HealthCatalyst®

Reducing Hospital Onset Clostridioides Difficile Infections Decreases Costs by $855K

Community Health Network

HEALTHCARE ORGANIZATION

Integrated Delivery System

PRODUCTS

- Health Catalyst® Data Operating System (DOS™) platform
- C. diff Prevention Analytics Accelerator

EXECUTIVE SUMMARY

Community Health Network, a hospital system in Indiana, discovered that its hospital-acquired Clostridioides difficile infection (HA-CDI) rate was higher than the national benchmark. The organization knew it needed to decrease infection rates, but without timely, meaningful data, leaders couldn't identify the right areas to focus improvement efforts.

With the use of a high-level, robust analytics system that allowed better access to data, team members were able to determine where to focus their efforts.

- $855K in savings in one year, the result of a 31.8 percent relative reduction in HA-CDI rate per 10,000 patient days, with 33 HA-CDIs avoided, and nearly 1,000 less unnecessary lab orders.

COMMUNITY HEALTH NETWORK AIMS TO REDUCE HOSPITAL-ACQUIRED C. DIFF INFECTIONS

Hospital-acquired infections are a significant patient safety concern for healthcare organizations. In the U.S., an estimated 223,900 hospitalized patients develop Clostridioides difficile (C. diff) infection, a bacterial infection associated with antibiotic treatment that can cause life-threatening diarrhea, resulting in 12,800 deaths annually.[1]

Ranked among the nation's most integrated healthcare systems, Indianapolis-based Community Health Network (CHNw) is Central Indiana's leader in providing convenient access to exceptional healthcare services.

INACCESSIBLE, UNTIMELY DATA: A ROADBLOCK TO REDUCING INFECTION RATES

CHNw recognized its HA-CDI rate was higher than the national benchmark and sought to reduce it. Individual hospitals had deployed siloed improvement activities that aimed to reduce

> The C. diff Analytics Accelerator enabled us to make a huge impact on our patient's lives, to improve quality, and to reduce our costs by more than $850K. We're applying our learning to similar patient safety events, improving safety and financial performance across our network.
>
> Patrick McGill, MD
> EVP, Chief Analytics Officer

HA-CDI. Without cohesive standard processes that addressed the root cause, those efforts were largely ineffective.

CHNw knew it needed to improve, but the organization lacked access to timely, meaningful data that would allow it to fully explore performance and identify opportunities for improvement.

While the data the organization needed for improvement was available in the EMR, it was incredibly difficult to access. Furthermore, meaningful data could only be obtained through time-consuming manual processes at an individual hospital level, impeding the ability to understand network-wide performance. Without an efficient mechanism for drilling down to root causes, CHNw could not implement impactful solutions to mitigate HA-CDIs.

CHNw needed a comprehensive, data-driven approach to reduce HA-CDI rates, decrease costs, and improve patient safety.

ACCESS TO ACTIONABLE DATA DECREASES HOSPITAL-ACQUIRED C. DIFF INFECTION RATES

CHNw uses a consistent, systematic improvement methodology to drive and accelerate improvement efforts. The health system convened an interdisciplinary network improvement team to apply its improvement methodology to decrease HA-CDI.

The improvement team leveraged the Health Catalyst® Data Operating System (DOS™) platform and a robust suite of analytics applications, including the C. diff Analytics Accelerator, to understand organizational performance and drill into root causes.

Using the C. diff Analytics Accelerator, CHNw was able to quickly and easily visualize C. diff performance data, including HA-CDI rate per 10,000 patient days, the reported number of HA-CDI cases, the number of positive cases, and days since the last HA-CDI (see Figure 1).

Figure 1: C. diff Analytics Accelerator sample visualization

CHNw used the analytics accelerator to drill into detailed unit and patient-level detail, identifying three common opportunities that drove the improvement strategy:

1. **Improving knowledge about CDI:** Infection prevention registered nurses developed and provided education for clinicians describing clinical symptoms that necessitated appropriate laboratory testing and patient isolation to prevent further spread of CDI to other patients, including algorithms to help guide testing and treatment decisions.

2. **Ensuring early detection and isolation:** During the admission process, clinicians receive decision support, which uses information documented in the EMR to inform clinicians if the patient has met criteria for risk of CDI. The decision support also contains the key evaluation criteria for CDI risk, indicates that lab testing should be ordered, and guides clinicians to place an isolation order, and to place the patient in isolation.

3. **Accurate CDI and samples:** Orders for CDI testing also contain clinical decision support, describing patient symptoms that indicate when testing is needed, and when it is not. When a clinician overrides the decision support, they are required to enter a description of the reason for the deviation from best practice. When orders for CDI testing are placed, the registered nurse receives a reminder that the patient has CDI testing ordered and should be placed in isolation until results are confirmed as negative. The CDI testing order includes a required isolation order.

CHNw further leveraged the analytics accelerator, defining deviations from standard organizational processes, and visualizing deviation data in the analytics accelerator. CHNw was able to quickly identify the following:

- Patients who need CDI testing but had not yet received it.

- Patients who had a lab order entered for CDI testing but were not yet in isolation.

- The number of lab orders per 10,000 patient days.

- The average time to complete each step of the order workflow.

- Test usage data and positive rates.

The discrete data, including the patient-level detail required to effectively review the deviation from standard practice, are visualized in the analytics accelerator, enabling rapid review of deviations, eliminating the burdensome manual chart review process, and expediting follow-up with individual clinicians to discuss and understand the reasons for the deviation (see Figure 2).

FIGURE 2. CDI ANALYTICS ACCELERATOR DEVIATION DATA SAMPLE VISUALIZATION

1. Filters to select data of interest, including filters for date(s), location, and department.
2. Tabs to review decision support compliance, appropriate testing, and the timeliness of testing workflow.
3. Graphic display of deviation categories.
4. Lab specimen turnaround time rate.
5. Inappropriate testing performance.
6. Positive lab results rate.

Figure 2: CDI Analytics Accelerator deviation data sample visualization

CHNw uses the deviation data to identify patterns and trends and the root causes associated with those trends, enabling continuous improvement.

RESULTS

Using this comprehensive data-driven methodology, CHNw substantially reduced HA-CDI rates, improving patient safety and quality while also reducing the cost of care, in one year:

- ⟩ $855K in savings in one year, the result of a 31.8 percent relative reduction in hospital-onset CDI rate per 10,000 patient days, with 33 HA-CDIs avoided.

- ⟩ 41.1 percent relative reduction in the number of labs per 10,000 patient days that did not meet the criteria for testing— nearly 1,000 fewer unnecessary lab orders.

WHAT'S NEXT

With the standard workflows in place for early identification and isolation of patients with CDI symptoms upon admission, CHNw plans to further enhance its antibiotic stewardship strategies across the network and will expand its work into the ambulatory care areas to further reduce CDI rates. The organization is also investigating its cleaning product practices to prevent cross-contamination in areas with high rates of patient turnover, such as the imaging and emergency departments. ◊

REFERENCES

1. Centers for Disease Control and Prevention. (2015). Healthcare-associated infections. *Clostridioides difficile infection.* Retrieved from https://www.cdc.gov/hai/organisms/cdiff/cdiff_infect.html

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Having the information on care variation within the C. diff Analytics Accelerator has been very powerful. It allowed us to rapidly identify and reduce unnecessary variation. We've made meaningful improvements to impact our patients' quality of life while also reducing costs.

Kate Mills, MSN, RN,
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Clinical Decision Support Manager
Department of Analytics

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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.

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