Southern Ohio Medical Center Lowers Hospital-Acquired C. Difficile Rates by 30% With MEDITECH

Introduction

Southern Ohio Medical Center's infection prevention and quality improvement team recognized in early 2020 that MEDITECH's Expanse EHR could support their efforts to better identify and treat Clostridium difficile, which could have a positive impact on the community. However, the team was overwhelmed with competing demands as the pandemic took hold. They prioritized COVID-19 prevention and control practices, but refused to let it deter them from doing whatever they could to mitigate C. diff.

The CDC states that C. diff infects approximately 400,000 Americans each year and is responsible for 12,800 deaths. C. diff-related morbidity can adversely affect an individual's quality of life and is often precipitated by antibiotics patients didn't need; previously healthy people experience multiple relapses or even colectomies.

SNAPSHOT

Opportunity

SOMC leveraged its Expanse EHR to automate the manual and capital-intensive processes involved in identifying and testing for C. diff.

Solution

C. Difficile Infection Quality Improvement Project with MEDITECH

Benefits

- 30% relative change in hospital-acquired C. diff infection
- 32% decrease in canceled tests
- 3.5 hours of infectious diseases pharmacist's time saved per week, previously spent reviewing all C. diff orders

Profile

Southern Ohio Medical Center (Portsmouth, Ohio) is a 248-bed hospital that serves a large, sparsely populated area in Southern Ohio and Northern Kentucky. The hospital and its 45 outpatient clinics support a community in which chronic conditions are prevalent and the poverty rate is high.

SOMC's infection prevention and quality improvement team established a multidisciplinary process to differentiate between an active C. diff infection, or CDI, and colonization. This screening process helped them to intervene in potential cases and by Q4 2021, led to a standardized infection ratio of 0.394, well below the 2020 industry average of 0.52.

This process, however, introduced challenges due to its labor-intensive tasks: Timing is critical to prevent the spread of C.diff. To automate the process in its new Expanse EHR, SOMC engaged MEDITECH to develop tools that would help to expedite appropriate C. diff testing. This initiative enabled SOMC to decrease its SIR even further, to 0.272.

Reviewing processes and procedures

PCR testing is particularly sensitive and cannot differentiate an active CDI from C. diff colonization. Thus, SOMC created multiple interventions to improve the PCR test's ability to distinguish infection from colonization. But the manual processes – coupled with multiple interventions – resulted in slow detection of CDIs, delaying the treatment and isolation of infected patients. These delays increased community spread and caused an artificially elevated number of cases to be classified as a hospital-acquired infection, which follows a different reimbursement model from cases designated as community onset.

After SOMC went LIVE with MEDITECH's Expanse EHR in 2020, the infection prevention team realized that using discrete information captured in the system could help to automate processes and lead to timelier decisions. Feeling empowered, SOMC's infection prevention team revisited their procedures for identifying patients with suspected CDIs and identified multiple areas that hampered efficiency:

- Lab staff evaluated all specimens to ensure they met the published criterion of being liquid. If the specimen was rejected, staff canceled the test and noted it on the patient's chart. This process took 3-5 minutes per rejected specimen and often resulted in wasted supplies.
- Specimens that met this criterion were set aside by laboratory staff for a twice-daily call with the infectious diseases pharmacist, who would process specimens only if patients were having multiple loose bowel movements per day and were not taking laxatives. This process consumed 3.5 hours of the ID pharmacist's time per week and often required additional conversations with the patient's nurse or the ordering provider. Any delays could cause the specimen to surpass the three-day window for identifying community onset.
- Status boards did not indicate if a patient tested positive, which could delay treatment and isolation.

Developing a plan

Vice President of Clinical Integration and Chief Quality Officer Valerie DeCamp, DNP, and Senior Medical Director, Infectious Disease, David Byers, MD, brought together stakeholders from across their organization to create the CDI Quality Improvement Project Team, which included clinical information systems experts, a physician lead, a pharmacy lead, an antimicrobial stewardship team, and subject matter experts in the impacted applications.

While the team could envision what they wanted to achieve, they recognized the need for additional support to realize their objective and engaged MEDITECH. SOMC had enlisted MEDITECH for several projects in the past, including its opioid stewardship program; hospital leaders were confident that the MEDITECH experts understood the nuances of the Expanse build and would help them to determine the right interventions. They also appreciated the knowledge transfer from working with MEDITECH, as it would enable them to implement similar projects independently in the future.

> "We have an amazing team here at SOMC, but there is a degree of specific MEDITECH knowledge and expertise that we didn't have natively at the beginning of the project. We believe a significant part of our success was the extensive knowledge that the MEDITECH team brought to the table that helped us take our concept and build something that is impactful for our organization."
>
> **David Byers, MD**
> **Senior Medical Director, Infectious Disease**

Defining roles

MEDITECH assigned a project manager, an electronic clinical quality improvement dictionary architect, and an eCQI consultant to the project. The project manager worked with the CDI Quality Improvement Project Team to develop a project plan and protocol design, and was responsible for tracking the project, scheduling meetings, supporting the build and validation, and designating testing times. To ensure success, the project manager also conducted post-LIVE assessments to review metrics and confirm they were trending in a positive direction.

Additional key roles included:

- An SOMC clinical information systems project leader that would bridge the clinical needs with their information systems level of expertise.
- An SOMC executive project sponsor and physician lead to help garner physician buy-in and assist with decisions throughout the project life cycle.

The MEDITECH eCQI dictionary architect, eCQI consultant, and remaining stakeholders worked with others on the committee to provide guidance and complete the system build and testing.

Setting goals

The CDI Quality Improvement Project Team established goals for both patient and process outcomes. In planning the project, they used guidelines from the CDC, the Infectious Diseases Society of America, and The Society for Healthcare Epidemiology of America as agreed-upon sources of truth. With these guidelines in mind, they identified:

- Potential process improvements.
- Opportunities where Expanse could support these improvements.
- Supporting evidence.
- Gaps in SOMC's current state and potential ways to address them.

By implementing EHR-based workflows and tools, the infection prevention team saw an opportunity to incorporate appropriate screening protocols that would help the organization to:

- Decrease the hospital-onset CDI median average rate by 10%.
- Decrease canceled hospital-based CDI specimen orders by 30%.
- Continue to remain below the national achievement threshold for SIR.

For the design, build, and testing, the team budgeted 10-15 hours per month for approximately five months, as well as additional time needed for end-user education on hospital protocols.

Leveraging people, process, and technology

The team approached the build from several angles: identifying possible CDIs more accurately, ensuring timely notifications, and measuring success through advanced analytics. Key processes included:

Nursing intake

The team started by evaluating whether there was a better way to identify patients with possible C. diff.

Where to document

They decided to leverage existing documentation to assist with the CDI screening process to prevent overburdening nursing staff:

- An ED nurse documents on the ED abdominal pain assessment or ED nausea/vomiting/diarrhea target assessment.
- Inpatient nurses document on a shift assessment or an admission physical assessment.

What to document

The team developed a decision tree using a series of queries to calculate a patient's risk for C. diff. Queries include logic that requires additional responses based on prior responses, including stool consistency, bowel movement frequency, and diarrhea duration.

If at any time during the assessment the query response does not meet the logic, then the additional queries are not required and the patient is deemed not at risk. If a patient is deemed at risk, rule logic then determines if additional information is required in order to determine the appropriateness of C.diff testing, such as recent use of laxatives or stool softeners. This aligns with SOMC's policy for C. diff testing and recommendations by the CDC and the IDSA.

Rules are also triggered at the point of ordering for antibiotic use within the last 24-48 hours. The user must acknowledge the warning and provide an override reason to proceed with the order.

Physician approval

Clinical decision support helps providers to detect CDIs earlier, while also giving them autonomy over their course of action.

The CDI Quality Improvement Project Team created three CDI-related indicators for Surveillance that appear on the Physician Status Board:

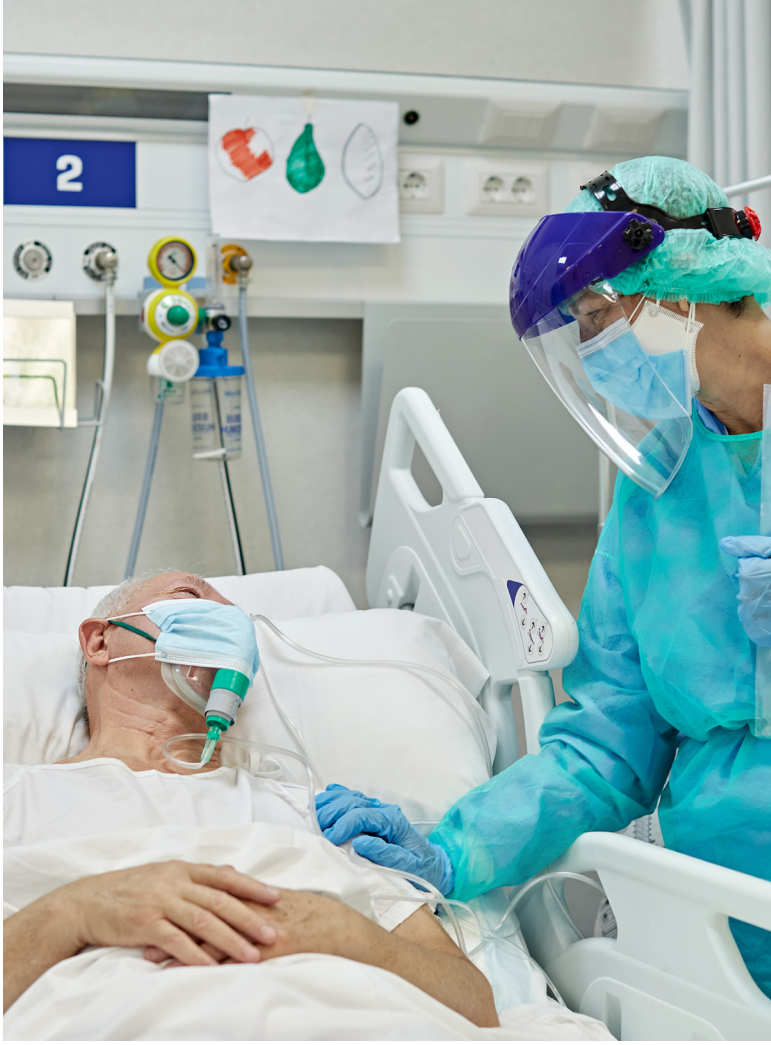
1. **No C.Diff Test:** Patients qualify when they meet stool criteria logic via the nursing assessment. No C. diff test has been ordered.
2. **+C.Diff:** Patients qualify when a C. diff test is positive. Also, the indicator reminds unit staff to initiate enteric precautions on positive patients.
3. **C.Diff Risk:** Patients qualify if they are on high-risk antibiotics OR have past CDI special indicators (e.g., history of C. diff in the last six months or recent antibiotic use).

Physicians can also review their patients' qualifying criteria in the CDI surveillance profiles and see the responses to nursing assessments. Unlike nurses, physicians can override warnings related to recent laxative/stool softener use and order CDI testing if they feel it is warranted. All order warning overrides file to a report monitored to identify process improvements.

Notification process

Keeping everyone informed of C. diff patients ensures that precautions are implemented and isolation occurs in a timely manner. Indicators were added to multiple places, ensuring nursing staff are alerted when a patient does test positive for CDI and requires enteric precautions. These indicators are visible without opening the patient's chart:

- Unit-level nursing leadership monitors surveillance watchlists for both indicators.
- Floor nurses are notified of positive C.diff patients on the unit status board, increasing awareness and alerting them to initiate the appropriate precautions to prevent the spread of CDI.



Preparing for rollout

SOMC's clinicians embraced the changes; their mindset is that new initiatives are worth the effort if they improve patient care. Staff realized the updated processes would expedite interventions and increase efficiency. A clinical informatics specialist trained physicians, nurses, pharmacists, and laboratory technicians using:

- Role-specific lesson plans.
- An electronic learning platform.
- Tip sheets.
- Pop-in Zoom sessions.

The specialist also trained clinical case managers on how to review reports and remove special indicators from patients' records after six months.

Realizing the results

Using dashboards they developed in MEDITECH's Business and Clinical Analytics solution, the infection prevention and quality improvement team tracked results, monitored progress, and adjusted processes as necessary. Key results include:

- A 30% reduction in canceled tests. Providers are more acutely aware of when it is appropriate to order a C. diff test.
- 3-5 minutes of lab time saved for each canceled test avoided.
- Improved testing turnaround times, attributed to fewer unnecessary tests in the queue.
- A 30% decrease in hospital-acquired CDIs. BCA enables the organization to more accurately identify whether the case is community onset or hospital acquired.
- 3.5 hours of pharmacist time saved per week, as the ID pharmacist is no longer spending that time manually reviewing orders.

SOMC also saw an increase in C. diff awareness among staff. SOMC measures the total number of tests performed each week, putting C. diff at the forefront of providers' minds and prompting them to consider whether testing is needed. The organization is seeing a sustained rise in appropriate testing, demonstrating that they have been able to maintain increased awareness.

"We are always looking for better ways to provide care," said DeCamp. "Our performance improvement model is called A Better Way and our team, in partnership with MEDITECH Professional Services, did just that. We found a better way to detect C. difficile infections and provide patient treatment earlier on."

What's next

The infection prevention and quality improvement team feels that the advantages of working with MEDITECH are the expertise that they bring and knowledge that they impart. This know-how has empowered the team to develop a structured approach to project management and improvement methodology. As a result, they are able to move forward with a foundational proof of concept that can be applied to other areas requiring diagnostic stewardship.

SOMC and MEDITECH are currently working on a diagnostic stewardship project that focuses on ordering urine cultures. Its goal is to prevent unnecessary tests by verifying that patients have the appropriate symptoms or indications for a urine culture prior to or during the ordering process.

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