure data, in our analytics application.

Tony Nurre, BSIE, MBA  
Senior Business Analyst  
UnityPoint Health

## RESULTS

UnityPoint Health's data-driven improvement efforts have reduced costly, unnecessary variation, improved the care it delivers to its patients undergoing outpatient elective PCI, and positively impacted clinical and financial performance across the health system, with the following results:

- \$843K utilization reductions in variable direct costs, the result of standardized care and operational improvements.
- 67.3 percent relative reduction in major adverse events.
- 65 percent relative reduction in non-major adverse events.
- 29.8 percent relative increase in same-day discharge, decreasing resource utilization.
- Eight percent relative reduction in LOS.

## WHAT'S NEXT

UnityPoint Health will continue its data-driven improvement work and plans to further spread and accelerate service line improvements across the entire continuum of care. 📈

## REFERENCES

1. Kim, A. & Zamanian, K. (2018). *PCI procedure volume recovers with new focus on complex PCI in the U.S. interventional cardiology market*. Retrieved from <https://www.dicardiology.com/article/pci-procedure-volume-recovers-new-focus-complex-pci-us-interventional-cardiology-market>
2. BlueCross Blue Shield. (2015). *A study of cost variation of percutaneous coronary interventions (angioplasties) in the U.S.* Retrieved from <https://www.bcbs.com/the-health-of-america/reports/study-of-cost-variation-percutaneous-coronary-interventions>

## ABOUT HEALTH CATALYST

Health Catalyst is a leading provider of data and analytics technology and services to healthcare organizations, committed to being the catalyst for massive, measurable, data-informed healthcare improvement. Our customers leverage our cloud-based data platform—powered by data from more than 100 million patient records, and encompassing trillions of facts—as well as our analytics software and professional services expertise to make data-informed decisions and realize measurable clinical, financial, and operational improvements. We envision a future in which all healthcare decisions are data informed. Learn more at [www.healthcatalyst.com](http://www.healthcatalyst.com).

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