Sepsis is one of a hospital’s worst nightmares. A patient develops an infection and the body responds by releasing chemicals to fight the organism. However, those same chemicals trigger inflammation throughout the body, which can, in severe cases, contribute to organ failure and death.

Anyone can develop sepsis, though the elderly and those with weakened immune systems are most at risk. The real danger comes if the condition progresses to septic shock. According to the Mayo Clinic, nearly 50 percent of patients who develop septic shock will die, while survivors run the risk of future infections. To stem this grim tide, an international campaign known as Surviving Sepsis was launched in 2002 to develop clinical protocols for reducing sepsis mortality worldwide.¹

The disease is of particular concern in the United States. Sepsis — sometimes known as “blood poisoning” — is the most expensive condition treated in hospitals, costing U.S. health care organizations more than $20 billion annually, according to a statistical brief from the Healthcare Cost and Utilization Project. In 2011, sepsis represented 5.2 percent of national costs for all hospitalizations. Nearly 7 percent of all Medicare costs incurred that year were for sepsis, according to the brief.

Saint Thomas Health, Nashville, Tennessee, a ministry of Ascension Health, understands the impact sepsis has on both patients and health system resources locally and nationally. Saint Thomas Health has actively participated in the Surviving Sepsis campaign since its inception in 2002. To attack a problem of such proportions, system
Battling hospital-acquired sepsis at Saint Thomas Health with data

leaders wanted to better utilize large volumes of data to support analytics that would identify sepsis patients, track their progress and create protocols to help reduce the overall number of cases — and subsequent costs.

This required robust analytics capable of coalescing large volumes of both clinical and administrative data. Ascension Health chose Optum One, a clinical analytics platform that draws knowledge from clinical and claims data, to help them improve their treatment and management of sepsis cases. “As Ascension moves into population health management along with the rest of forward-thinking health care organizations, tools like Optum One can make a difference in the care we deliver. The complementary use of the Electronic Health Record and Optum One make each more powerful in identifying and treating our septic patients,” said Dr. Robert R. Taylor III, MD, Vice President, Care Excellence at Ascension Health.

“We wanted very accurate, normalized, structured data sets across our entire network,” said Dr. John Pirolo, Saint Thomas Health’s Chief Medical Officer. “We couldn’t do that independently and run comparisons across the network without a tool like Optum One.”

**Early-warning sepsis alerts improving outcome tracking and patient care**

In December 2013, Saint Thomas Health launched an early-warning system within its inpatient electronic health record to proactively identify patients displaying symptoms of sepsis. Data is imported into Optum One’s sophisticated analytics engine, where reports can then be generated to compare outcomes between patients with an alert and those without. “This information is critical for not only identifying patients who are at risk for sepsis, but also to educate hospital staff on the signs and symptoms,” said Sharon Stacey, RN, an Ascension Information Services Senior Business Analyst who previously worked for the Saint Thomas Health group overseeing sepsis program analytics.

“We’re doing a much better job of identifying and treating sepsis,” Stacey said. “Symptoms can be similar to other conditions, and therefore sepsis can be hard to determine in the early stages. We’ve focused in the last six to 12 months on staff education in addition to standardizing our processes by following the elements and bundles of the Surviving Sepsis campaign.

“Sepsis has a very distinct continuum from mild sepsis to septic shock, and a patient can move down that continuum very quickly. It comes down to stopping the progression within that continuum by identifying and treating sepsis as quickly as possible upon presentation of the patient. Getting physicians and other clinicians the right information to identify opportunities to improve how they handle those situations is key.

“There is an ease of importing and exporting patient data between clinical elements within Optum One that is extremely advantageous to our analysis and knowledge attainment regarding sepsis and its treatment.”

—Sharon Stacey, RN, Ascension Information Services

Saint Thomas Health identifies sepsis encounters with and without sepsis alerts, then imports the cases into Optum One. “Because many patients have multiple encounters over time, the unique identifiers uploaded in Optum One allow us to follow different cohorts of patients longitudinally,” Stacey said. “Using the Optum One tool allows us to focus on those cases where a sepsis diagnosis was coded but there was not a sepsis alert and vice versa. By understanding the sensitivity and specificity of this alert system, we can better enhance the algorithms that support the alerts to provide clinicians with the best tools possible.”
The quest for high reliability organization status and value creation opportunities

Saint Thomas Health’s parent company, Ascension Health, is striving to attain High Reliability Organization (HRO) status. Simply put, HROs are organizations that deliver on what they intend to do. They have exceptionally consistent systems that help meet stated goals and, more importantly, avert catastrophic errors.

In support of Health Ministries as HROs, Ascension Health is adopting Value Creation Opportunity (VCO) areas where it wants to see significant improvements over time. At the top of that list: sepsis management.

“With Optum One, we have a rich suite of outcomes measures that can be filtered by various attributes,” said Dr. Pirolo. “The Optum platform gives us an idea where the areas are that we need to focus on to improve our work in treating sepsis.”

Evaluating the true impact on patient care over time

The real benefit of Optum One comes when positive outcomes increase and negative outcomes decrease. For Saint Thomas Health, this value journey began in mid-2013. “The most critical measurement is reduction in mortality rates, something every health care organization has struggled with for years,” Stacey said.

An evaluation of sepsis patient data reports generated from Optum One shows sepsis mortality rates at Saint Thomas Health hospitals are trending down, Stacey said. For calendar year 2012, mortality for all patients presenting with sepsis (MS-DRGs 870-872) was 15.7 percent. For 2014, the mortality rate was down to 12.4 percent, which means the number of sepsis-related deaths fell by 21 percent.

Length of stay and charges for Saint Thomas sepsis patients have remained consistent, if not slightly trending up, during the same period. That is to be expected, since better identification and treatment of sepsis patients resulting in fewer deaths will lead to higher length of stay and costs of treatment. Once standardized processes and protocols are implemented routinely, length of stay and charges will likely start trending down as well.

Saint Thomas Health’s sepsis VCO is mirroring the work of the Surviving Sepsis campaign, whose goal is to decrease sepsis mortality rates by 25 percent, and motivate 10,000 hospitals worldwide to contribute data on sepsis care and implement standardized protocols. Doing so, organization leaders say, could save 400,000 lives — and that’s by treating only half of identified cases.

According to Medicare’s 2015 Inpatient Prospective Payment System Final Rule, severe sepsis and septic shock will be a quality measure for the Medicare Inpatient Quality Reporting program in fiscal year 2017. Inclusion could open up the possibility of sepsis management process measurement being utilized in such programs as Medicare’s Value-Based Purchasing, a pay-for-performance program that financially rewards or penalizes organizations based on their performance across multiple measures and outcomes compared to other organizations across the country.

Better tracking of how well clinicians follow best-practice guidelines for treating sepsis patients will prepare Saint Thomas for this quality reporting as well as improve the efficiency and effectiveness of treating sepsis patients.

“Optum has been very forthcoming in committing resources and adjusting timelines and working with their development cycle to build in the new variables and the new analytics that we need.”

—Dr. Pirolo, Saint Thomas Health
“With Optum, we got basic outcomes data by geography and by provider; those are useful and we act on those primarily, but they revealed a need for a next level of analytic, and that’s led to a lot of the work that we’ve been doing of late,” Dr. Pirolo said. “Optum has been very forthcoming in committing resources and adjusting timelines and working with their development cycle to build in the new variables and the new analytics that we need.”

**Creating a long-term partnership between Saint Thomas Health and Optum**

The second development phase is focusing on measuring adherence to Saint Thomas Health’s sepsis clinical care guidelines to standardize coding, documentation and use of defined protocols across all aspects of an encounter, Stacey said. Saint Thomas Health plans to use Optum One reporting to evaluate how individual departments and physicians are dealing with sepsis cases and ensure standardized treatment every time.

Optum One’s data includes clinical information on more than 65 million patients and claims data covering more than 120 million insured lives. Dr. Pirolo sees utilizing Optum One’s reporting power for benchmarking sepsis cases against other peer group measurements contained in the data sets. That requires normalization of data across all Saint Thomas Health systems — something he believes can’t be done without Optum One.

“Optum is working with us to develop predictive models from the volumes of patient data,” he said. “There’s quite a bit of work to build out the cascading levels of analytics. It’s about not just looking at the ‘whats’ but the ‘whys’ to know how to best move forward.”

Saint Thomas Health’s fight against sepsis is long from over, and leaders like Dr. Pirolo know it’s going to take commitment, attention and help from partners like Optum One to win the battle.

“There is certainly a story to be told about moving the bar clinically, because that’s why we do all this. It requires a very strong and committed partnership between a provider and analytics solutions provider, and that’s a relatively uncommon thing,” he said.

**Sources**