

# Integrate predictive analytics with clinical workflows in the ED

## Saint Luke's Health System – West Region of BJC Health System

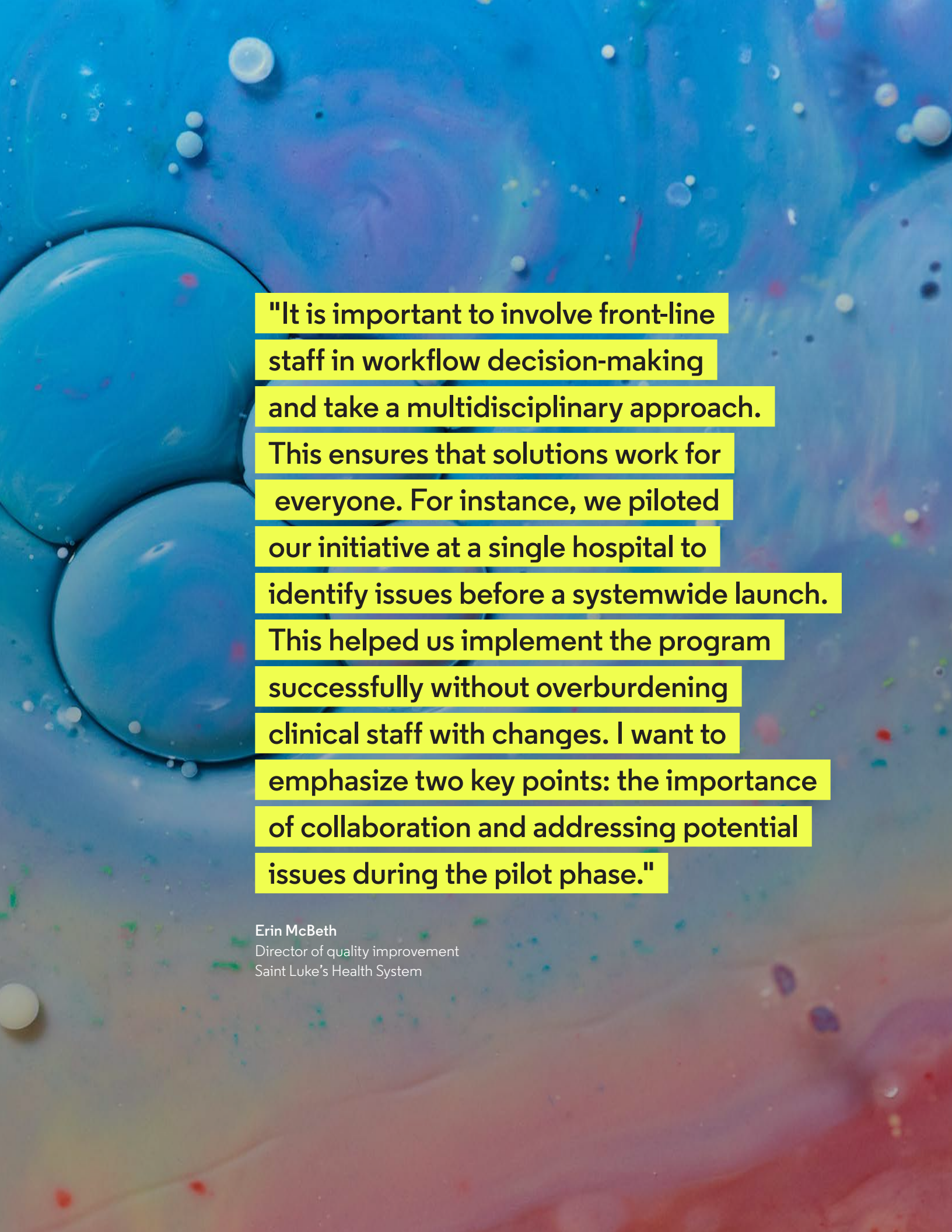
Profile	Key stakeholders and partners
<ul style="list-style-type: none"><li>• Integrated healthcare network in Missouri and Kansas</li><li>• 10 hospitals and campuses across the Kansas City region</li><li>• Flagship hospital ranked as No. 2 in the Kansas City metro area by U.S. News &amp; World Report</li></ul>	<ul style="list-style-type: none"><li>• Chief medical officer</li><li>• Quality improvement director</li><li>• ED staff</li><li>• Nursing staff</li><li>• Quality analysts</li></ul>

### Importance of predictive analytics for early detection of sepsis

Predictive analytics utilizes historical data in conjunction with advanced algorithms to analyze patient information, enabling the timely detection of sepsis in the ED. Early identification is essential, as sepsis can rapidly progress to severe sepsis or septic shock, both of which are associated with increased mortality rates. By anticipating the onset of sepsis, analytical tools empower clinicians to execute prompt interventions, such as administering antibiotics and fluids, which are critical for improving patient outcomes. The integration of predictive analytics within the ED not only enhances patient care but also boosts operational efficiency by reducing unnecessary testing and hospital admissions. As healthcare systems strive to improve quality while minimizing costs, adopting predictive analytics tools is becoming increasingly vital.

### Building the case

Saint Luke's Health System has successfully implemented version 2 of Epic's Early Detection of Sepsis cognitive computing model to enhance the identification of sepsis indicators. Following a pilot program conducted in two hospitals over several months, a significant improvement in the mortality index was observed. In addition to monitoring the mortality index, compliance with CMS bundles was also assessed due to its critical importance for hospital reimbursement and return on investment. The organization did not engage any new full-time equivalents for this initiative. Instead, during a preexisting quality restructuring, the existing team was reorganized, resulting in the appointment of four quality analysts dedicated to sepsis management. This strategic decision enabled the abstraction of data from 100% of sepsis cases.



"It is important to involve front-line staff in workflow decision-making and take a multidisciplinary approach. This ensures that solutions work for everyone. For instance, we piloted our initiative at a single hospital to identify issues before a systemwide launch. This helped us implement the program successfully without overburdening clinical staff with changes. I want to emphasize two key points: the importance of collaboration and addressing potential issues during the pilot phase."

Erin McBeth  
Director of quality improvement  
Saint Luke's Health System

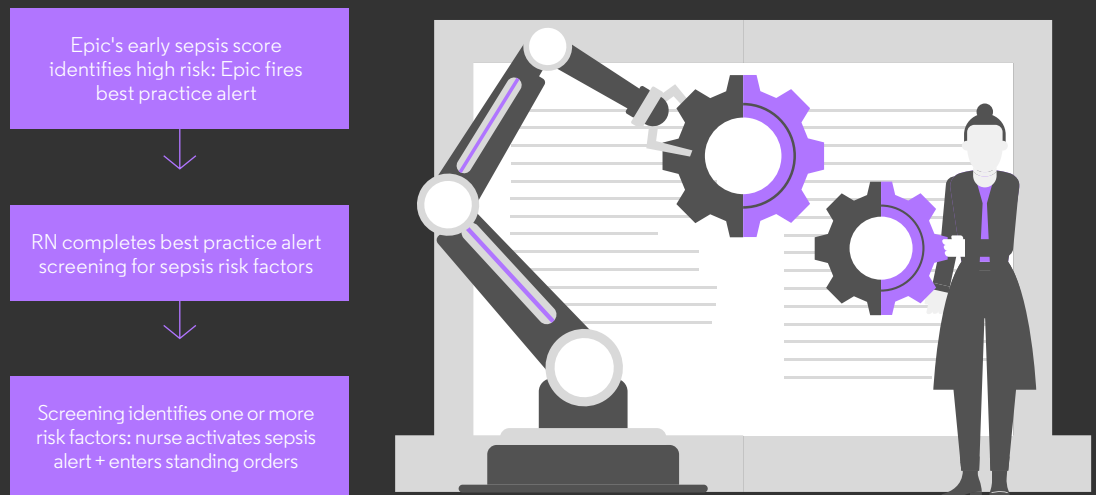
## Background

Challenge	Key practices
The criteria for diagnosis of sepsis have evolved considerably over time. Early identification and timely intervention are crucial for the effective management of sepsis, not only at the level of individual patients but also within the framework of broader healthcare initiatives. Recognizing these critical elements allows for an enhanced approach to sepsis management.	Saint Luke's Health System uses Epic's Early Detection of Sepsis model to identify signs of sepsis. When a patient in the ED is flagged as at risk, the nursing staff conducts a manual evaluation. The system prompts the nurse to check specific risk factors. If any signs of sepsis are present, the nurse can activate a sepsis alert, which triggers specific standing orders for prompt care.

## Case study

- Effective identification and treatment are essential components of successful sepsis management at the patient level. In light of this, Saint Luke's Health System adopted version 2 of Epic's Early Detection of Sepsis cognitive computing model to enhance the identification of sepsis indicators.
- This model employs advanced machine learning techniques to ascertain various risk factors and assess their influence on the risk score in real time. It incorporates a best practice alert designed to inform clinical staff when a patient meets high-risk criteria derived from the predictive model.
- In instances where the system identifies a patient as being at higher risk of sepsis within the ED, the nursing staff carries out an initial screening that includes a manual evaluation. Epic prompts the nurse to assess several risk factors associated with the patient. These factors may be somewhat subjective and could encompass issues such as skin compromise, recent antibiotic use, or respiratory symptoms.
- If a patient presents with one or more indicators of sepsis, the nurse is authorized to activate a sepsis alert. When a sepsis alert is triggered, it initiates specific standing orders. These typically include essential laboratory tests—a complete blood count, a comprehensive metabolic panel, lactate levels, and blood cultures—along with the monitoring of vital signs. When lab results come in, or when the provider examines the patient and identifies a confirmed or suspected source of infection, the provider takes over management of the case. The nurse is not responsible for ordering medications; their role is focused solely on initiating the necessary lab work to commence the process.

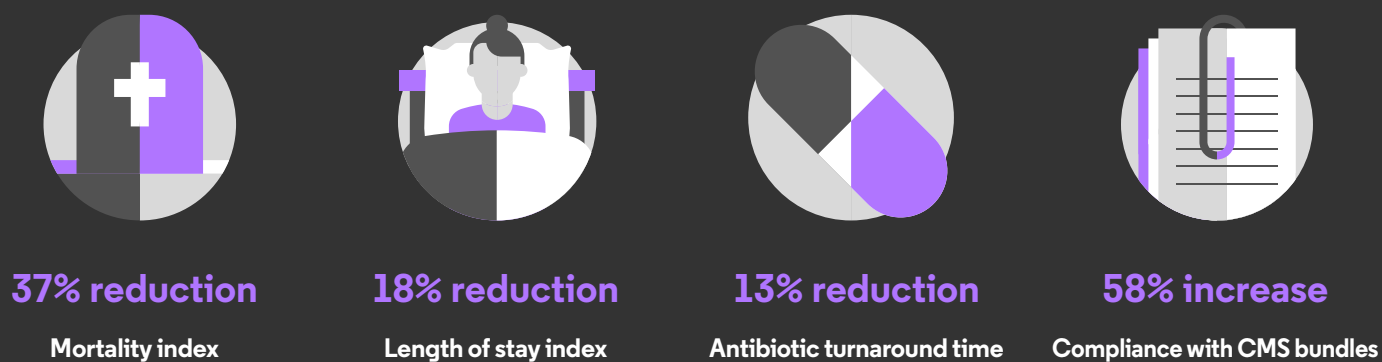
**Figure 7: Saint Luke's Health System's ED sepsis program**



Source: Saint Luke's Health System, 2025

- The organization reports that the system effectively identifies suitable cases for further evaluation, activating the alert feature only when specific eligibility criteria are met. By using a sensitive screening threshold, the organization focuses on a particular subset of the population. As a result of this targeted approach, a significant proportion of flagged patients—approximately 70% to 80%, with some facilities reporting as high as 90% to 95%—have been found to have some form of infection. This focused strategy has proven to be effective, with an estimated 45% to 55% of identified patients ultimately being diagnosed with sepsis.
- Following the implementation of the early detection model, the organization has achieved notable success across various performance metrics. From 2022 to present, the organization has reported a 37% reduction in the mortality index, an 18% reduction in the length of stay index, a 13% reduction in antibiotic turnaround time, and a 58% increase in compliance with CMS bundles.

Figure 8: Improved outcomes in sepsis cases at Saint Luke's Health System, 2022–2025



Source: Saint Luke's Health System, 2025

### Where to start

- ✓ Connect with the EHR vendor to identify solutions to incorporate into the system's operations.
- ✓ Gain buy-in from leaders by outlining positive patient outcomes and reimbursement associated with the initiative.
- ✓ Pilot and implement the solution, identify training needs of staff, and monitor and report key metrics and cost savings.