

## AHRQ Quality Indicators (QIs) Case Study: Carilion Clinic’s Adoption of AHRQ QIs Brings Focus to System’s Goal of Zero Harm

### Key Findings

- After examining its rate of Iatrogenic Pneumothorax (PSI 06), Carilion Roanoke Memorial Hospital, part of the Carilion Clinic health system, instituted a residency simulation program that decreased its rate for this Patient Safety Indicator (PSI) by over 50 percent.
- By implementing protocols for evidence-based best practices associated with surgery, Carilion Roanoke was able to reduce occurrences for Postoperative Acute Kidney Injury Requiring Dialysis (PSI 10) and Postoperative Respiratory Failure (PSI 11).
- Following implementation of all of the PSIs, Carilion Roanoke is now focused on tracking its performance across the AHRQ Prevention Quality Indicators (PQIs) and initiating focused improvements in primary care as a result of the system’s performance on the PQIs.

Carilion Roanoke Memorial Hospital, a member of the Virginia-based Carilion Clinic health system, has used AHRQ’s Patient Safety Indicators (PSIs) to guide improvements for more than five years. Recently, Joshua Clark, Senior Director Quality & Patient Safety, shared with AHRQ the improvements experienced by Carilion Roanoke Memorial Hospital as a result of its focus on the AHRQ Quality Indicators.

### Residency Simulation Program Improves Iatrogenic Pneumothorax (PSI 06) Rate

In 2015, the quality and safety team at Carilion Roanoke Memorial Hospital noticed that there was opportunity to reduce the occurrence of Iatrogenic Pneumothorax (PSI 06). After a closer examination of the underlying data, the quality and safety team partnered with the Graduate Medical Education leadership to establish a simulation program to improve resident training for central line placement. This training effort included increased oversight and formal documentation of competency for all residents and fellows. Following this implementation, Carilion was able to reduce the incidence rate of PSI 06 by more than 50 percent when comparing the rate in 2015 to 2018. Carilion subsequently adopted this training module more broadly – for any procedures for which there is a risk of iatrogenic pneumothorax and continues to utilize their state of the art Center for Simulation, Patient Safety and Research to drive improved outcomes.

#### Carilion Clinic: At a Glance

- Carilion Clinic is a Roanoke, Virginia based integrated health care system that provides care to nearly one million people in Virginia and West Virginia.
- Carilion operates seven hospitals in western Virginia, including the region’s only Level 1 Trauma Center at Carilion Roanoke Memorial Hospital.
- Carilion owns and operates the Jefferson College of Health Sciences and a joint venture medical school and research institute with Virginia Tech.
- With more than 13,000 employees and more than 700 physicians representing 70 specialties and practicing at 225 sites, Carilion is the largest employer in Virginia’s Roanoke Valley.

## Evidence-Based Approaches to Surgery Recovery Improves PSI 10 and PSI 11 Rates

In 2014, Carilion instituted a set of protocols that apply evidence-based best practices associated with enhanced recovery after surgery. The protocols address, for example, the use of non-narcotic pain medications after surgery, and early ambulation. Carilion leadership found that implementing these protocols led to zero occurrences of Postoperative Acute Kidney Injury Requiring Dialysis (PSI 10) in September 2017, and they continue to maintain zero occurrences as of April 2019. In addition, Carilion achieved a 20 percent reduction in Postoperative Respiratory Failure (PSI 11) from the first quarter of 2017 through the first quarter of 2018. Following the protocols also reduced other complications, reduced the number of patients needing nursing home or rehabilitation facility care during recovery, increased patient satisfaction, and decreased lengths of stay and readmissions related to surgical complications. For example, Carilion’s average length of stay for colorectal surgery decreased by more than 30 percent from the baseline period of 2011-2012.

## Using a Quality Performance Indicator Dashboard Helps to Visualize and Motivate Improvement on AHRQ QIs

While Carilion has improved PSI rates over time, it is seeking to maintain and accelerate those gains in part by consolidating its processes and resources devoted to quality and patient safety into a new Department of Clinical Advancement and Patient Safety.

“When focusing on preventable harm, Carilion’s goal is always to get to zero.”  
 Joshua Clark, Senior Director, Quality and Patient Safety, Carilion Clinic

This new department developed the Quality Performance Indicator Dashboard, Carilion’s homegrown business intelligence platform developed to visualize performance in a meaningful and understandable way for front line clinicians and leaders. Prior to focusing on coordinated quality improvement efforts and developing the Dashboard, “we were sometimes reacting to data as it became public, which is dated information and difficult to analyze for real opportunity,” Clark explained. “Now we are more capable of responding to, and monitoring, patient safety events in real time.” The platform provides a visual display of Carilion’s performance for each AHRQ PSI – depicted by occurrence on a monthly basis rather than by rates.

The Quality Performance Indicator Dashboard is accessible by leaders of each department, and Carilion’s analytics team updates reports at least monthly. The Dashboard’s visual display allows clinicians to more easily interpret the data and encourages interdisciplinary conversations on improving quality rather than questioning the data or underlying methodology.

## Initial Focus on PSIs Broadens to Focus on PQIs and Opportunities for Improved Primary Care Outreach

To date, Carilion has monitored and worked to improve performance across the full slate of PSIs to improve patient safety. Carilion’s focus on safety culture and continuous improvement has also led the organization to proactively focus on the health of the community. One way to do this was to begin tracking performance across AHRQ’s Prevention Quality Indicators (PQIs), which assess communities’ access to effective ambulatory care using data on hospital admissions for conditions that can typically be

managed on an outpatient basis.<sup>1</sup> Omid Shabestari, MD, Carillion’s Director of Healthcare Analytics notes that monitoring the system’s performance across all PSIs and PQIs was prompted by implementation of value-based payment models by health care payers. To address the connection between primary care and the types of “ambulatory sensitive conditions” captured by the PQIs, Carilion decided to focus on targeted primary care interventions for patients at risk for Dehydration (PQI 10) and Short-term Diabetes Complications (PQI 01). Carilion built preventive care alerts into its electronic medical record system for hypertension, heart disease, and diabetes, to name a few examples. In the future, Carilion’s leaders plan to deepen PQI use and share PQI data with clinicians so that they can identify opportunities to increase prevention and improve PQI performance.

### Interview Participants

*Carilion Clinic: Joshua Clark, Senior Director, Quality and Patient Safety, Omid Shabestari, MD, Director of Healthcare Analytics, Dylan S. Glover, Healthcare Analytics Consultant*

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### **About the AHRQ Quality Indicators (QIs)**

The AHRQ QIs include four sets of measures—Patient Safety Indicators, Inpatient Quality Indicators, Prevention Quality Indicators, and Pediatric Quality Indicators—which address quality of care for patients hospitalized for a broad range of procedures or conditions that are high risk, problem prone, and/or high volume. The AHRQ QIs represent a national standard and are publicly available at no cost to the user. Many of the indicators are endorsed by the National Quality Forum (NQF), suggesting that stakeholders across the healthcare enterprise view the measures as “best in class.” They can be used to support quality improvement efforts, public reporting, and accountability programs, and ultimately to help provide safe, effective care to patients. Many of the AHRQ QIs are used by the Centers for Medicare and Medicaid Services (CMS) and other payers for quality monitoring, pay-for-performance, and value-based purchasing initiatives. Hospitals and health systems can use AHRQ QIs as part of an overall performance initiative to improve the quality of care. For more information about the AHRQ QIs visit <http://www.qualityindicators.ahrq.gov/>.

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<sup>1</sup> More information about AHRQ’s Prevention Quality Indicators may be found at [https://www.qualityindicators.ahrq.gov/modules/pgi\\_overview.aspx](https://www.qualityindicators.ahrq.gov/modules/pgi_overview.aspx).