THE Value Initiative

Members in Action: Improve Quality & Patient Outcomes

Augusta Health – Fishersville, VA

Reducing Sepsis Mortality with Automated Surveillance

AHA's *Members in Action* series highlights how hospitals and health systems are implementing new value-based strategies to improve health care affordability. This includes work to redesign the delivery system, manage risk and new payment models, improve quality and outcomes, and implement operational solutions.

Overview

Patient safety initiatives have been foundational to Augusta Health's mission since the 255-bed community hospital opened in 1994. As part of the hospital's ongoing patient safety efforts, Augusta Health established a sepsis task force in 2015 to find ways to reduce sepsis mortality. Sepsis is a life-threatening complication of an infection, and 62% of people hospitalized with sepsis are readmitted within 30 days. Because 86% of patients with sepsis are diagnosed in emergency departments (EDs), Augusta Health's leaders decided to target its own ED to tackle sepsis.

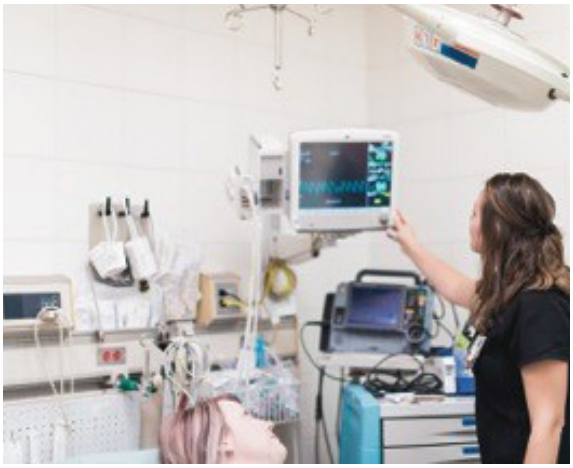
Impact

Augusta Health's sepsis mortality rate has dropped by 36% since the launch of the automated alert system. Further, the hospital's sepsis mortality rate is now 32% lower than Virginia's statewide sepsis mortality rate. In addition, Augusta Health has decreased its readmission rate for patients with sepsis from 19% to 13%. This change translates into 28 fewer patients readmitted to Augusta Health in 2016-2017, for an estimated cost savings of $313,000 per year.

Augusta Health's multidisciplinary team developed an automated severe sepsis screening system that launched in May 2016 in the hospital's ED. The screening system employs an algorithm that analyzes patient clinical data to determine when a patient shows signs of becoming septic. Based on standard sepsis screening measures, an alert is activated when two or more variables (which include body temperature, pulse, respiratory rate, and white blood cell count) register outside of the normal range and one or more variables from an additional group (which includes systolic blood pressure and mean arterial pressure check, lactate level, or creatinine level) fall outside of the normal range. The sepsis mortality rate rises by 8% per hour delay in treatment, so the algorithm automatically runs every 15 minutes. When the parameters trigger an alert, a secure text is delivered directly to the ED charge nurse's cell phone. If the patient is determined to be septic after an assessment, the charge nurse alerts the entire hospital via an overhead communication. The house supervisor, a phlebotomist, and a pharmacist respond to the page by going to the ED and assisting with lab work, rapid administration of antibiotics, and documentation.

Augusta Health considered other sepsis alert tools that flagged potential sepsis cases within patients' electronic medical records. For those

tools, clinicians are alerted to sepsis flags only when they open a patient's record. Augusta Health's system, however, sends an alert immediately and directly to the charge nurse. Given the chaotic nature of most EDs, coupled with the fact that minutes count in sepsis diagnosis and treatment, pushing an alert directly to the charge nurse can make a critical difference in delivering much needed care.



Based on the alert's success in the ED, Augusta Health rolled out the automated sepsis alert system to its inpatient units in September 2017. A modified algorithm was developed to detect high scores based on weights assigned in the logistic regression analysis. Running every hour, the inpatient alert system obtains nurse-patient assignment data, along with charge nurse and house supervisor information. The program then combines the nurse and location information with variables for each patient identified by the algorithm as being at risk for sepsis. Alerts are then sent to the appropriate nursing staff via their Vocera badges or the Vocera smartphone app.

Lessons Learned

Richard Embrey, M.D., chief medical officer at Augusta Health, believes that support from Augusta Health's leadership team is a significant component of its success.

"We have an ED physician who has truly championed the automated sepsis alert system. He believed in what we wanted to accomplish and was very willing to act on the information we provided," says Embrey.

He also notes that effective surveillance systems can be "home grown" without specialized software programs, new hardware, or specialized devices.

"I believe that an important lesson for other hospitals—especially community hospitals like Augusta Health—is that this is something you can actually do yourself," says Embrey. "It isn't an expensive endeavor, and the algorithm itself is fairly straightforward. The key is notifying clinical staff as quickly as possible once an alert is triggered and running the algorithm frequently."

Future Goals

Augusta Health plans to promote its early warning system for sepsis in the ED with other hospitals in the state. The hospital also intends to modify the algorithm to determine if there are even more effective ways to identify a potential sepsis case, as well as predict which patients are at the highest risk. As the program matures, the hospital will be able to measure its gains on the inpatient side. Augusta Health also has joined the Virginia Hospital Improvement Innovation Network, which collaborates to demonstrate improvements in lives saved, expenditure reductions, and opportunities for future initiatives to accelerate change.

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