

Comprehensive Approach to CAUTI Prevention Leads to Dramatic Reduction in Infections



HEALTHCARE ORGANIZATION

Integrated Delivery System

PRODUCTS

- Health Catalyst® Analytics Platform, including the Late-Binding™ Data Warehouse and broad suite of analytics applications
- The Catheter Associated Urinary Tract Infection (CAUTI) Prevention Advanced Application

SERVICES

- Installation Services

EXECUTIVE SUMMARY

Despite being common, healthcare-associated infections are potentially deadly and carry a significant financial cost. Of healthcare associated infections, catheter-associated urinary tract infections (CAUTIs) are one of the most common, despite most instances of CAUTI being preventable.

As CAUTI was determined to be one of the top five influential factors in the publicly reported quality scores, Piedmont Healthcare looked to infection data for more visibility into factors that were contributing to CAUTIs in an effort to permanently reduce the number of infections. By engaging clinical and quality staff for compliance with CAUTI prevention best practices, Piedmont has seen sustainable improvements.

RESULTS

- 50.2 percent relative reduction in CAUTI standardized infection ratio (SIR). This translates to 37 fewer patients with infections than expected.
- 6.7 percent relative improvement in insertion bundle compliance.
- Maintenance bundle compliance improved dramatically, with nearly a three-fold increase in the percentage of patients receiving the maintenance bundle.

REDUCING CAUTIS WITH EVIDENCE-BASED PREVENTION

Healthcare-associated infections (HAIs) are a common, costly, and potentially deadly occurrence. Catheter-associated urinary tract infections (CAUTI) are one of the most common HAIs.¹

Piedmont Healthcare is an integrated healthcare system of seven hospitals with nearly 100 physician and specialist offices across greater Atlanta and North Georgia. Piedmont looked to the reduction of CAUTIs as an opportunity to improve quality outcomes and reduce costs. Evidence-based practice guidelines are available to inform prevention activities that would lead to a reduction in CAUTIs. However, ensuring compliance with the guidelines is challenging in the complex healthcare environment.^{2,3,4}



Analytics provided insight into the process metrics rather than outcomes alone, enabling us to reduce the number of CAUTIs through preventive best practices.

Jeremiah Bame, MBA, BSN, RN
Chief Nursing Officer
Piedmont Newton Hospital

CAUTI IMPROVEMENTS HINDERED BY FOCUS ON OUTCOMES RATHER THAN PROCESS METRICS

Piedmont had attempted efforts to reduce CAUTIs for more than two years. Despite instituting several recommended prevention activities, the health system was unable to make any sustainable gains. As a result, publicly reported quality scores influenced by CAUTI SIR did not portray Piedmont in a favorable light.

Previous prevention activities were focused solely on the outcome measure (CAUTI rate) rather than the factors that impacted infection rates, such as insertion or maintenance of the indwelling urinary catheter. In order to prevent CAUTIs, Piedmont understood it would be necessary to shift focus to monitoring and measuring CAUTI prevention process metrics (insertion and maintenance bundle compliance) and engage providers and nursing staff in the shift in culture. Additionally, the health system knew it needed to move away from the resource-intensive manual chart review they were performing. Thousands of hours were used each year to perform surveillance, hindering improvement efforts by leaving data unavailable in time for care revisions. This also carried with it a significant cost.

INCREASED VISIBILITY LEADS TO IMPROVED CAUTI PREVENTION

Piedmont made CAUTI reduction a top priority. Understanding that clinician ordering practices and care processes contribute to infection risks, the health system established an interdisciplinary CAUTI team with a clear goal of achieving a SIR of less than one through 80 percent compliance with insertion and maintenance bundle components.

Members of the team included urologists, physicians, registered nurses, infection preventionists, quality improvement professionals, and laboratory staff. Physician advisors and nurse champions helped to advocate for change with their peers, and, along with other members of the interdisciplinary team, provided expert guidance for developing policy, decision support algorithms, and care procedures.

To facilitate improvement, Piedmont defined standard work and process metrics for insertion and maintenance of indwelling urinary catheters, and clearly defined the roles and responsibilities for executive leaders, quality leaders, nursing staff, educators, safety coaches, and laboratory staff in preventing CAUTIs.



Physician and nurse engagement were critical components to our success. Bringing them into the improvement process was vital to achieving a sustainable reduction in CAUTIs.

Dr. J. Maxwell White, MD
Urologist
CAUTI Physician Advisor

To ensure easy access to the standard workflow and evidence-based guidelines for indwelling urinary catheters, Piedmont's interdisciplinary team developed a comprehensive toolkit, referred to as the "promise package." The toolkit provides frontline staff access to all CAUTI prevention information in one location on the Piedmont intranet. The information includes goals, insertion criteria, policy and procedure links, EHR documentation instructions, and information about the analytics application.

The collaborative efforts resulted in evidence-based guidelines with standard workflow for indwelling urinary catheters, including the following:

- Insertion bundle.
- Maintenance bundle.
- Algorithms for:
 - Inability to void.
 - Post-void residual.
 - Postoperative urinary retention.
- Documenting catheter insertion and catheter management in the EHR.
- Expectations for use of the catheter daily use data, insertion compliance data, and maintenance compliance date.
- Alternatives to indwelling urinary catheters.
- Algorithms for discontinuing catheters:
 - Present on admission.
 - Inserted in the emergency department.
 - Inserted in the OR.

Initial improvement efforts focused on prompt discontinuation of indwelling urinary catheters. These efforts did help to decrease the number of CAUTIs slightly; however, to obtain substantial improvement, Piedmont needed insight into the factors contributing to CAUTI. The Piedmont team made the decision to use the Health Catalyst® Analytics Platform, including the Late-Binding™ Data Warehouse and broad suite of analytics applications, implementing the Catheter Associated Urinary Tract Infection (CAUTI) Prevention Advanced Application™ (see Figure 1).

FIGURE 1. CAUTI ADVANCED APPLICATION SAMPLE VISUALIZATION

- 1 Filters data to level of interest.
- 2 Filters to select measure of interest.
- 3 CAUTI measure summary.

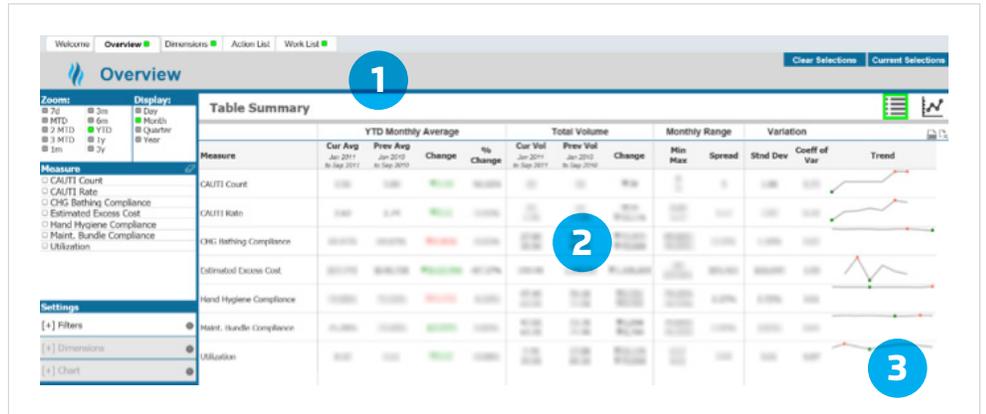


Figure 1. CAUTI Advanced Application sample visualization

The CAUTI application provides infection prevention specialists, clinical and operational directors, and quality improvements staff easy visualization of various process metrics, supporting the monitoring of catheter days, insertion bundle compliance, and maintenance bundle compliance. Using the analytics application, Piedmont can drill down to the facility, unit, service, or patient level when analyzing performance. This data provides Piedmont the ability to review the effectiveness of quality improvement interventions and provide supporting feedback to nursing staff and providers as appropriate.

The increased visibility of maintenance bundle components (see Figure 2) made it clear that indwelling urinary catheter care was inconsistent across hospital units. Nursing procedures for catheter care varied between units, with some demonstrating effective catheter care and a low number of CAUTIs while others did not.

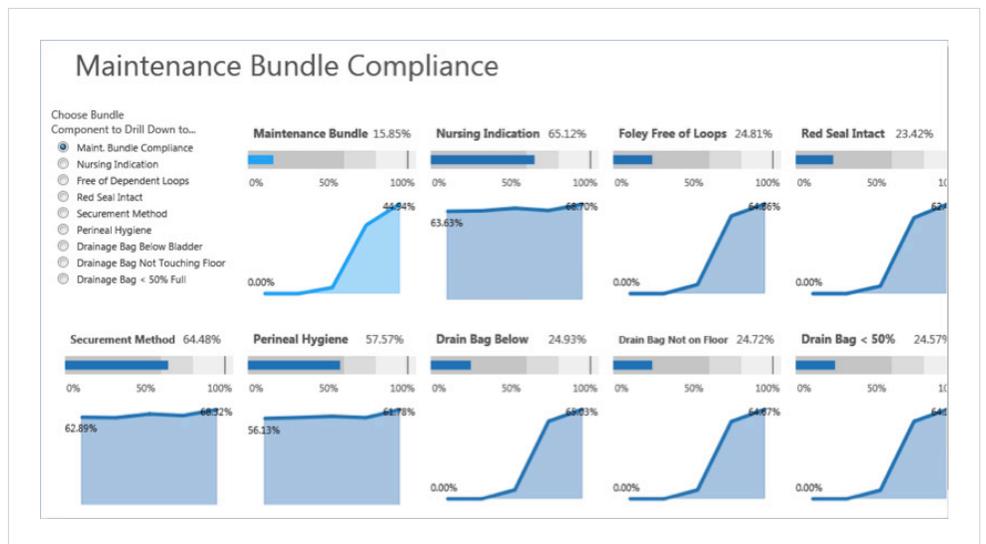


Figure 2. CAUTI Advanced Application maintenance bundle sample visualization



Analytics allowed us easy access to one source of truth, with ability to drill down to identify areas for improvements. Where previously the reduction of incidence of CAUTI were hard to sustain, data aided in the development of best practices to ensure the permanence of the improvements seen at Piedmont.

Shalom Hernandez-Patel
MPH, CPH, CIC
Infection Prevention Manager
Piedmont Atlanta Hospital

With better understanding of performance and existing opportunities for improvement, maintenance bundle compliance became the focus of improvement activities.

Nurses are empowered to apply best practice interventions for patients, minimizing the use of urinary catheters and discontinuing indwelling urinary catheters when appropriate. To support nursing staff in managing discussions with providers regarding catheter discontinuation, the comprehensive toolkit includes recommended scripting, and an escalation process should a disagreement arise that cannot not be immediately resolved. Physician advisors provide further support to the nursing staff by delivering education to the nursing staff and sharing changes with physician peers through presentations at medical staff meetings.

It was determined that some CAUTI attributed to the hospital as HAIs at Piedmont were likely inaccurately attributed due to the over-ordering of urinalysis (UA), including some ordering of UA days into the inpatient stay for patients who did not have symptoms of infection. This made it difficult to identify if a patient's infection was present upon arrival or developed during their hospital stay. To reduce over-ordering of UAs, Piedmont developed standard criteria to diagnose an infection, including when to send the specimen for culture.

Historically, when patients did not empty their bladder for a prolonged period of time, nursing staff would insert a catheter. This was appropriate for some patients, as they were experiencing urinary retention. However, for others the insertion of a catheter increased the risk of infection without benefit to the patient, as their bladders were not full. To ensure that patients at Piedmont were not catheterized more often than necessary, additional bladder scanner equipment was purchased, allowing the nursing staff to assess the volume of urine in the bladder prior to catheterization, decreasing unnecessary catheterization.

RESULTS

By using the standard workflows and evidence-based guidelines for indwelling urinary catheters outlined in the comprehensive toolkit, Piedmont achieved dramatic improvements in less than one year:

- 50.2 percent relative reduction in CAUTI standardized infection ratio. This translates to 37 fewer patients with infections than expected.
- 6.7 percent relative improvement in insertion bundle compliance.

- Maintenance bundle compliance improved dramatically, with nearly a three-fold increase in the percentage of patients receiving the maintenance bundle.

WHAT'S NEXT

Piedmont continues ongoing monitoring of CAUTI prevention performance. Leaders conduct purposeful rounds, engaging in conversations with nursing providers and answering any questions that staff have, all in an effort to encourage discontinuation of indwelling catheters within 48 hours and to encourage adherence to the standard work and evidence-based practices in the comprehensive toolkit. 🌟

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Health Catalyst is a next-generation data, analytics, and decision support company committed to being a catalyst for massive, sustained improvements in healthcare outcomes. We are the leaders in a new era of advanced predictive analytics for [population health](#) and [value-based care](#). with a suite of machine learning-driven solutions, decades of outcomes-improvement expertise, and an unparalleled ability to integrate data from across the healthcare ecosystem. Our proven data warehousing and analytics platform helps improve quality, add efficiency and lower costs in support of more than 85 million patients and growing, ranging from the largest US health system to forward-thinking physician practices. Our technology and professional services can help you keep patients engaged and healthy in their homes and workplaces, and we can help you optimize care delivery to those patients when it becomes necessary. We are grateful to be recognized by Fortune, Gallup, Glassdoor, Modern Healthcare and a host of others as a Best Place to Work in technology and healthcare.

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