TMF Health Quality Institute

QI Snapshot

Special Innovation Project: Improving Early Detection and Management of Sepsis

In 2015, the Lower and Upper Rio Grande Valley (RGV) regions of Texas were identified as areas with particularly high levels of sepsis prevalence. As a Special Innovation Project (SIP) under contract with CMS, the TMF Quality Innovation Network Quality Improvement Organization (QIN-QIO) aimed to increase awareness of potential sepsis patients and avert sepsis with early detection and intervention in inpatient and outpatient settings. The TMF QIN-QIO also aimed to increase the use of evidence-based interventions to improve outcomes, decrease morbidity/mortality and reduce overall cost of care. Key interventions included promotion of an early detection screening tool to identify systemic inflammatory response syndrome and timely implementation of evidence-based sepsis bundles to reduce prevalence and mortality of severe sepsis and septic shock in the recruited communities of the Lower and Upper RGV.

Project Overview

Intervention

The key interventions of this project included promotion of sepsis early detection screening tools and evidence-based practice bundles. The specific interventions included nursing education, educational webinars, one-on-one coaching to individual hospitals, peer-to-peer sharing and learning and the provision of tools and resources.

Nursing Education and Education Webinars: The project team provided nursing education on early identification and treatment of sepsis for 723 participants at five of the nine participating hospitals; to 217 participants at 16 nursing and rehabilitation (rehab) facilities using a train-the-trainer format; and to 24 participants at two long-term acute care hospitals (LTACH). In addition, a total of six sepsis education webinars were delivered to over 700 participants throughout the regions.

One-on-One Coaching: The project team provided one-on-one coaching both on-site and virtually to several facilities in addition to those participating hospitals, including nursing and rehab facilities, LTACHs, accountable care organizations (ACOs) and physician offices.

Peer-to-Peer Sharing and Learning Interventions: The peer-to-peer sharing and learning facilitation provided by the team included:
- Presenting sepsis information at coalition meetings with attendees representing hospitals, nursing and rehab facilities, home health agencies, LTACH, Area Agency on Aging, pharmacies and ACOs
- Assisting hospitals in developing sepsis screening tools and protocol/order sets
- Recommending that emergency departments (EDs) stock broad-spectrum antibiotics in the pharmaceutical dispensing machines

- Providing sepsis education and sample pre-hospital protocols to local emergency medical service (EMS) providers
- Facilitation of three hospitals presenting sepsis improvement stories at coalition meetings

Tools and Resources: The project team developed and distributed over 350 posters and badge cards in English and Spanish covering topics such as understanding sepsis, sepsis signs and antibiotics usage. The team also rebranded and distributed a sepsis stoplight tool and a self-management tool created to assist patients and/or their family/friends in monitoring changes in sepsis symptoms and when to seek medical attention.

Assessment

Nine out of 10 hospitals in the Lower and Upper RGV were recruited to participate in the project, and all nine hospitals remained active during the two-year project time period (2015–2017). Specifically, this project had three process measure goals related to recruitment, all of which were met:
- Number of recruited hospitals implementing a screening tool: All nine of the recruited hospitals had implemented a screening tool by November 2016.
- Number of recruited hospitals implementing a 3-hour sepsis bundle: All nine of the recruited hospitals had implemented a 3-hour sepsis bundle by May 2016.
- Number of recruited hospitals implementing a 6-hour sepsis bundle: All nine of the recruited hospitals had implemented a 6-hour sepsis bundle by May 2016.

Outcomes

The project outcome measures included reducing the prevalence of sepsis infections in the recruited communities and reducing the mortality rate for sepsis infections. The outcome measures were calculated using Medicare Part A Fee-for-Service (FFS) claims for all hospitals in the Lower and Upper RGV of Texas. The number of sepsis infections is based on claims with a Diagnosis Related Group (DRG) for septicemia (870, 871 and 872). Prevalence was calculated by taking the number of septicemia admissions and dividing by the total number Medicare Part A FFS beneficiaries in the community, and then multiplying by 1,000. Mortality was calculated by taking the number of septicemia claims where the beneficiary died and dividing by the total number of septicemia claims.

The project exceeded the established goal of a 20 percent reduction in sepsis mortality rate. In addition, sepsis prevalence increased, most likely due to increased awareness and identification of sepsis among providers as a result of the intervention. During the baseline time period, nearly 13 percent of sepsis hospitalizations in the Lower and Upper RGV ended in death. Over the course of the project, TMF noted 100 fewer deaths from sepsis (based on data through March 31, 2017).

As shown in Figure 1, mortality declined in both the Lower and Upper RGV during this time period. The greatest improvements were made prior to the beginning of the project, but the overall mortality has continued to slowly decrease throughout the project, with the greatest improvements being made in the Lower RGV.
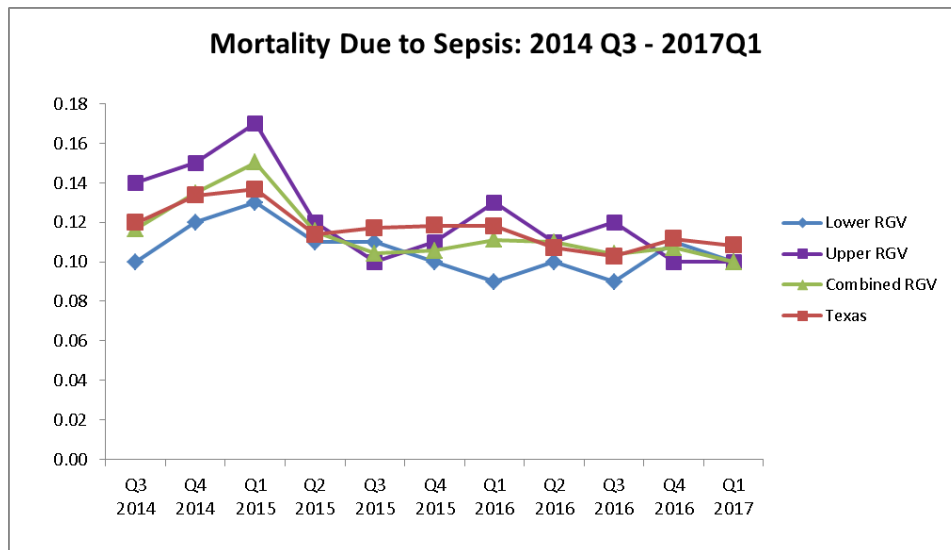
Mortality Due to Sepsis: 2014 Q3 - 2017Q1

Figure 1. Sepsis Mortality

As shown in Figure 2, significant changes in sepsis prevalence were not observed over the course of this project. It does appear, however, that sepsis prevalence may have a seasonal component likely explained by the seasonality of pneumonia (admissions), of which has the potential to progress to sepsis.
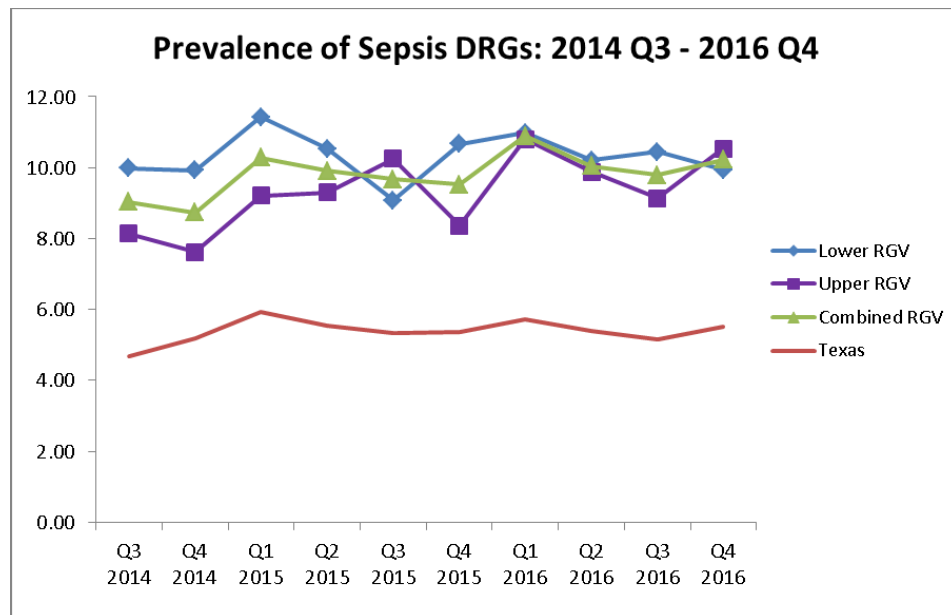
Prevalence of Sepsis DRGs: 2014 Q3 - 2016 Q4

Figure 2. Sepsis Prevalence

Discussion

Successes
Through the project interventions, a greater than 20 percent reduction in sepsis mortality rate was achieved, translating into 100 fewer sepsis deaths. In addition to lives saved, though TMF QIN-QIO was unable to calculate dollars saved during the timespan of the project, it is estimate that the cost savings was significant from

treatment avoidance. Moreover, the increase in sepsis prevalence (finding more people with sepsis) supports that the intervention identification tools were effective.

The success of this project has been attributed to having well-established relationships and demonstrated success in this community with previous work in hospital readmissions reduction. Via relationships in previous hospital projects, the TMF QIN-QIO team was able to leverage existing relationships with community providers and stakeholders. These established relationships allowed for rapid introduction and quick start-up for this shorter-term SIP, which resulted in maximization of efficiencies across projects and a broader reach of hospitals, skilled nursing facilities, long-term care facilities, home health agencies and community agencies. Also, as sepsis is linked to readmissions, all facilities in the convened community groups were interested in identifying and treating sepsis more effectively to impact readmissions for both cost containment and outcomes improvement.

Challenges
With success also came several challenges in which the project team had to overcome. These main challenges included:
- The majority of nursing home staff in the Lower RGV are Spanish-speaking only. This required the procurement of an interpreter to complete presentations and the development of family-facing materials to be printed in English and Spanish.
- Antibiotics are easily accessible in Mexico, and local flea markets create increased antibiotic resistance in this community. In response to this, the team developed beneficiary-facing posters in English and Spanish illustrating the danger of self-treating with antibiotics and the danger of obtaining antibiotics without a prescription.

Recommendations
- Based on the team's experience in slow adoption of sepsis protocols and processes among hospitals, the project team recommends engaging hospital senior leadership early in the project and providing progress reports early and regularly. Additionally, the appointment of a clinical champion who would be responsible for the project and have the authority to move projects forward would help to facilitate change in the facilities.
- Delivery of educational materials in English and Spanish to a patient simultaneously, allows the provider to display materials side by side. The initial posters produced for the intervention were in English, and the Spanish versions were delivered a few months later. The lesson learned is to obtain translation much sooner in the process.
- Hospitals were at varying points of implementing early identification of sepsis, and group education was not the most effective intervention because of these different levels of knowledge. Instead, more one-on-one coaching and technical assistance were identified as needs and were provided to close this gap.