Preventing Hospital Readmission In The Sepsis Patient: A Multi-Modal Discharge National Framework

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Preventing Hospital Readmission in the Sepsis Patient:

A Multi-Modal Discharge National Framework

Submitted to the Faculty
Yale University School of Nursing

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Nursing Practice

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Abstract

Sepsis, the leading cause of hospital readmissions in the United States, accounts for $23.7 billion of aggregate costs. The Medicare Hospital Readmissions Reduction Program (HRRP) requires hospitals to provide efficient patient discharge coordination to prevent readmissions or risk financial penalties. Although a substantial value capture opportunity exists to reduce avoidable readmissions, a significant gap exists in sepsis-specific discharge interventions. The purpose of this quality improvement project was to design and evaluate an evidence-based framework for reducing sepsis readmissions in the acute care setting with national impact. The novel, multidisciplinary framework developed here integrated literature on: (1) Sepsis Nurse-Navigator driven discharge interventions; (2) Patient awareness using an expert-validated sepsis education tool; and (3) Patient-Nurse collaboration using telehealth or telephonic follow-up at critical time points. Seventy-five community hospital patients with qualifying CMS (2019) Diagnosis Related Group (DRG) 870, 871, and 872 discharging to home or an assisted living facility participated for a total of 6 months. Comparative analysis included review of 30-day readmissions pre-and post-program. Patient and nurse satisfaction as indicators of sustainability or opportunities for improvement were examined. The reduction in readmission rate after program implementation was statistically and clinically significant. Observed readmission rate fell to 17.2% after implementation of the framework ($Z=37.36, p < .001$) vs. the 44.2% baseline rate. Intervention resulted in a large effect size of 27.0% (95% CI=25.2%, 28.0%). National outcomes of this Healthcare Leadership DNP project determine scalability across a 21-state health system, inform evidence-based discharge interventions, and contribute to best practices for sepsis readmission reduction nationally.
### Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td><strong>CMS</strong></td>
<td>Centers for Medicare &amp; Medicaid Services, a part of the Department of Health &amp; Human Services (HHS).</td>
</tr>
<tr>
<td><strong>Hospital Readmissions</strong></td>
<td>The Hospital Readmissions Reduction Program is a Medicare value-based purchasing program that reduces payments to hospitals with excess readmissions. The program supports the national goal of improving healthcare for Americans by linking payment to the quality of hospital care (CMS, 2018).</td>
</tr>
<tr>
<td><strong>Readmission</strong></td>
<td>The 30-day risk standardized readmission measures include: all-cause unplanned readmissions that happen within 30 days of discharge from the index (initial) admission; patients who are readmitted to the same hospital, or another applicable acute care hospital for any reason (CMS, 2018).</td>
</tr>
<tr>
<td><strong>Medicare</strong></td>
<td>Federally-funded health insurance program for: people age 65 or older; people under age 65 with certain disabilities; and people of all ages with End-Stage Renal Disease (permanent kidney failure requiring dialysis or kidney transplant) (CMS, 2018).</td>
</tr>
<tr>
<td><strong>Sepsis</strong></td>
<td>A life-threatening condition that arises when the body’s response to an infection injures its own tissues and organs (Singer et al., 2016).</td>
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### Clarification

- **Hospital Readmissions Reduction Program (HRRP)**: A program that reduces payments to hospitals with excess readmissions, aiming to improve healthcare quality and promote more efficient care delivery (CMS, 2018). This program encourages hospitals to report quality measures and receive higher annual updates to their payment rates (CMS, 2017).

- **Inpatient Quality Reporting Program (IQRP)**: A clause in the Medicare Modernization Act (MMA) of 2003 that authorized CMS to pay hospitals for reporting designated quality measures, thereby incentivizing quality improvement (CMS, 2017).
Preventing Hospital Readmission in the Sepsis Patient: 
A Comprehensive Discharge National Framework

Chapter 1

Introduction

Sepsis is a life-threatening blood infection that occurs in approximately 1 million hospitalized patients each year (Martin, 2012). It is the leading cause of hospital readmissions (12.2%), costing $10,070 per re-hospitalization (Mayr, et al. 2017). Shankar-Hari et al. (2020) reported that one in five sepsis survivors are re-hospitalized within 30 days of discharge, citing infection as the primary cause of readmission. Older, non-Caucasian, male patients with multiple comorbid conditions were found to be at higher risk of re-hospitalization. Sepsis readmission accounts for $23.7 billion of aggregate costs for all hospitalizations in the United States (Torio & Moore, 2016). Under the Medicare Hospital Readmissions Reduction Program (HRRP), hospitals are required to provide patients with effective care coordination and post-discharge planning to prevent readmissions or risk financial penalties (CMS, 2018). Prescott (2015) reported that up to 40% of hospital readmissions of those patients discharged with sepsis are avoidable. Effective discharge coordination and post-discharge patient follow-ups are strategies to mitigate hospital readmissions. Given the magnitude of financial exposure and quality implications, there is an emergent need for healthcare institutions to prevent sepsis readmissions.

Background

The enactment of The Patient Protection and Affordable Care Act in 2010 brought forth sweeping changes in the healthcare landscape. The mandate had three aims: (1) increase access to affordable healthcare, (2) expand Medicaid services, and (3) devise care delivery initiatives that support lowering the cost of healthcare, while delivering the highest quality of care. As a result,
the Centers for Medicare & Medicaid Services implemented value-based initiatives in the acute care setting, focused on improving care that result in quality outcomes.

One of these initiatives, The Hospital Value-Based Purchasing (HVBP) program incentivizes healthcare providers for outcomes and processes that produce the highest quality of care. The HVBP program is designed to: (1) eliminate errors in healthcare that cause patient harm; (2) support evidence-based care practices that produce quality outcomes; (3) improve the patient care experience in the hospital through administration of the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) at discharge; (4) provide consumer access to hospital quality metrics; and (5) reward hospitals that provide stellar care to Medicare patients at a substantially lower cost (Centers for Medicare & Medicaid Services, 2019).

The Hospital Acquired Conditions (HAC) Reduction program is another value-based program that encourages hospitals to improve care by reducing the number of hospital-acquired conditions, such as pressure injuries, central line-associated bloodstream infections, and catheter-associated urinary tract infections. Since HAC’s realization in 2014, hospitals have employed strategies to reduce the number of conditions patients develop as a result of being hospitalized. Quality teams and workgroups within organizations have committed resources to reduce the number of hospital-acquired infections.

In support of the Affordable Care Act’s value-based model initiatives, Medicare launched the Hospital Readmissions Reduction Program (HRRP) in 2012, aimed at reducing payments to hospitals with excess readmission rates. Hospital readmission is defined by Medicare as an “unplanned readmission that happens within 30 days of a discharge from the index admission” and “patients who are readmitted to the same hospital, or another applicable acute care hospital for any reason” (Centers for Medicare & Medicaid Services, 2019). Currently, there are 6 specific
measures that are analyzed due to the high prevalence and cost of these diagnoses: (1) Acute Myocardial Infarction (AMI), (2) Heart Failure (HF), (3) Pneumonia (PN), (4) Total Hip/Knee Arthroplasty (THA/TKA), (5) Chronic Obstructive Pulmonary Disease (COPD), and (6) Coronary Artery Bypass Graft (CABG). As a response to HRRP, organizations have designed discharge strategies to include evidence-based practices that support efficient care transitions.

**Problem Statement**

Jack et al. (2009) found that implementation of a systematic, bundled discharge program can reduce hospital readmissions, thus improving patient quality outcomes. Elements of a bundled discharge program can include follow-up appointments with a primary care physician within seven days of discharge, completed medication reconciliation, effective discharge instructions, and efficient post-acute care placement. Hoyer et al. (2018) supports the use of bundled discharge care strategies for higher acuity diagnosis, such as sepsis, to reduce hospital readmissions. Other chronic disease management programs, such as congestive heart failure (CHF), have demonstrated successes in preventing readmissions when evidence-based interventions are utilized at discharge (Di Palo, Patel, Assafin, & Pina, 2017). Furthermore, a systematic review and meta-analysis of randomized trials in preventing 30-day hospital readmissions reported that hospital driven interventions such as patient-directed education, use of telehealth services, timely provider follow-up, and frequency of patient contact play a vital role in reducing avoidable readmissions (Leppin et al., 2014). A significant gap exists in sepsis-specific discharge interventions in preventing hospital readmissions. The primary aim of this healthcare quality improvement DNP project was to design and evaluate an evidence-based framework for reducing readmissions in the acute care setting with national impact.
Significance of Addressing the Problem

Mayr et al. (2017) reported data from the 2013 Nationwide Readmission Database citing sepsis as the leading cause of hospital readmissions when compared to the HRRP diagnoses measures including heart failure, chronic obstructive pulmonary disease (COPD), and pneumonia. Furthermore, the investigators found that the 30-day hospital readmission rate for sepsis was at 12.2% versus heart failure at 6.7%, costing approximately $10,070 per readmission. Although the HRRP does not include sepsis as a focus diagnosis in its current measures, sepsis readmissions have trended upward placing a huge burden on all aspects of the U.S. healthcare system in terms of financial, societal, and humanitarian costs.

Winters et al. (2010) reported that sepsis survivors continually experience an impaired quality of life well beyond hospital discharge. According to Genga and Russell (2017) sepsis survivors “experience long-term outcomes, such as late mortality, immune dysfunction, secondary infections, impaired quality of life and unplanned readmissions” (p. 441). Hospitalized patients are at risk for acquiring hospital-related infections, which increases mortality rates. These problems further compel the need to address the human impact of sepsis readmissions.

The shift towards public reporting of hospital quality data and outcomes have generated a landscape of transparency for consumers seeking quality care. Medicare’s Hospital Inpatient Quality Reporting Program (HIQRP) mandates hospitals to post quality data through Hospital Compare, which includes measures from the Hospital Value-Based Program, Hospital-Acquired Condition Reduction Program, and the HRRP (CMS, 2017). Hospital readmission rates of the six measures in the HRRP, in addition to all-cause readmission rates, are publicly displayed on the Care Compare website allowing for discerning consumers to choose where they receive care. This transparency creates a significant bearing on healthcare organizations to deliver high quality and
cost-effective patient care. A substantial value capture opportunity exists for healthcare institutions to devise initiatives to alleviate the rising cost of healthcare, while simultaneously addressing significant health issues, such as sepsis. Institutions must take a proactive stance within their macro-systems to drive transformational improvements in patient care delivery, as CMS’s value-based purchasing program remains a continued focus for payers. As such, organizations must ascertain solid financial health as it continues to provide services to patients and communities well into the future. Improving efficiencies in care delivery, in addition to introduction of innovative methods in care delivery will allow organizations to stay ahead of potential payer penalties or reimbursement reductions.
Chapter 2

Literature Review

Initial review of the literature yielded a wealth of information on the topics of sepsis, hospital readmissions, sepsis readmissions, care transition bundles, patient experience, virtual care visits, and telehealth. A variety of Biomedical databases (Medline, CINAHL, Scopus, Web of Science, etc.) were utilized to search for the topic of reducing hospital readmissions in sepsis patients. A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA, 2009) flow diagram was created to illustrate the review process and subsequent systematic and meta-analyses reviews found during the literature search (see Appendix A). Currently, there are no evidence-based comprehensive discharge models or frameworks available for patients diagnosed with sepsis. However, there was a significant amount of literature available for chronic disease models, such as Congestive Heart Failure and Chronic Obstructive Pulmonary Disease, that demonstrate successes in managing these conditions when specific discharge models of care are implemented. Evidence shows that disease-targeted discharge programs have a significant impact on preventing re-hospitalizations.

Sepsis

Sepsis is defined as a life-threatening organ dysfunction caused by a dysregulated host response to infection (Singer et al., 2016). Sepsis results from an individual’s systemic inflammatory response syndrome (SIRS) to infection. The presence of two or more of the following indicates SIRS: Temperature >38°C or <36°C, Heart rate >90bpm, Respiratory rate >20/min or PACO2 <32 mm Hg, or White blood cell count >12,000/mm³ or <4000/mm³ or >10% immature bands (Bone et al., 1992). A sepsis diagnosis is derived from a known or suspected infection in addition to the presence of two or more of the aforementioned SIRS criteria.
Due to its high mortality rate, advances in sepsis treatment have been widely implemented to reduce hospital deaths. In October 2015, CMS introduced the use of a sepsis management bundle (SEP-1) to capture patients with clinical presentation of sepsis and implement evidence-based interventions, such as timely antibiotic administration, intravenous fluids, and lactate level measurement. The SEP-1 measures are intended to improve timely diagnosis and management of sepsis and are based on studies demonstrating efficacy of bundled interventions in reducing in-hospital mortality (Han et al., 2018). As an evidence-based intervention, hospitals have implemented a sepsis Rapid Response Team (RRT) to ensure all cases of sepsis are critically reviewed and treated according to the SEP-1 bundle protocol. An interdisciplinary group of healthcare professionals respond to the sepsis rapid response activation to collectively decide the best course of treatment for the sepsis patient, based on the SEP-1 protocol. Hospital systems nationally are monitoring sepsis mortality and compliance to the bundle as part of quality and readmissions reporting to CMS. A systematic review of hospital cost of sepsis found that despite implementation of these bundles, treatment of sepsis is “consistently extremely expensive” (Arefian et al., 2017, p.115).

**Hospital Readmissions**

Under HRRP, financial payments to hospitals are reduced for excess readmissions, placing pressure on hospitals to improve the quality of care and reduce re-hospitalizations. CMS determines the hospital payment adjustment factor, which is the percent reduction of hospital payment (CMS QualityNet, n.d.). A maximum penalty of 3% is adjusted to the total Medicare payment the hospital receives annually (McIlvennan, Eapen, & Allen, 2015). In the era of value-based purchasing, hospitals are held accountable for the quality and outcomes of care delivery, as opposed to the dwindling fee for service models that are still present today. The HRRP program
requires hospitals to (a) establish better communication and care coordination efforts, and (b) work efficiently with patients and caregivers on post-discharge care planning (CMS, 2018).

There are a variety of factors that drive hospital readmissions. Medication reconciliation, for instance, is a process wherein patient medications are reconciled at admission and discharge. Failure to reconcile medications at discharge places the patient at risk of taking multiple medications that can have untoward adverse effects potentially resulting in re-hospitalization. Lack of primary care physician (PCP) follow-up post discharge is another factor that can drive readmissions. Best practice dictates that primary care follow-up post discharge is key in ensuring the continuity of care along the continuum. Identification of patients at high risk for readmissions is also a significant factor in ensuring efficient planning is conducted before discharge. Patients who present with complex comorbid conditions should be identified early during the hospitalization to allow for mobilization of resources at the time of discharge. While potential barriers exist both inside and outside the hospital, administrators must work collaboratively with stakeholders to help reduce the number of avoidable readmissions.

**Sepsis Readmissions**

Chang et al. (2015) highlighted the importance of sepsis readmissions as a new emphasis in healthcare settings due to the high cost associated with caring for patients diagnosed with sepsis. A cross-sectional study of sepsis readmissions in 2008-2011 in Medicare fee-for-service patients revealed that one-third of sepsis survivors were readmitted to the hospital (Norman, 2017). It was also estimated that 40% of sepsis readmissions are preventable. Chronic illness, medication related issues, and lack of post-discharge follow-up are among the causes of sepsis readmissions reported. As previously mentioned, only the following conditions are included in the HRRP measurement analysis: AMI, COPD, HF, pneumonia, CABG surgery, and THA/TKA. Sepsis has surpassed
these aforesaid conditions as the leading cause of hospital readmissions. It will only be a matter of time until sepsis is included in the list above as part of the measure to monitor hospital performance.

Hospital readmissions can be prevented when evidence-based strategies are employed, as demonstrated in patients with heart failure (Bradley et al., 2013). Nurse driven interventions are crucial in attaining successful outcomes on readmissions. One of the most effective and proven strategies is to ensure patients receive physician follow-up within seven days after discharge. This allows for immediate communication with their physicians with the appropriate follow-up care discussed prior to leaving the hospital. An effective hand-off between care providers is paramount in ensuring patients receive the aftercare they need outside the hospital. Accurate medication reconciliation is also an important discharge activity to mitigate the risk of untoward medication side effects. Employing these bundled interventions at discharge is a successful strategy to reduce avoidable hospital readmissions ((Adams, Stephens, Whiteman, Kersteen, & Katruska, 2014).

**Care Transition Bundles**

The literature shows that elements of a bundled discharge program can significantly reduce hospital readmissions. PCP follow-up, medication reconciliation, effective discharge instructions, and post-acute care collaboration are evidence-based interventions that have shown significant improvement in reducing hospital readmissions. The re-engineered (RED) program was tailored for patients diagnosed with congestive heart failure (CHF) (Jack, 2009). The program utilized the interventions to CHF patients prior to leaving the hospital and have shown dramatic success in managing this condition. Nurses have the unique ability to improve and innovate the discharge process. Hospital administration is key to ensuring adequate support and resources are available to nurse staffing to move any readmissions initiative forward. Nurses have the capability to
communicate directly to providers prior to a patient’s discharge to discuss care issues. Care coordination plays a significant role in coordinating aftercare interventions outside the hospital and confirming that patients are placed externally with the appropriate resources.

While there are not specific articles focusing on improving sepsis discharge care coordination to prevent readmissions, multiple articles have demonstrated that effective discharge planning, regardless of the disease process, reduces the likelihood of readmissions. Patel & Dickerson (2018) found that coordination of care using a bundled discharge tool kit, such as Project RED, should be utilized as part of the discharge process to improve patient outcomes and readmissions. Similarly, Kamermayer et al. (2017) performed a systematic review to determine the effectiveness of evidence-based transitions of care interventions and found the value of using these comprehensive interventions to reduce readmissions.

**Patient Experience**

The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) is a survey administered to patients to gain perspectives on the experience and quality of their hospital stay. HCAHPS is a publicly reported survey that provides financial incentive for hospitals to improve the quality of care provided. Figueroa et al. (2018) associated effective transition of care strategies with better patient care experience. The researchers found that the use of bundled discharge strategies increase patient satisfaction. Furthermore, Carter et al. (2018) found that patients who report high satisfaction and good physician communication were less likely to be readmitted in the hospital. Part of a comprehensive transition bundle is having an effective handoff between caregivers to ensure the continuity of care delivery post discharge. When nurses, physicians, and other members of the healthcare team are all consistent in the plan of care, patients
and their caregivers become more engaged which in turn reduces the likelihood of returning to the hospital.

There is no specific evidence in the literature linking the experiences of patients with sepsis to the discharge process. However, facilities have the capability to stratify the survey responses to determine demographics, diagnoses, and unit admission. Since patient experience accounts for a substantial portion of the CMS value-based payment model, hospitals have allocated teams and resources to ensure focus on enriching the patient experience. As the data shows more readmissions for patients with sepsis, it is advantageous for hospitals to scrutinize survey responses to determine which interventions are perceived to better meet patient’s needs and expectations. Tailoring those interventions specific to sepsis patients’ needs will drive better patient outcomes and experience that are essential in today’s value-based healthcare environment.

**Telehealth**

The United States Health Resource Services Administration (HRSA) defines telehealth as:

The use of electronic information and telecommunication technologies to support long-distance clinical health care, patient and professional health-related education, public health, and health administration. Technologies include video conferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications. (HRSA, 2019).

Telehealth offers the sophistication of conducting patient and provider visits through a variety of technological modalities, such as through a tablet application. Telehealth serves as a patient care substitute when a face-to-face encounter is not feasible thereby increasing access to care. As a new and innovative way in delivering patient care, The American Medical Association’s Council on Ethical and Judicial Affairs (CEJA, 2017) recommends maintaining standards in conducting telehealth such as, fidelity, competence, transparency and informed consent, privacy
and confidentiality, and continuity of care. It is crucial that these standards are observed to ensure adherence to standards of care when new technologies in patient care delivery are introduced.

There are only a handful of studies that highlight the value and effectiveness of telehealth in preventing readmissions. Noel et al., (2020) conducted a 12 month, randomized controlled trial evaluating the use of telehealth versus standard transitions of care in preventing hospital readmissions. The study reported that “telehealth has great value in providing safe transitions of care, increasing patient satisfaction and improving patient adherence to medication” (Noel et al., 2020, p. 8). The study was unable to demonstrate telehealth’s role in reducing readmissions.

Another pilot, randomized controlled trial, to evaluate the effectiveness of telehealth compared to standard of care for patients with diabetes and COPD who were at high risk of hospital readmissions, reported that although telehealth monitoring did not have a direct effect on re-hospitalization the use of telehealth improved its participants reported health outcomes and quality of life (Mudiyanselage, et al., 2019). A recent study in New York state found that hospital programs that employ a variety of post-discharge interventions that include telehealth demonstrated reduced hospital readmission rates (Summers & Atav, 2020). Although strong level of evidence-based research does not exist in establishing a correlation on the effectiveness of telehealth in reducing readmissions per se, current research supports the use of telehealth as a modality to engage patients’ reporting of health status.

**Evidence-Based Practice Model**

A variety of models are widely available to systematically guide implementation of evidence-based practice (EBP) and assist clinicians seeking to change practice within their organizations (Melnyk & Fineout-Overholt, 2015). Integration of EBP models assure consistency in the transfer of evidence into the clinical setting. The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model is the conceptual model that was utilized for this project. The model
assisted in informing organizational stakeholders of the need to focus on the quality and financial implications of sepsis readmissions.

The model was developed by nurses from the Johns Hopkins Hospital and School of Nursing to promote incorporation of best evidence into nursing practice for administrative, educational, and clinical decision-making (Dearholt & Dang, 2012). In the JHEBP model, EBP is defined as:

a problem-solving approach to clinical decision-making within a health care organization that integrates the best available scientific evidence with the best available experiential (patient and practitioner) evidence, considers internal and external influences on practice, and encourages critical thinking in the judicious application of such evidence to care of the individual patient, patient population, or system. (Dearholt & Dang, 2012, pp. 4-5)

JHEBP utilizes a three-step process called PET, practice question, evidence, and translation, with the use of tools and checklists to guide implementation (Dang & Dearholt, 2017). The model provides guidance in disseminating evidence of the problem and support translation of evidence-based interventions. The following JHEBP tools guided this project in the implementation of its overall aims: (a) PET Management Guide, (b) Stakeholder Analysis Tool, (c) Action Planning Tool, and (d) Dissemination Tool.

**Organizational Description**

Dignity Health, Glendale Memorial Hospital and Health Center (GMHHC) is a 334-bed, not-for-profit acute care hospital, serving the Glendale California community, since 1926. The hospital is part of the newly formed company, CommonSpirit Health, which is the largest not-for-profit health system in the nation.
CommonSpirit Health is the parent company of Catholic Health Initiatives (CHI), Dignity Health (DH), and Dignity Community Care. The $29 billion system operates more than 700 care sites and 142 hospitals in 21 states, providing healthcare access to one in four U.S. residents (CommonSpirit Health, 2019). Through CommonSpirit Health’s sheer magnitude and reach, the company creates huge economies of scale for competitive advantage gaining efficiencies in resource allocation and capabilities.

Organizational Analysis

GMHHC is a community hospital offering a wide array of services including 24-hour emergency, intensive care, telemetry, medical-surgical, behavioral, maternal-child, neonatal intensive care, and surgical services. The facility also offers senior care services, wound care center with hyperbaric oxygen therapy, acute and outpatient rehabilitation. The hospital’s mission is carried out by over 1200 employees, 500 active medical staff, and over 400 volunteers. The medical center is accredited by The Joint Commission (TJC), the most prestigious healthcare accreditor in the country. The hospital is a primary stroke center, accredited by TJC, and is a Los Angeles County Emergency Medical Services designated, stroke center.

Prior to the arrival of the current leadership team at GMHHC, the hospital was experiencing a multitude of operational challenges. At the beginning of 2018, the facility experienced a “turn-around,” due to years of financial and quality of care turmoil. A new hospital administrative team was chosen to resurrect the positive community reputation and employee morale it was once known for. The hospital’s quality indicators, such as readmission rates, sepsis mortality ratios, Cesarean section rates, and patient experience scores have all been under-performing. Leapfrog, a national organization that grades hospitals for quality of care delivery and patient safety, has graded the hospital a “C” since 2014. The new administrative team continues to implement
changes that pose immediate and sustainable quality metrics. Most recently, the hospital received a Leapfrog “A” score and a 5-star CMS rating, the highest recognition the hospital has ever achieved. At the end of fiscal year 2018, the hospital’s earnings before interest, taxes, depreciation, and amortization (EBITDA) were reported at a positive $6.3 million, a 17.7% positive variance from fiscal year 2017 (GMHHC financials, 2018). The current payer mix reflects the community it serves with 50% Medicare, 48% Medicaid and 2% uninsured. The patient population ethnic make-up is diverse, with Armenians making up the majority.

Glendale Memorial Hospital and Health Center’s mission is to deliver compassionate, high-quality, affordable health services; to serve and advocate for our sisters and brothers who are poor and disenfranchised; and to partner with others in the community to improve the quality of life (GMHHHC, 2019). In light of the changes being implemented by the senior leadership team, employees of the medical center are optimistic about the future. Operational inefficiencies that affect delivery of safe and effective care are being streamlined. The hospital has also invested in human capital, hiring leaders with proven track records of strong operational and clinical expertise. Stakeholders are experiencing a transformation that is aligned with the hospital’s mission. Employees, physicians, and the community are enthusiastic for the future and continued success of GMHHHC.

This DNP project aimed at preventing sepsis readmissions was timely and relevant for the hospital. The project leveraged the organizational climate where changes and improvements were embraced. This climate was a facilitator of seamless engagement and acceptance of the project implementation. Furthermore, the financial and quality benefits of the project were aligned with the hospital’s strategic vision of elevating the quality of care and improving financial performance.
COVID-19 Pandemic

The COVID-19 pandemic confounded society at its core. Healthcare institutions deployed immediate and innovative measures to respond to the needs of patients, staff, physicians, and communities. The magnitude of this pandemic required significant changes to healthcare delivery while still ensuring patient care standards were not compromised. Notably, the use of telehealth in the inpatient and outpatient settings significantly increased as a reactive response to COVID-19 (Hollander & Carr, 2020).

The sequelae of COVID-19 infection continues to be investigated as new information is disseminated daily in the scientific community. It is difficult to predict how COVID-19, as a comorbid condition, will affect sepsis readmissions. Sepsis, as a diagnosis, remains the focus of this project. Patients with COVID-19 infection were included in the project provided the patient fully recovered from symptoms and consented to participation.

Project Goal, Aims, and Expected Outcomes

The overall goal of this quality improvement project was to demonstrate a reduction of readmitted patients previously discharged with a primary sepsis diagnosis through implementation of a multi-modal discharge framework. The first aim of this project was to devise a framework consisting of three approaches: (1) identify evidence-based discharge interventions that help reduce readmissions (nurse approach), (2) provide an expert-validated comprehensive sepsis overview to patients and families at discharge (patient approach), and (3) conduct a post-discharge follow-up consult via phone-call or telehealth (patient and nurse approach). The second aim of this project was to implement and evaluate the effectiveness of the framework in reducing sepsis readmissions at Glendale Memorial Hospital & Health Center. The third aim of this project was to recommend sustainability within and across system context at CommonSpirit Health.
Chapter 3

Methods

Sepsis is the leading cause of hospital readmissions (12.2%), costing $10,070 per re-hospitalization (Mayr, et al. 2017). Prescott (2015) reported that up to 40% of hospital readmissions of those patients discharged with sepsis are avoidable. There is a clear need for hospitals to pay attention to the financial and quality implications of sepsis readmissions. This DNP project was aimed at improving and developing processes that will significantly contribute to the reduction of patients readmitted for sepsis at Glendale Memorial Hospital & Health Center and nationally.

Aim 1: Develop a Multi-Modal Discharge Framework to Reduce Sepsis Readmissions.

A three-prong approach (nurse, patient, nurse & patient) was utilized to accomplish this aim: (1) identify nurse driven, evidence-based discharge interventions that help reduce readmissions (nurse approach), (2) develop awareness of sepsis symptoms, prevention, and self-advocacy using an expert-validated sepsis education tool (patient approach), and (3) conduct a structured post-discharge follow-up utilizing two different modalities (patient and nurse approach). The Yolo Framework (Figure 1) conceptualized a multi-modal approach to help guide clinicians in improving care transition strategies to reduce the rate of re-hospitalizations. The multi-modal approach centered around patient wellness after hospital discharge, applying evidence-based strategies to address quality and operational deficiencies that may occur during care transitions. To ensure adherence to elements of the framework, a cross-functional flowchart was developed to guide stakeholders during project implementation (see Appendix B).
Nurse Approach: Identify Nurse-Driven, Evidence-Based Discharge Interventions

Evidence-based discharge interventions, introduced by Jack et al. (2009) to decrease re-hospitalization in the congestive heart failure patient population, was identified as the model for this project to assist in the reduction of sepsis readmissions. The hospital’s current sepsis nurse navigators (SNNs), in conjunction with the registered nurse care coordinators (RNCCs) were the primary stakeholders involved in the nurse approach. These specialized registered nurses conducted all sepsis-related interventions that included the following: ensured primary care provider follow-up appointment was scheduled prior to hospital discharge, effective discharge planning and instructions were provided to patients and family members, hand-off was provided to the next caregiver for continuity of care, medication reconciliation and teaching were conducted prior to discharge, involved multi-disciplinary team in determining resources required for post-
acute care settings, including collaboration with community providers, and identified high risk patients for readmission during hospitalization to prevent recurrence. The subsequent sections outlined illustrates evidence-based interventions that were implemented to accomplish the nurse approach of the Yolo framework.

**Primary Care Provider (PCP) Follow-Up.** The RNCCs queried the patient at the time of initial contact for the name of his or her primary care physician. If one was identified, then a follow-up appointment was scheduled, prior to discharge. If the patient did not have a current primary care provider, a list of the current community PCPs was provided. The patient had the option to choose from the list and upon determination of the PCP, the RNCC contacted the office and scheduled a follow-up appointment within 7 days of the discharge date. The time and schedule of the appointment were conducive to the patient and/or caregiver schedules. An appointment card listing the physician, address, date, and time of the appointment was provided to the patient, prior to discharge. Documentation of the appointment was reflected in the patient’s Electronic Health Record (EHR).

**Discharge Instructions.** Discharge planning began shortly after admission to the unit. As a current practice, RNCCs arranged for discharge planning options with the patient or family member within 24 hours of admission. Options such as skilled nursing facility, assisted living care, or home health needs were discussed at length to ensure the patient was discharged to the right level of care post hospitalization. Disease specific education, including sepsis, was printed out from the EHR by the RNCC or primary care RN. Discharge information was discussed in detail with the patient and/or caregiver to ensure understanding of instructions. Evidence of teaching was documented in the patient’s record.
**Caregiver Handoff.** Caregiver handoff at the time of discharge is a crucial activity to relay information regarding current patient status. It is at this juncture where caregivers exchange pertinent information regarding the patient’s disposition. The RNCC provided initial handoff to a caregiver, as appropriate, with final handoff completed by the primary nurse at discharge. When a caregiver was unable to come to the hospital for discharge teaching and hand-off communication due to visitor restrictions related to COVID-19, the RNCC or primary care RN contacted the next caregiver telephonically to provide patient handoff utilizing the Situation, Background, Assessment, and Recommendation (SBAR) framework (Figure 2). Handoff documentation was documented in the EHR.
**Figure 2. SBAR Communication.** Adapted from “SBAR: A Shared Mental Model for Improving Communication Between Clinicians,” by K. Haig, S. Sutton, and J. Whittington, 2006, The Joint Commission Journal on Quality and Patient Safety,32, p.171. Copyright 2006 by the Joint Commission on Accreditation of Healthcare Organizations. All rights reserved. Used with permission.

**Medication Reconciliation and Teaching.** Reconciling medications at the time of discharge is another crucial activity that requires nurse and provider attention. Medication teaching at the time of discharge by the primary care RN and reinforced by the SNN presents an opportunity for dialogue between patients and healthcare providers to gain understanding of medication indications and side effects. Documentation of medication reconciliation and teaching were present in the EHR.
Multidisciplinary Team. With increasing workload demands for primary care nurses, patient education and discharge instructions are often performed at a suboptimal level. Although the majority of the work processes outlined above were part of the current standard work performed by the primary nurse, SNNs, and RNCC, consistency in executing these interventions was not evident. A clear delineation of duties and accountabilities were not in place resulting in confusion, and redundancies for the stakeholders.

A multidisciplinary team consisting of the SNNs, RNCCs, primary care RN, physical therapists, nursing management, hospitalist physicians, discharge planners, and palliative care nurse conducted daily rounds on all patients, with specific focus given to sepsis patients. The SNN facilitated discharge interventions utilizing a checklist of the five evidence-based interventions described above (see Appendix C). The SNN was the process owner who ensured that all stakeholders initialed and dated their completion of checklist items. The team, in consultation with the primary care physician, determined the best post-acute care setting for the patient based on acuity, insurance payer, patient or family choice, and skilled nursing need. The SNN and RNCCs were responsible for monitoring patients who return to the hospital for sepsis readmissions. Cases of sepsis readmissions were reviewed by the multi-disciplinary team to identify opportunities for improvement.
**Patient Approach: Develop Awareness of Sepsis Symptoms, Prevention, and Self-Advocacy Using an Expert-Validated Sepsis Education Tool**

In a published report on U.S. health literacy, Kutner, Greenburg, Jin, and Paulsen (2006) reported that American adults possessed 53% intermediate, 22% basic, and 14% below basic, health literacies, respectively. Understanding a patient’s health literacy is important as it offers background on how patients will understand written health information that is provided by the healthcare provider. The Centers for Disease Control and Prevention’s Sepsis Fact Sheet (Figure 1) was reviewed by an expert panel for understandability, actionability, and overall usefulness for patient education and was determined to add value in overall sepsis education (Schorr, Hunter, & Zuzelo, 2018). The SNN and/or primary care nurse educated patients and caregivers with this tool at the time of discharge using the teach-back method. The Agency for Healthcare Research and Quality (2020) endorsed clinicians’ use of teach-back method to ascertain patient and caregiver understanding of information relayed to them. It was an opportunity for providers to verify comprehension of information that most likely led to patient and caregiver adherence. The Sepsis Fact Sheet was provided as a reference tool for patients to take home at the time of discharge. The fact sheet reinforced sepsis education and assisted patients and caregivers at home to recognize signs and symptoms of sepsis including awareness of when to seek medical assistance. The SNNs recommended placing this reference sheet in a prominent place in their homes, such as on their refrigerators, for easy access. Participation in education and ownership of the Sepsis Fact Sheet actively engaged the patient and caregiver in the plan of care. The SNN and/or primary nurse documented dissemination of the sepsis education sheet in the medical chart.
Figure 3. Sepsis Fact Sheet

SEPSIS FACT SHEET

A POTENTIALLY DEADLY OUTCOME FROM AN INFECTION

What is sepsis?
Sepsis is the body’s overwhelming and life-threatening response to an infection which can lead to tissue damage, organ failure, and death.

When can you get sepsis?
Sepsis can occur to anyone, at any time, from any type of infection, and can affect any part of the body. It can occur even after a minor infection.

What causes sepsis?
Any type of infection that is anywhere in your body can cause sepsis, including infections of the skin, lungs (such as pneumonia), urinary tract, abdomen (such as appendicitis), or other part of the body. An infection occurs when germs enter a person’s body and multiply, causing illness and organ and tissue damage.

Who gets sepsis?
Anyone can get sepsis as a bad outcome from an infection, but the risk is higher in:
- people with weakened immune systems
- babies and very young children
- elderly people
- people with chronic illnesses, such as diabetes, AIDS, cancer, and kidney or liver disease
- people suffering from a severe burn or wound

Ask your doctor about your risk for getting sepsis.

What are the symptoms of sepsis?
There is no single sign or symptom of sepsis. It is, rather, a combination of symptoms. Since sepsis is the result of an infection, symptoms can include infection signs (diarrhea, vomiting, sore throat, etc.), as well as ANY of the symptoms below:

S - Shivering, fever, or very cold
E - Extreme pain or general discomfort ("worst ever")
P - Pale or discolored skin
S - Sleepy, difficult to wake up, confused
I - "I feel like I might die"
S - Short of breath

Figure 3. Sepsis Fact Sheet from the Centers for Disease Control and Prevention. Adapted from “Understandability and Actionability of the CDC’s Printable Sepsis Patient Education Material,” by Schorr et al., 2018, American Journal of Critical Care, 27, pp. 421-422. Copyright 2018 by the American Journal of Critical Care. All rights reserved. Used with permission.
Why should I be concerned about sepsis?
Sepsis can be deadly. It kills more than 258,000 Americans each year and leaves thousands of survivors with life-changing after effects. According to CDC, there are over 1 million cases of sepsis each year, and it is the ninth leading cause of disease-related deaths.

How is sepsis diagnosed?
Doctors diagnose sepsis using a number of physical findings like fever, increased heart rate, and increased breathing rate. They also do lab tests that check for signs of infection.

Many of the symptoms of sepsis, such as fever and difficulty breathing, are the same as in other conditions, making sepsis hard to diagnose in its early stages.

How is sepsis treated?
People with sepsis are usually treated in the hospital. Doctors try to treat the infection, keep the vital organs working, and prevent a drop in blood pressure.

Doctors treat sepsis with antibiotics as soon as possible. Many patients receive oxygen and intravenous (IV) fluids to maintain normal blood oxygen levels and blood pressure.

Other types of treatment, such as assisting breathing with a machine or kidney dialysis, may be necessary. Sometimes surgery is required to remove tissue damaged by the infection.

Are there any long-term effects of sepsis?
Many people who have sepsis recover completely and their lives return to normal. But some people may experience permanent organ damage. For example, in someone who already has kidney problems, sepsis can lead to kidney failure that requires lifelong dialysis.

How can I prevent sepsis?
1. Get vaccinated
2. Prevent infections that can lead to sepsis by:
   - Cleaning scrapes and wounds
   - Practicing good hygiene (e.g., hand washing, bathing regularly)
3. If you have an infection, look for signs like:
   - Fever, chills, rapid breathing and heartrate,
   - Rash, confusion, and disorientation.

Where can I get more information?
- Centers for Disease Control and Prevention (CDC)—CDC works 24/7 protecting America’s health, safety and security. Whether diseases start at home or abroad, are curable or preventable, chronic or acute, stem from human error or deliberate attack, CDC is committed to responding to America’s most pressing health challenges. cdc.gov/sepsis
- Rory Staunton Foundation—The Rory Staunton Foundation supports education and outreach efforts aimed at rapid diagnosis and treatment of sepsis, particularly in children. rorystaunton.com
- Sepsis Alliance*—Created to raise sepsis awareness among both the general public and healthcare professionals, Sepsis Alliance offers information on a variety of sepsis-related topics. Visit sepsis.org/library to view the complete series of titles. sepsis.org

Figure 3. Continued
Patient & Nurse Approach: Conduct a Structured Post-Discharge Follow-up Utilizing Two Different Modalities

The patient and nurse approach centered around implementation of a follow-up care consult via telephone or telehealth at specified time points after hospital discharge. The follow-up concept is modeled after Eric Coleman’s four pillars of transitional care interventions that have shown effectiveness in reducing readmissions specifically, medication self-management, patient-centered record, telephone follow-up, and red flags (Coleman, Parry, Chalmers, & Min, 2006). Furthermore, Totten et al. (2016) published a report for the Agency for Healthcare Research and Quality (AHRQ) indicating strong support of telehealth’s effectiveness in reducing readmissions and improving quality of life in patients with chronic conditions.

All sepsis patients discharging to home and assisted living facilities were given the option for either a phone or telehealth follow-up by the SNN or RNCC at 24, 72, 120 hours; and at 7, 14, and 28 days after hospital discharge. The follow-up consult started at 24 hours after the patient left the hospital and ended on day 28, after the final check-in. A quick follow-up consult was performed by the SNN to assess the patient’s current health status based on a developed script (see Appendix D). Patient contacts were documented in the patient’s EHR. A total of three attempts via phone or telehealth were made before the patient was withdrawn from the follow-up care consults. Attempts made via phone call, telehealth or physician contact were documented in the patient’s chart. For those patients who chose the telehealth option, a phone consult was provided as a back-up method for technical issues that prevented or interrupted contact (no internet, unable to connect through the telehealth application) and was noted as such in the EHR.
Zoom was the application utilized to conduct telehealth consults. The platform offered a synchronous audio and video communication between patients and providers and is the Dignity Health approved, Health Insurance Portability & Accountability Act (HIPAA) compliant, telehealth application. SNNs ensured that patients who chose this option had the program on their mobile/computer devices to ascertain understanding of application features.

**Aim 2: Implement and Evaluate the Yolo Framework in Reducing Sepsis Readmissions**

The clinical groups that participated in this quality improvement project were groups of qualified patients with an assigned CMS (2019) Diagnosis Related Group (DRG): 870 (Septicemia or Severe Sepsis with MV >96 hours), 871 (Septicemia or Severe Sepsis without MV >96 hours with MCC), and 872 (Septicemia or Severe Sepsis without MV >96 hours without MCC). As mentioned previously, patients who discharged to home and assisted living facilities were eligible for the follow-up consults. Patients with the above DRGs discharged to skilled nursing facilities (SNFs) or long-term acute care hospitals (LTACHs) were excluded from program. Residents of SNFs and LTACH facilities have a more complex living structure that would make it difficult for follow-up consults to occur. Phone calls to these long-term residential care sites are filtered through different nursing stations that would make patient access difficult. Furthermore, multiple facility approvals and staff trainings would have to be secured before implementation can occur, which is well beyond the scope of this project. Patient demographics, clinical, and hospitalization data were accessed including, medical record number, date of birth, sex, date of admission, date of discharge, place of discharge, physician name, DRG number, and date of readmission, if applicable, through a report generated from the facility’s EHR.
Successful implementation of this framework required buy-in from multiple stakeholders. As such, the following hospital committees/departments (i.e. Readmissions Reduction Committee, Nurse Executive Council, Sepsis Committee, Utilization Management, Medical Executive Committee, Senior Leadership team, Care Coordination, and Hospital Community Board) were apprised of this project through formal presentations at departmental meetings. A systematic approach was taken in the implementation of this project, which entailed utilization of the translation section of the JHNEBP PET Management Guide tools (i.e. Stakeholder Analysis, Action Planning, Dissemination).

**Monitoring.** The SNN and RNCCs held weekly fidelity meetings with the CNO to discuss barriers or issues that required modifications to guarantee the project’s success. The SNN and RNCC submitted a weekly report to the CNO to ensure adherence to the standard work and data collection guidelines. Embarking on a new quality initiative required strong leadership support throughout the course of the project. The ramifications of COVID-19 continue to play a significant role in decision making in today’s hospital settings. The project was evaluated on a weekly basis to tailor processes that impacted patient participation, human resource capital, and data collection.

**Aim 3: Recommendation for Sustainability and Scalability of the Yolo Framework**

The third aim of this project was to provide recommendations for sustainability and scalability of the multi-modal sepsis discharge program. This hospital-wide improvement initiative afforded the opportunity to assess sustainability, scalability, resource and time allocation to the program. Since the project demonstrated a positive outcome during the first 3 months, the project was extended for another 3 months of implementation. At the conclusion of six months of
implementation, the findings were evaluated to determine recommendations for scale up to the entire eighteen Southern California division hospitals within CommonSpirit Health.

**Evaluation/Analytic Plan**

The primary outcome measure for this DNP project is the reduced number of readmitted sepsis patients within 30 days. To demonstrate effectiveness of the framework, a comparative analysis was conducted to show baseline and project outcome data. A retrospective review of the number of sepsis readmissions was performed from the last 5 years (2015-2019), utilizing the following DRGs 870, 871, and 872 to capture the baseline rate during the specified 6-month (July-December) timeframe. Readmissions data from CMS were aggregated after submission of hospital claims, thus causing a significant delay in publishing these reports for up to a year. For the purposes of this project, readmissions data from the follow-up consultations during the implementation phase were used for comparison in lieu of the reported Medicare data. This substitution was appropriate given that the follow-up consultations assessed for patient status, disposition and readmission to any hospital was collected and reported for comparative analysis.

Two variables were analyzed: specifically: \( P_0 \) = the proportion of sepsis patients who were readmitted within 30 days *before* the implementation of the framework, and \( P_1 \) = the proportion of sepsis patients who were readmitted within 30 days *after* the implementation of the framework. The Z-test for the comparison of two population proportions was used. For this project’s statistical analysis, Minitab version 19.0 was utilized to calculate the Z-test.

Descriptive statistics were calculated to determine the level of patient and nurse satisfaction in follow-up consult participation (See Appendices E and F). On the patient side, the questions presented in this evaluation measured satisfaction of the process, the effectiveness of the nurse(s), the frequency of follow-up, and response to any issues. The nurses received a similar questionnaire
assessing their satisfaction with the various touch points and consultation set-ups. The percentage of overall patient and nurse satisfaction scores were reported for each of the five survey categories. The overall mean score with 95% confidence intervals was also computed, based using the scale: $1 = \text{Very unsatisfied}; 2 = \text{Somewhat unsatisfied}; 3 = \text{Neutral}; 4 = \text{Somewhat satisfied}; 5 = \text{Very satisfied}$. The satisfaction level of the multimodal framework indicated whether the overall experience of administering or receiving this treatment, positive or negative, may provide indicators of sustainability or opportunities for improvement.

**Implications**

Outcomes of this DNP project provided insight into the effectiveness of current nurse-driven evidence-based discharge interventions. While these interventions have shown effectiveness in reducing readmissions in the chronic disease population, results of this project will contribute to the work of others in identifying strategies to reduce hospital readmissions in sepsis patients. Qualitative results of this project highlighted patients’ and nurses’ experiences during the discharge and transition to care processes.

**Statement on Human Subjects**

This DNP project was a quality improvement project in the acute care setting. The project aimed to reduce hospital readmissions in the sepsis population by implementing a safe, efficient, patient-centered, and cost-effective care delivery model. The DNP project summary was reviewed by a representative of the Yale Institutional Review Board (IRB) and affirmed the project does not meet IRB requirements for protection of human subjects’ approval. This Quality Improvement project did not require Dignity Health/CommonSpirit IRB approval.
Timeline

Project implementation was dependent upon DNP project advisor and project committee approvals in June 2020. Project implementation was slated for July 1, 2020 with expected completion date of September 2020, excluding analytical analyses. Based on the results of the 3-month pilot and the hospital’s COVID-19 (surge) state, the project implementation phase was extended until the end of December 2020. Analyses were conducted in January-February 2021. The final DNP project summary was submitted to the ProQuest Dissertation and Thesis database in May 2021.

Leadership Immersion

Implementation of this DNP project required senior leadership support and approval from Jill Welton, MSN, RN, President and Chief Executive Officer, at Glendale Memorial Hospital & Health Center, which the student secured. Dr. William Wang, MD, Chief Medical and Quality Officer, who has operational and strategic accountability over the hospital’s Quality and Safety Department was identified as the hospital advisor and mentor for this project. Project success was dependent upon engagement of the implementation team: (a) Jonah Abellera and Pearl Saldana, Sepsis Nurse Navigators; (b) Care Coordination Registered Nurses and leadership, headed by Claudia Schenke-Sen, Director of Care Coordination; (c) Leah Nubla, RN Director of Quality and Safety Department; (d) David Mejia, Strategic Financial Analyst; and (e) Kora Guoyavatin, Chief Financial Officer. Progress reports during the implementation phase were maintained and submitted to faculty and hospital mentor, as required. The DNP student, with guidance from the DNP advisor and hospital mentor, led this project at the hospital setting.
Chapter 4

Results

Readmission Rate of Patients

Sufficient data were collected to address the question: To what extent is there a reduction in the 30-day readmission rate of sepsis patients after the implementation of a multi-modal framework (that aims to address quality and operational inefficiencies that might occur during care transitions)? The original pilot was to capture readmissions within a 3-month (July-September) timeframe; however, this plan was changed due to early promising results and further disruptions associated with the COVID-19 pandemic. The timeframe was extended to six months (July to December).

A retrospective review of the number of sepsis readmissions over five years (2015-2019) indicated that the baseline rate of readmissions before the implementation of the framework was 38.1% in 2015, 34.4% in 2016; 40.9% in 2017, 45.5% in 2018, and 63.9% in 2019. The overall baseline sepsis readmission rate between 2015 and 2019 was 44.2%. In 2020, the readmission rate was 17.2% between July and December.

A one-tailed Z-test for the comparison of two proportions was conducted. The reduction in readmission rate after program implementation was statistically and clinically significant. Observed readmission rate fell to 17.2% after implementation of the framework ($Z = 37.36, p < .001$). Intervention resulted in a large effect size of 27.0 % (95% CI = 25.2%, 28.0%).

Patient Satisfaction

Table 1 presents the frequency distributions of the responses of $N = 66$ patients who completed the satisfaction questionnaire after the implementation of the multi-modal framework.
Table 1

Frequency Distributions of Responses of Patients to “Please Rate your Satisfaction after Receiving a Telephone Call or Telehealth Follow-up from the Hospital” (N = 66)

<table>
<thead>
<tr>
<th>Item</th>
<th>Very unsatisfied</th>
<th>Somewhat unsatisfied</th>
<th>Neutral</th>
<th>Somewhat satisfied</th>
<th>Very satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of the follow-up calls/telehealth</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>1 (1.5%)</td>
<td>5 (7.5%)</td>
<td>60 (90.9%)</td>
</tr>
<tr>
<td>Length of time you were interviewed</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>1 (1.5%)</td>
<td>5 (7.5%)</td>
<td>60 (90.9%)</td>
</tr>
<tr>
<td>Nurse who you interacted with</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>1 (1.5%)</td>
<td>3 (4.5%)</td>
<td>62 (93.9%)</td>
</tr>
<tr>
<td>Issues were addressed</td>
<td>1 (1.5%)</td>
<td>2 (3.0%)</td>
<td>1 (1.5%)</td>
<td>9 (13.6%)</td>
<td>53 (80.3%)</td>
</tr>
<tr>
<td>Overall participation in the program</td>
<td>1 (1.5%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>6 (9.1%)</td>
<td>59 (89.4%)</td>
</tr>
</tbody>
</table>

All but one of the patients (n = 1, 1.5%) were somewhat or very satisfied with the frequency of the follow-up calls/telehealth, the length of time they were interviewed, the nurse who they interacted with, and their overall participation in the program. All but four of the patients (n = 4, 6.0%) were somewhat or very satisfied that all the issues were addressed. The proportion of patients who reported consistently that they were very satisfied with all five of the questionnaire items was n = 51, 77.3%. An overall satisfaction score (mean ± confidence intervals) for N = 66 patients was computed using the scale: 1 = Very unsatisfied; 2 = Somewhat unsatisfied; 3 = Neutral; 4 = Somewhat satisfied; 5 very Satisfied. The descriptive statistics for the overall score indicated that at least 95% of the patients self-reported that they were satisfied after receiving a telephone call or telehealth follow-up from the hospital (M = 4.85 [95% CI = 4.76, 4.93]).
Nurse Satisfaction

Table 2 presents the frequency distributions of the responses of two nurses who completed the satisfaction questionnaire after the implementation of the multi-modal framework. The answers referred to each of the 66 patients who provided the data in Table 1.

Table 2

<table>
<thead>
<tr>
<th>Item</th>
<th>Very Unsatisfied</th>
<th>Somewhat Unsatisfied</th>
<th>Neutral</th>
<th>Somewhat Satisfied</th>
<th>Very Satisfied</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Program</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>66 (100.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Time spent with Patients</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>1 (1.5%)</td>
<td>65 (95.8%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Frequency of Check-ins</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>1 (1.5%)</td>
<td>2 (3.0%)</td>
<td>63 (95.5%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Phone Consults</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>2 (3.0%)</td>
<td>3 (4.5%)</td>
<td>59 (97.0%)</td>
<td>2 (3.0%)</td>
</tr>
<tr>
<td>Telehealth Consults</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>2 (3.0%)</td>
<td>64 (97.0%)</td>
</tr>
</tbody>
</table>

The nurses were very satisfied with the overall program and were also somewhat or very satisfied with the time that they spent with patients \((n = 66, 100.0\%)\). All but one of the responses \((n = 1, 1.5\%)\) indicated that the nurses were somewhat or very satisfied with the frequency of check-ins and all but two of the responses \((n = 2, 3.0\%)\) indicated that the nurses were somewhat or very satisfied with the phone consults. Two responses indicated that the nurses were very satisfied with telehealth consults. The proportion of responses indicating that the nurses reported consistently that they were very satisfied with four of the questionnaire items (excluding telehealth...
consults) was \( n = 65, 98.5\% \). The overall satisfaction score (excluding telehealth consults) was computed using the scale: 1 = Very unsatisfied; 2 = Somewhat unsatisfied; 3 = Neutral; 4 = Somewhat satisfied; 5 = Very satisfied. The descriptive statistics for the overall score indicated that at least 95% of the responses indicated that the two nurses were satisfied with the follow-up care consults (\( M = 4.95 \, [\, 95\% \, CI = 4.93, 4.99]\)).

**Chapter 5**

**Discussion**

The aim of this quality improvement project was achieved: to implement and evaluate the effectiveness of a multimodal framework in reducing sepsis readmissions at Glendale Memorial Hospital & Health Center. The main finding was that the overall baseline 30-day readmission rate of sepsis patients between July and December in 2015 to 2019 was 44.2%; however, in 2020, between July and December, after the implementation of the multimodal framework, the readmission rate fell to 17.2%. This readmission rate was greater than the recommended ideal rate of 30-day readmissions, which is reported to be about 10% to 15%; however, few healthcare facilities achieve this goal in practice (Berkowitz, 2016). In comparison, Jones et al. (2015) reported that between 2010 and 2012, the sepsis readmission in an academic hospital system was 27.3%. Sun et al. (2016) reported that in 2012, the proportion of sepsis survivors in three hospitals who experienced an unplanned 30-day readmission was 23.4%. Chang, Tseng, & Shapiro (2015) reported that the risk and reliability-adjusted readmission rates following sepsis across all hospitals in California from 2009 to 2011 ranged from 11.0% to 39.8%. Goodwin and Ford (2018) reviewed 30-day hospital readmission among sepsis survivors, and reported widely variable readmission rates ranging from 18% to 26%. Therefore, the overall readmission rate of 44.2% estimated between 2015 to 2019 in Glendale Memorial Hospital & Health Center was higher than that
reported in previous studies; however, the readmission rate of 17.2% estimated in 2020 was lower than that reported in previous studies.

The main conclusion of this quality improvement project is that the apparent effect of the multimodal framework was to reduce the readmission rate in July and December 2020 by 27.0% relative to July to December 2015 to 2019. This reduction was statistically significant \((p < 0.001)\). Furthermore, the reduction in readmission rate was considered to be moderately large and clinically significant, because it was 20% greater than the average 30-day all-cause readmission rate among all Medicare patients in USA which decreased by 7.0% between 2010 and 2016 (Bailey et al., 2019). The final conclusion, based on the data collected using satisfaction questionnaires, was that at least 95% of the responses of the patients and nurses indicated that they were satisfied with the follow-up procedures.

**Limitations of the Results**

The first limitation is that the readmission rate of patients reported after the implementation of the multimodal framework may be underestimated. For example, during the COVID surge at the hospital in December 2020 only five patients could be recruited due to diversion of resources to support the nursing staff and none of these patients were readmitted.

The second limitation is that the project was implemented at one clinical setting (Glendale Memorial Hospital & Health Center) for a limited time. The implications are that the results and conclusions of this project may lack external validity (i.e., they may not be generalizable to other clinical settings, at other times, and in other places (Stangor, 2015). The third limitation is that it is not possible to conclude definitively that the multimodal framework was the only factor that caused a reduction in the readmission rate. Some other confounding factors may have been entirely or partially responsible. In order to determine if the framework was the only factor causing the
reduction in readmission rate and to eliminate confounding factors, it would be necessary to conduct a randomized controlled trial, which is the gold standard for evaluating the effectiveness of change and improvement strategies in healthcare settings (Eccles, Grimshaw, Cambell, & Ramsay, 2003; Hariton & Lacascio, 2018). The readmission rate in one randomly selected sample of sepsis patients who were exposed to the framework (the treatment group) should ideally be compared with the readmission rate of another group of randomly selected patients who were not exposed to the framework (the control group). The framework is effective only if the reduction in the readmission rate of the treatment group significantly exceeds that of the control group.

The final limitation is that the self-reported responses to the patient satisfaction questionnaire may be biased. Boroughs et al. (2005) suggested that self-report questionnaires provide healthcare providers with inflated impressions of their patients’ levels of satisfaction. Patwardian and Spencer (2012) asserted that the quality of the responses to a patient satisfaction questionnaire are dependent on its structure and psychometric properties (e.g., length, validity, reliability, discriminatory power) as well as the characteristics of the target population. Berkowitz (2016) claimed that researchers and policy makers still have a lot to learn about the dynamics of patient satisfaction and its measurement. Dunsch et al. (2018) argued that high levels of self-reported patient satisfaction tend to overestimate the quality of health services and that patient satisfaction measures should ideally be complemented with more objective measures of quality.

**Modifications for Sustainability**

The framework was developed prior to the COVID-19 pandemic. Feedback received from the SNNs was to incorporate COVID-19 education during the follow-up sessions. Signs and symptoms of infection, masking, hand hygiene, and social distancing were valuable information that required education and reinforcement among participants and their families.
Recommendation for Scalability

Implementation of the Yolo Framework has demonstrated promise in reducing sepsis readmissions in the acute care setting, albeit without limitations as described above. The framework provided a novel and innovative approach to a significant disease process lacking evidence-based tools to prevent re-hospitalizations. This DNP project also underscores the importance of dedicating resources, such as SNNs, to assist patients in navigating through this multifaceted disease and complex healthcare system to generate better health outcomes. Results of this project will be shared with CommonSpirit Health National Sepsis Committee and The Readmissions Reduction Team to highlight its success and adoption as best practice.

Conclusion

Sepsis readmissions in the acute care setting continues to trend as the leading cause of re-hospitalizations. A significant gap exists in sepsis-discharge interventions to prevent readmissions. The purpose of this quality improvement project was to design and evaluate an evidence-based framework for reducing sepsis readmissions in the acute care setting with national impact. A multidisciplinary framework was developed and incorporated literature pertaining to: (a) Sepsis Nurse-Navigator driven discharge interventions, (b) Patient awareness using an expert-validated sepsis education tool, and (c) Patient-Nurse collaboration using telehealth or telephonic follow-up at critical time points. The reduction in readmission rate after program implementation was statistically and clinically significant. An estimated cost savings of $700,000 was projected for those patients not readmitted during the project phase. This impact extends to significant cost reduction for US healthcare systems. National outcomes of this Healthcare Leadership DNP project determine scalability across a 21-state health system, inform evidence-based discharge interventions, and contribute to best practices for sepsis readmission reduction nationally.
References


Eccles, M., Grimshaw, J., Campbell, M., & Ramsay, C. (2003). Research designs for studies evaluating the effectiveness of change and improvement strategies. Quality and Safety in Health Care, 12, 47–52


*Dimensions of Critical Care Nursing, 36*, 311-316. doi: 10.1097/dcc.0000000000000266


*JAMA internal medicine, 174*, 1095-1107. doi: 10.1001/jamainternmed.2104.1608


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Appendix A


Records identified through database searching (n = 2,563)

Additional records identified through other sources (n = 879)

Records after duplicates removed (n = 1,942)

Records screened (n = 906)  Records excluded (n = 639)

Full-text articles assessed for eligibility (n = 267)  Full-text articles excluded, with reasons (n = 226)

Studies included in qualitative synthesis (n = 17)

Studies included in quantitative synthesis (meta-analysis) (n = 24)
Appendix B

Cross Functional Flow Chart

**Sepsis Readmissions Cross-Functional Flowchart**

- **Sepsis Nurse Navigator (SNN)**
  - Receives Daily List of Sepsis Patients generated from EHR
  - Reviews and completes Accountability Checklist
  - Maintains ownership of checklist to ensure tasks are performed
  - Informs patient/family of Telephone or Telehealth Follow-up prior to discharge
  - Conducts Follow-up Consults via Telephone or Telehealth to patients
  - Tracks and records patient disposition for the program

- **RN Care Coordinator (RNCC)**
  - SNN Reviews and completes Accountability Checklist with RNCC daily
  - Participates in Multi-Disciplinary Rounds
  - Reinforces Discharge Instructions
  - Supplements Medication Reconciliation Teaching
  - Educates & Provides Sepsis Fact Sheet

- **Primary RN**
  - SNN or RNCC Reviews and completes Accountability Checklist with Primary Care RN daily
  - Participates in Multi-Disciplinary Rounds
  - Provides Final Discharge Instructions
  - Performs Medication Reconciliation and Teaching
  - Conducts Final Caregiver Hand-Off
  - Educates & Provides Sepsis Fact Sheet
Appendix C

Accountability Checklist

Dignity Health
Glendale Memorial Hospital

Nurse Driven Evidence-Based Discharge Interventions
Accountability Checklist

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Date Completed</th>
<th>SNN</th>
<th>RNCC</th>
<th>Primary RN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Schedule Primary Care Appointment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Discharge Instructions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Caregiver Handoff using SBAR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Medication Reconciliation/Teaching</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Multi-disciplinary Team Rounds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name:</th>
<th>Initials:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*SNN, RNCC, or Primary RN to initial inside the boxes after task completion
Appendix D

Follow-up Care Consult Questionnaire (Phone or Telehealth)

- Good morning, my name is ____________________. I am a Registered Nurse at Glendale Memorial Hospital & Health Center.
- Are you available to participate in this consultation? If yes, proceed with questions below. If unable, please schedule a time to touch base.
- Can you please verify your full name and date of birth?
- I will ask you a series of questions that requires you to answer ‘Yes’ or ‘No’. If there are relevant information to support your answer, please feel free to inform me.

**Follow-up Questions**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answer Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have you had a fever since you were discharged?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>2. Have you felt very cold or experienced shivering?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>3. Have you been sleeping more than usual?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>4. Have you experienced any period of confusion</td>
<td>Yes or No</td>
</tr>
<tr>
<td>5. Are you having trouble breathing today?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>6. Have you had any nausea, vomiting, or diarrhea?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>7. Have you experienced extreme pain or general discomfort?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>8. Do you have any other symptoms that you wish to report?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>9. Did you take all your prescribed medications?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>10. Are you scheduled or have you followed-up with your primary care doctor since discharge?</td>
<td>Yes or No</td>
</tr>
</tbody>
</table>

- Thank you for taking the time to speak with me today. I will follow-up with you on ___________ (provide next follow-up care consult).
Appendix E

Patient Satisfaction Survey

Follow-up Care Consults

**Patient Satisfaction Questionnaire**

Please rate your satisfaction after receiving a telephone call or telehealth follow-up from the hospital.

<table>
<thead>
<tr>
<th></th>
<th>Very Unsatisfied</th>
<th>Somewhat Unsatisfied</th>
<th>Neutral</th>
<th>Somewhat Satisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency of the follow-up calls/telehealth</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Length of time you were interviewed</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Nurse who you interacted with</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Issues were addressed</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Overall participation in the program</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Thank you for your participation!
Appendix F

Nurse Satisfaction Survey

Follow-up Care Consults

**Nurse Satisfaction Questionnaire**

Please rate your satisfaction with the Follow-up Care Consults.

<table>
<thead>
<tr>
<th></th>
<th>Very Unsatisfied</th>
<th>Somewhat Unsatisfied</th>
<th>Neutral</th>
<th>Somewhat Satisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall Program</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Time spent with Patients</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Frequency of Check-Ins</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Phone Consults</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Telehealth Consults</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Thank you for your participation!