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Bridging the Gap in the Continuum of Care for Spine Surgery Patients: A Quality Improvement Project

Capstone: Evidenced Based Practice Project
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Masters in Nursing: Clinical Nurse Leader
From The Sacred Heart University

By
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Abstract

The purpose of this paper is to discuss the inadequate communication between patient settings and the practice settings, review the literature regarding communication and risks of readmission for spine surgery patients, and present an intervention for this problem using the PDSA cycle. The change in practice included a literature review to identify patients who were at high-risk for complications after surgery and readmission. Patients were identified with the use of the operative schedule and chart reviews and those that were identified were communicated using secure email or face-to-face hand-off to the inpatient Clinical Outcomes Leader (COL). Prior to the initiation of project, 30-day readmission rate mean was 7.4 percent and after the first month of project implementation, the rate decreased to 2.2 percent. Many components of the first PDSA cycle were successful but need to be modified for optimal compliance and success. Some patients were not identified when they were in the office for their pre-operative visit or when they signed their surgical consent. Communication between the RN Patient Navigator (RNPN) and the COL was positive in providing effective patient hand-off. Clinical Nurse Leaders (CNL) are leaders of healthcare teams of a microsystem and assess for the need for changes in practice. The project outcomes were successful and contribute to the importance to nursing practice, the role of the CNL, and healthcare in general.

Keywords: transitional care, communication across continuum, continuity of care, spine surgery, risk factors, nursing, communication, 30-day readmissions, readmissions, navigation, handoff, hand-off, coordination of care, orthopedic spine, neurosurgery spine, clinical nurse leader, outpatient and inpatient.

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CHAPTER 1. INTRODUCTION AND PROBLEM SUMMARY

Bridging the Gap in the Continuum of Care for Spine Surgery Patients: A Quality Improvement Project

Transitions between care settings for any patient can be anxiety provoking, however, for patients with multiple chronic health conditions, transitions can create significant vulnerabilities and discrepancies if care is fragmented and not coordinated precisely. The lack of continuity of care has been linked with higher healthcare costs and possible lower quality of care whereas care that persists across the continuum has been associated with better patient outcomes (Tsai, Orav, & Jha, 2015). According to Collins (2014), “research from the University of Maryland revealed that communication inefficiencies result in \$12 billion in excess costs or lost revenue annually” (para. 1). The purpose of this paper is to discuss the inadequate communication between patient settings and the practice settings, review the literature regarding communication and risks of readmission for spine surgery patients, present an intervention for this problem using the PDSA cycle, discuss findings and evaluation of cycle, review the impact of cost and quality, and discuss the significance to nursing and Clinical Nurse Leaders.

Clinical Practice Problem

A microsystem analysis was conducted on a 17-bed spine surgery/musculoskeletal unit in a large hospital in Connecticut and in an outpatient spine surgeon clinic. The analysis identified a lack of communication between the outpatient surgeon clinic and inpatient unit which caused fragmented care and inadequate handoff regarding high-risk, complex, spine surgery patients. A lack of a formal process for interdisciplinary collaboration leads to gaps in care (Bender, Connelly, & Brown, 2015) and Manderson, McMurray, Piraino, and Stolee (2012) report, “Fragmentation is associated with incomplete transfer of information between healthcare

providers and greater challenges in managing and coordinating care delivery to ensure optimal outcomes” (p. 113).

The lack of a process of communication has been identified as an opportunity for change to improve patient outcomes, organizational performance, and intraprofessional teamwork. Currently, care across the continuum can be fragmented with an absence of follow through. Also, there is a lack of handoff between settings as the patient progresses through different settings of care and with little recognition of which patients are at high-risk for readmission or which will require additional resources. Although there has not been any documented sentinel events, root cause analysis, trend analysis, incidence reports or analysis of outcomes related to hand-off between the outpatient and inpatient setting, it would be beneficial to evaluate the outcomes of effective communication between the two settings.

Patient Population

The patient population that was targeted were patients who were undergoing elective spine surgery by a select group of surgeons who were professors or assistant professors at this teaching hospital. Patients range from no significant past medical or surgical history to multiple co-morbidities with multiple prior spine surgeries. Patient’s ages ranged from 15 to 97 years old with a wide range of race, religion, educational backgrounds, and socioeconomic statuses.

Typically about 15 to 30 patients have surgery weekly from this practice.

Practice Environment

There were two clinical environments that have been associated with the clinical problem. First, the outpatient spine surgeon clinic and secondly, the inpatient post-operative spine unit. Both units cared for the patients of a select group of surgeons who were professors and assistant professors at this teaching hospital.

Outpatient Spine Clinic

The outpatient spine clinic staff consisted of three LPNs, one staff RN, one RN Patient Navigator, two PAs, three orthopedic spine surgeons, five neurosurgeons, and a physiatrist. The LPNs and the staff RN worked closely with the surgeons, facilitated their clinics, interviewed and educated the patients, and assisted with prescriptions, referrals, and follow-up information. The nurses also forwarded consents and booking sheets to the surgeons' main offices for patients who were going to undergo surgery as the main offices booked surgeries and set-up pre-admission testing. The nurses were also responsible for returning phone calls, assisting during procedures, removing sutures/staples, and clinic preparation. The RN patient navigator (RNPN) worked as a charge nurse and acted as an active RN in the clinic due to the high patient volumes and the lack of additional nurses. The RNPN also interviewed patients for the physiatrist and surgeons, made pre- and post-procedure phone calls to patients who have had or were having in-office procedures, provided patient education and health promotion, triaged phone calls, returned phone calls to patients, prepared clinics, and was a resource to all nurses and providers. Post-discharge phone calls were also made to patients who had complications during their inpatient stay by the RNPN.

Strengths. Strengths of this practice environment are as follows:

1. Nurses had frequent and efficient communication with the surgeons and the main offices.
2. The role of the RNPN in the practice.
3. Electronic medical record (EMR) provided all pre-operative and post-operative information and discharge summaries.

Weaknesses. Weaknesses of this practice environment are as follows:

1. The role of the RNPN was not utilized optimally.
2. Staff shortage prevented optimal pre-operative education.
3. Staff shortage prevented communication to the RNPN regarding patients who are at high risk for complications or readmission after surgery.

Inpatient Post-Operative Spine Unit

The inpatient post-operative spine unit was located in one of the campuses of a large teaching hospital. There were a total of 20 RNs, one Clinical Outcomes Leader (COL), eight patient care associates (PCAs), and four unit secretaries and at least 3 nurses were on the unit per shift with at least one PCA and when the unit was at capacity, there were 4 RNs and 2 PCAs. There was a secretary on the unit from 7am to 11pm. There is also 1 housekeeping associate, 2 physical therapists, and 1 dietary associate that provided services to the unit. There were many attending physicians and PAs that also provided care to this patient population as well as radiology, respiratory, laboratory technicians, IV team, and consulting physicians or hospitalists.

The RNs on the unit cared for the patients based on orders from the providers and policies and protocols of the hospital. The COL was responsible for assisting to identify, plan, and implement quality improvement projects that improved patient outcomes, decreased infection rates, decreased readmission rates, decreased complications and improved the patient experience. The COL also acted as a resource for all nurses, patients, and providers and only communicated with the RNPN when a patient had a complication after surgery.

Strengths. Strengths of this practice environment are as follows:

1. 24-hour care to patients by RNs, PCAs, physicians, PAs, and hospitalists
2. COL utilized to identify trends in nurse sensitive metrics which allowed for planning and implementation of changes in practice for better patient outcomes.

3. Communication throughout the interdisciplinary team.
4. Electronic medical record (EMR) provided all pre-operative and post-operative information and discharge summaries.

Weaknesses. Weaknesses of this practice environment are as follows:

1. COL lacked communication with the RNPN regarding all patients with follow-up needs.
2. COL does not receive hand-off of patients at risk for complications after surgery.

Interdisciplinary Communication

Interdisciplinary communication is essential in effective patient care. There was effective and efficient communication within the interdisciplinary teams in the inpatient unit. The RNs received report from the post-anesthesia care unit (PACU) or the emergency department prior to the patient being admitted to the unit. RNs also met with PAs, the care manager, and the physical therapists separately to discuss patient's needs and progression of care. The RN then disseminated the information to other members of the care team ensuring that all worked together to meet the needs of the patient and their family. The care manager also coordinated care between the inpatient unit and the extended care facility (ECF) or home care agency.

Interdisciplinary communication in the outpatient clinic is inadequate. The surgeons and PAs communicated with the nurse they worked with and their main offices; however, the communication lacks between the providers, nurses, and the RNPN. The lack of communication was also a result of inadequate staffing due to budgetary restraints, lack of a formal process, and insufficient development of the RNPN role secondary to inadequate staffing.

Collaboration

Interprofessional collaboration is the key to decreasing fragmented care and vital in providing high quality care across the continuum. Collaboration between spine surgeons, PAs, fellows, residents, or surgeons of another specialty to assist with a case was impressive both inpatient and outpatient. The collaboration between the nurses of the inpatient and outpatient units was inadequate and could be significantly improved. Collaboration between nursing and the providers was exceptional on both units. Transdisciplinary care ultimately needs to improve considerably to decrease the gaps in care to provide high quality, patient-centered care throughout the continuum of care and to decrease readmission rates.

CHAPTER 2. LITERATURE REVIEW

Methods

Using the hospital's library, four electronic databases (CINHAL, PubMed, Ovid, and Google Scholar) were searched for articles. The search began in June 2016 and ended in August 2016. Keywords that used to search in combination were: transitional care, communication across continuum, continuity of care, spine surgery, risk factors, nursing, communication, 30-day readmissions, readmissions, navigation, handoff, hand-off, coordination of care, orthopedic spine, neurosurgery spine, clinical nurse leader, outpatient, and inpatient. Articles included were systematic reviews, a variety of study designs, expert opinions, and literature reviews.

Results

Prevalence and Causes of Readmission

“An unplanned readmission to the hospital within 30 days of discharge is seen as a failure by the health care team to appropriately plan for a safe and effective transition to the next level

of care”(Puls, Guerrero, & Andrew, 2014). A meta-analysis by Bernatz and Anderson (2015), revealed that the 30-day readmission rate after spine surgery typically ranges between 4.2% and 7.4% while other medical specialties typically have a 7%-19% readmission rate. It was noted that Medicare only patient populations had a significantly higher rate of readmissions after 30-days than any other insurance group and age, length of stay, discharge to skilled nursing facility (SNF), higher BMI, ASA score greater than 3, and Medicare/Medicaid insurance were associated with increased 30-day readmissions in greater than 75 percent of studies. Infection was the most common cause of readmission ranging from 28.8% (Bernatz & Anderson, 2015) to 32% (McCormack et al., 2012) of 30-day readmissions. Non-surgical or medical complications accounted for 22% (McCormack et al., 2012) to 26.6% (Bernatz & Anderson, 2015) of 30-day readmissions. McCormack et al. (2012) also identified hardware complications, prolonged wound drainage, uncontrolled pain to be reasons for readmission in which 57% of the readmissions were required to return to surgery.

A study by Tsai, Orav, and Jha (2015) determined that one in every four older patients in the U.S. are readmitted to different institution of their previous admission which was associated with 48% higher incidence of mortality. Readmission to a different facility can create significant fragmentation of care which is associated with poorer outcomes (Tsai, Orav, and Jha, 2015). Although some of the patients did have another hospital closer to them, further research needs to be done to understand the rational for those who were equidistant to another hospital.

Readmission Prevention Strategies

Interventions. Interventions such as post-discharge phone calls, pre-admission visits to plan for early discharge with post-discharge follow-up, video-follow up visits, and nurse home

visits after discharge did not have significant results to determine if interventions were effective (Hansen, Young, Hinami, Leung & Williams, 2011; Puls, Suerrerro, & Andrew, 2014).

Transition of care communication. Care needs to be coordinated across the continuum especially as the healthcare model moves “slowly, from fee-for-service when quantity of care reigns, to a ‘bundled’ payment model where quality outcomes are all important” (Haas, Vlasses, & Havey, 2016, p. 126). The disengagement of the ambulatory settings and acute care area needs to be corrected by developing avenues and evidence-based standards of communication tools using the situation, background, assessment, and recommendation (SBAR) format to standardize communication throughout the care teams (Haas, Vlasses, & Havey, 2016). A systematic approach will be needed to improve communication which includes promoting a culture of open communication to ensure safe, effective care. “A needs assessment-a systematic tool for determining goals, identifying discrepancies between optimal and actual performance, and establishing priorities for action- can assist organizations to improve communication (Nadzam, 2009, p. 185).

“The surgical patient is more vulnerable to transition-in-care error or communication lapses because of the number of times the patient travels across sites of care through the preadmission, intraoperative, and postoperative phases” (Malley, Kenner, Kim, Blakeney, 2015, p. 2). Patients often report issues with conflicting recommendations regarding their self-management, lack of follow-up care, confusion about medication regimen, and poor preparation for healthcare visits (Coleman et al., 2004). Providing tools and support to participate more actively in care decreases rates of hospital admission (Coleman et al., 2004). Also, the use of nursing preoperative assessment was valuable in identifying and defining patient’s risk factors for surgery and for the perioperative care trajectory. The preoperative assessment tool was used

to assess patients' vulnerability and risk factors to allow the nurse to understand 'red flags' and be ready for intervention should it be needed. It also allows for a more comprehensive report to be passed to the next unit (Malley, Kenner, Kim, Blakeney, 2015).

Best practice guidelines. According to the Center for Healthcare Research and Transformation (CHRT) (2014), guidelines for best practice in care transition focus on transition of patients from the hospital to the home. Guidelines include: the need for comprehensive discharge planning which allows the staff to organize follow-up services, address barriers to receiving care, and coordinate for community resources as needed. Post-discharge phone calls should be made to review medications, reinforce education to the patient or caregiver, and to review any other questions or assess any symptoms the patients may be having. Timely communication to outpatient providers is essential with detailed discharge summaries that include diagnosis, results of tests and procedures, pending results, medication list with changes and the rationale, and contact information for the discharging physician and recommendations for follow-up care. Medication reconciliation at each point of transition must be completed with appropriate medication and dosing to prevent errors. Education provided to patients and their family/caregiver should use the "teach-back" method to evaluate learning. Open communication between all providers in the multidisciplinary team is essential with clearly defined tasks of each member is another best practice. Lastly, follow up visits should be scheduled at the hospital within seven days of discharge or per the providers' recommendation (CHRT, 2014).

The Transitions of Care Consensus conference (TOCCC) also found the need to inspire guidelines and performance measures as many patients express anxiety due to confusion, conflicting advice from different practitioners, the sense of abandonment, and disregard for their care to the lack of input of their preferences during transitions of care. TOCCC proposed

coordinating clinicians to assist patient's throughout their care continuum and would utilized the coordinating clinician as a point person (Snow et al., 2009).

Optimization of the CNL role. Inadequate communication within a healthcare organization, clinic, or hospital can impact patient and staff experience, the organizations' performance, and clinical outcome measures (Collins, 2014). The Clinical Nurse Leader (CNL) can assist in reducing readmission rates by linking the interdisciplinary team and eliminating gaps while formalizing a process to decrease the fragmentation of care. Overloaded providers, nurses, and other members of the interdisciplinary team may not be able to participate in collaborating with other members of the team and thus creating fragmentation of care which are associated with preventable adverse outcomes (Bender, Connelly, & Brown, 2015). With the CNL as a leader in the interdisciplinary team, they are able to coordinate and promote team communication and ensure that communication is timely and effective. According to Stavrianopoulos (2012), "Reduced fragmentation of care and gaps in the communication result in cost-effective efficiency, improved clinical outcomes, and increased patient satisfaction" (p. 395) effectiveness of a CNL can be measured by improved patient satisfaction, clinical and financial outcomes (Stavrianopoulos, 2012).

A systematic review by Manderson, McMurray, Piraino, and Stolee (2012) identified that because the CNL role is relatively new, there is not an abundance of literature to truly determine the effectiveness; however, of the nine programs that utilize navigators for "chronically ill older adults while transitioning between setting or provider, five reported positive economic outcomes, two reported higher satisfaction with care for providers and patients and five reported increased patient quality of life or functionality" (Manderson et al., 2012, p. 123).

There is a need for more studies on the effectiveness of CNLs, interventions for communication with patients over the continuum of care, and how communication with the interdisciplinary team and patients potentially increase patient satisfaction, increase clinical outcomes, and decrease readmission rates. Also, due to the developing definition of navigation, care across the continuum, and continuity of care, database searches were difficult to find pertinent information.

CHAPTER 3. PROJECT PLAN

Project Aim, Objectives, and Desired Outcomes

The aim of this project is to improve communication across the continuum of care in spine surgery. The process begins with the initial meeting between the patient and the surgeon in the outpatient setting and continues throughout the pre-operative planning, surgery, and post-operative care on the inpatient unit. The process ends with a follow-up visit six months after surgery in the outpatient setting. By working on the process, we expect to identify high-risk patients, communicate across the continuum regarding high-risk patients, increase follow-up phone calls to increase high-quality care while decreasing readmissions to the hospital. It is important to work on this now because it will determine a process that can eventually be utilized throughout the organization to increase communication between the outpatient offices and the inpatient units, decrease readmission rates, increase quality of care, and increase patient satisfaction.

The development of a plan and workflow for communication and hand-off between the two units will allow for more frequent and precise report, decrease fragmentation of care, increase awareness of high-risk patients, and improve readmission rates. Also, criteria to identify high risk patients was developed to determine which patients are at greater risk of

complications after surgery which can lead to extended patient stays or readmission to the hospital after discharge. Ultimately, the objective of the change in the process will improve lateral integration of care from the outpatient settings to the inpatient settings then back to the outpatient setting to decrease readmissions for patients who undergo elective spine surgery.

The fishbone diagram below (See figure 1-1) identified four major categories that can lead to potential readmissions after spine surgery. The categories identified were: process, people, patients, and materials. Overall, two main themes that were recognized were poor communication, and lack of education to patients. Also, the lack of consistency for practices, orders, treatments, and education vary from provider to provider which created inadequacies and difficulties to provide appropriate education to patients and their families. These flaws could lead to gaps in care or education which may put patients at risk for readmission. If communication is increased between the units and to the patient throughout transitions of care, both themes that were identified would decrease which would lead to decrease in readmissions.

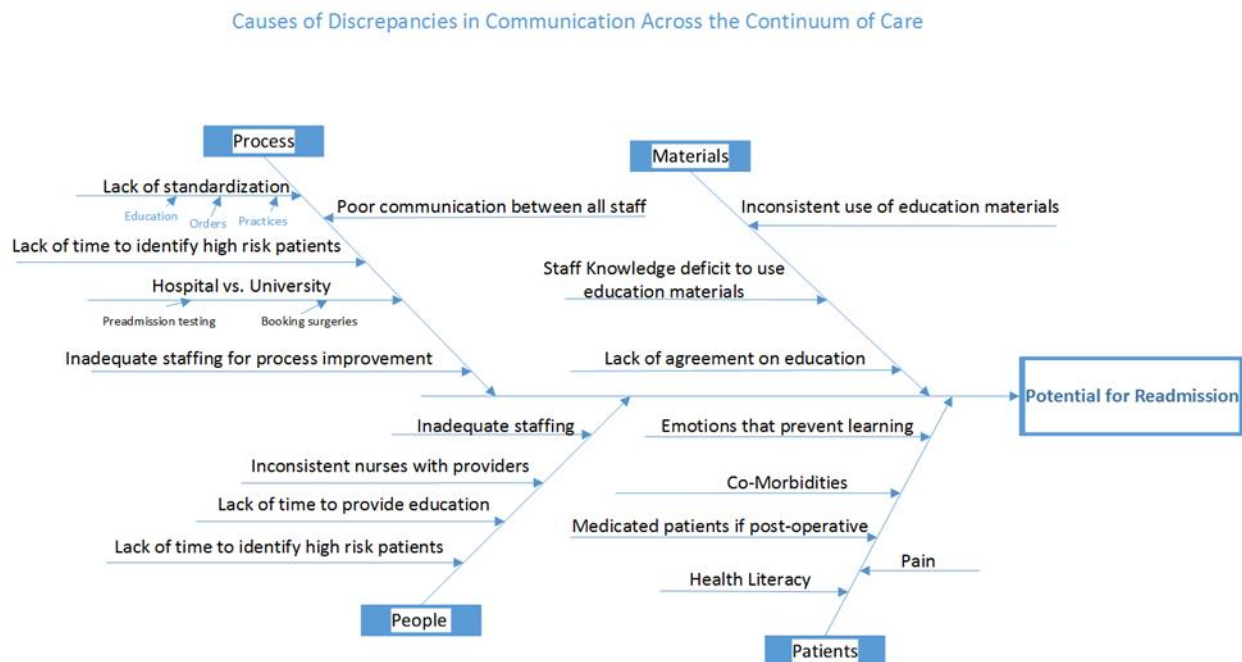


Figure 1-1. Fishbone Diagram Fishbone Diagram Causes of Discrepancies in Communication across the Continuum of Care

Plan, Do, Study, ACT (PDSA Cycle)

PDSA cycle diagrams are used frequently to “conduct tests of change in a disciplined and rapid fashion” (Nelson, Batalden, & Godfrey, 2007, p. 275). The quality improvement cycle consists of four steps: plan, do, study, and act. “The PSDA cycle promotes prediction of the outcome of test of change and subsequent measurement over time (quantitative or qualitative) to assess the impact of an intervention on the process or outcomes of interest” (Taylor et al., 2014, p. 291). The use of the PDSA cycle permits for testing new changes on a smaller scale, evaluating outcomes, and the ability to adjust the process as many times as needed until the new process is smooth which then can be rolled out on a larger scale.

The PDSA cycle illustration below (figure 2-2) depicts the first cycle of this quality improvement project. The plan started with the development of patient risk factors and the identification of current trends of current readmissions and ends with evaluation of pre- and post-change data which was necessary to evaluate effectiveness of change.

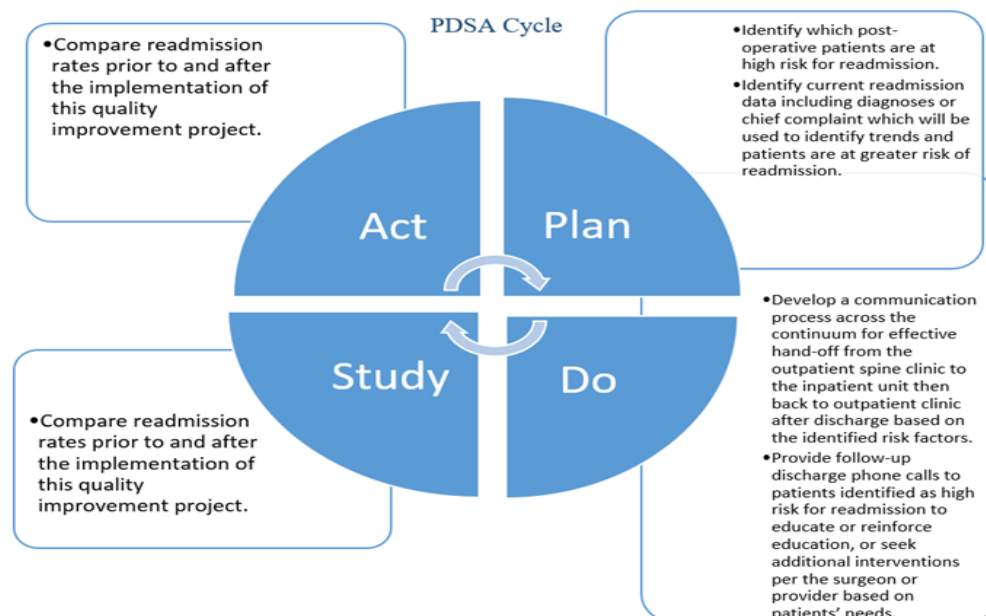


Figure 2-2. PDSA Cycle for Bridging the Gap in the Continuum of Care for Spine Surgery Patients.

Plan

The aim of this improvement process is to design and implement a communication method that will unify the care continuum for spine surgical patients from the outpatient setting to the inpatient setting and then back to the outpatient setting. The objective was to decrease readmission rates by the identification of high risk patients prior to surgery.

The first step for this plan was the development of high-risk patient criteria. Patients who are at high risk for readmission or complications after surgery were those with comorbidities, older, previous spine surgery, multiple levels of spinal fusions, revisions of spinal fusions, complex spinal fusions (McCormack et al., 2012), and trauma patients admitted through the emergency room who underwent emergency surgery. Other risk factors that were discussed in meetings between the outpatient and inpatient units were patients with dementia, sleep apnea, higher BMI, polypharmacy, Parkinson's, and voiding abnormalities prior to surgery.

The second step was to review current trends for readmission or complications in the past two years of patients who underwent elective spine surgery in this institution. Identified complications were related to wound infections or dehiscence, inadequate pain control, pulmonary embolisms (PE), deep vein thrombosis (DVT), hardware failure, and non-surgical related complications secondary to comorbidities.

Another process that needed to be planned was the identification of patients who were going to surgery. The RNPN would review the surgery schedule for the upcoming week and briefly reviewed the patient's chart specifically for medical and surgical history, medications, and BMI. Also, the completion of pre-admission testing and surgical clearance is confirmed. Nurses from the outpatient clinic were also asked to notify RNPN when a surgeon consented a patient who had risk factors for complication or readmission.

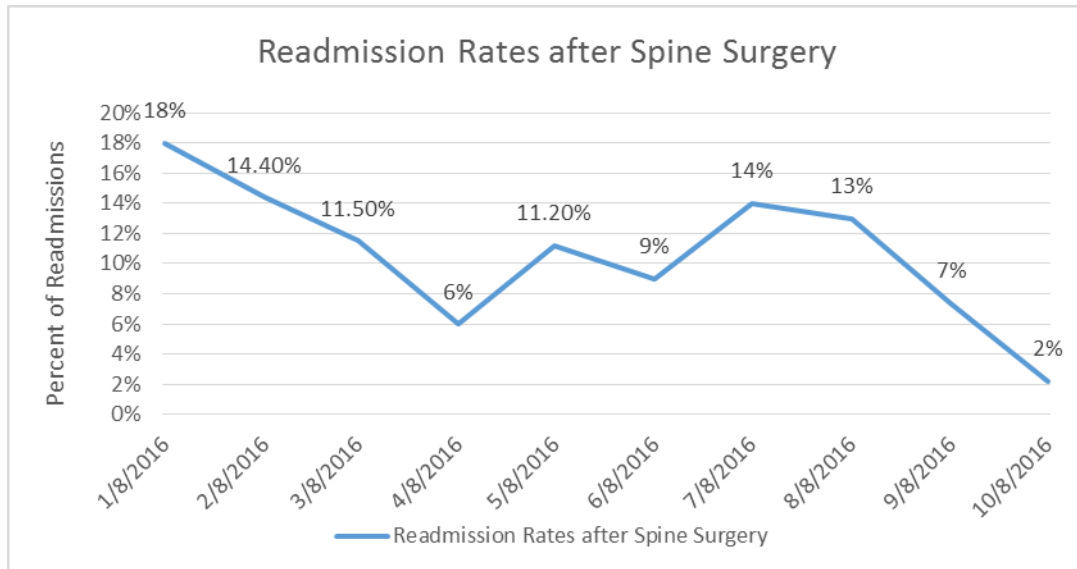


Figure 3-3. Run Chart of Readmission Rates after Spine Surgery

The run chart above illustrates projected readmission rates after spine surgery with the implementation of this change in process which would increase the communication across the continuum to prevent readmissions and complications after spine surgery.

Do

The first process that was necessary to implement change was to develop a communication workflow to provide effective hand-off from the outpatient clinic to the inpatient unit and then back to the outpatient clinic. The first avenue of communication that was utilized was the use of secure email between the RNPN and the COL where communication would be exchanged using patient's MRN number and initials. The second communication route is face-to-face hand-off on Monday mornings to discuss patients who will be admitted after spine surgery for that week and patients who have been discharged over the weekend. Then a follow-up email is to be sent out each Friday afternoon to report any complications or potential complications of patients who have been discharged that week.

Another implementation of change was for the COL to provide discharge phone calls to patients who had complications after surgery and those who were identified as risks for

readmissions 24 to 48 hours after discharge to assess their needs. Then communication was provided to the RNPN regarding needs for the RNPN to coordinate. The RNPN then provided follow-up discharge phone calls seven to ten days after discharge from hospital to patients identified as high risk for readmission to educate or reinforce education, or seek additional interventions per the surgeon or provider based on patients’ needs.

To implement this plan human and financial resources were evaluated pertaining to the implementation of this change in process. Both units are equipped with nurse leaders, RNPN & COL, which are responsible for the communication and coordination of this process change. One obstacle that remains problematic is the inadequate nurse staff in the outpatient clinic which limits the RNPN’s time to investigate upcoming surgical patients that are at risk for complications or admissions. The outpatient unit is working to obtain another nurse to assist the clinic to allow the position of the RNPN to be optimized for this change in process. The RNPN position needs to be developed and enhanced to assist with communication and coordination across the continuum to benefit all high risk spine surgery patients.

A Gantt chart was created and used as an action plan to coordinate the change in process to improve the continuum of care for spine surgery patients. See figure 4-4 for detailed plan and time frames that was utilized to coordinate and strategize for the PDSA cycle.

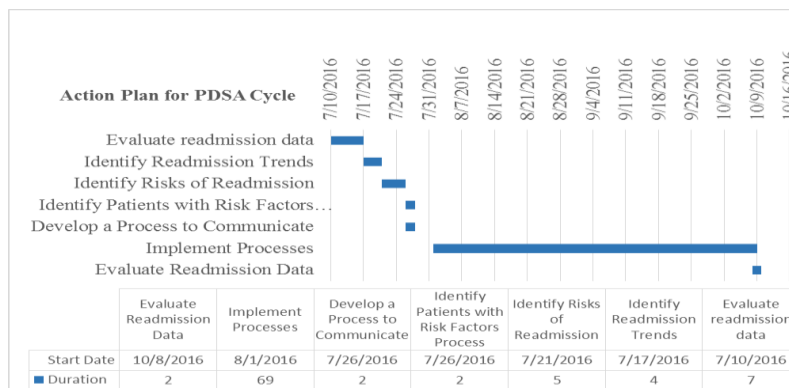


Figure 4-4. Gantt chart for Action Plan for the Implementation of Communication across the Continuum of Care for Spine Surgery Patients

Study

The implementation process will be evaluated by analyzing previous readmission rates data with readmission rates after the full implementation of the communication across the continuum for spine surgery patients. A chart review will be performed by COL and RNPN should a patient be readmitted to determine if the readmission was preventable.

Act

If the rate of readmission decreases, the process was successful; however, should there be little change, then further investigation is warranted. Chart reviews that will be performed by the RNPN and the COL to determine if the readmission was preventable will enable the identification of other potential risk factors for readmission. Based on findings, other change in processes may need to be made or possibly more in depth pre-operative work-ups may be implemented for specific patient populations.

CHAPTER 4. FINDINGS AND EVALUATION**Findings**

Thirty day readmission rates were evaluated monthly from January to August. Prior to the implementation of this evidence-based practice project, 30-day readmission rates averaged about 7.4 percent. The first month after implementation the 30-day readmission rate decreased to 2.2 percent. The most recent 30-day readmission rate was unavailable. The objective of this project was to decrease readmissions for patients who undergone elective spine surgery by increasing communication across the continuum of care. Although there was a decrease in readmission rates, continued monitoring of this project is needed as well as alterations of the process to continue to decrease 30-day readmission rates.

Limitations

There were a number of considerations that may have impacted the 30-day readmission data that was obtained. First, the facility in which this project was implemented was and continues to be undergoing a change in process for graduate students to obtain data. Data was obtained by a quality improvement representative and the Clinical Outcomes Leader (COL) from the outpatient unit. Unfortunately, this information was also a collective percentage from both the community spine surgeons and the surgeons who practice at the outpatient spine clinic. The community surgeons were not included in this project and thus accuracy of the effectiveness is questionable. Also, many of the surgeons alternated vacations in the month May through August.

The readmission rates also included a variety of patients who did progress through the normal patient process. Some patients may have been admitted through the emergency room, endured emergency spine surgery, and were discharged. Although these patients may have received follow-up phone calls after discharge, they did not receive a risk-factor evaluation, pre-operative education, or any form of preparation prior to their surgery. Also, many of the surgeons treat patients in additional locations. While the RN Patient Navigator (RNPN) may have identified them for risk factors for complication or readmission after surgery, they may not have received adequate pre-operative education.

Another aspect to consider is the percentage of patients who may have been admitted at another institution. Many patients travel from across the state, country, and world to have spine surgery with surgeons of this practice and may seek medical attention at hospitals that are closer to their home. Information was not obtained regarding patients who were readmitted at other

facilities. Furthermore, patients who may have been readmitted on different services may not have been taken into account.

Evaluation

A PDSA cycle was utilized as an organizational tool to plan and execute this evidence based project and allowed the process to be evaluated for effectiveness. There were many aspects of the original plan that were effective; however, there were some parts of the process that were ineffective and/or impractical.

The planning stage of this project included a literature review to utilize evidence to define which patients were at risk for readmission and/or complication after spine surgery. The literature review that was conducted was successful in developing accurate and adequate criteria. This stage also included a retrospective chart review of all spine surgery patients who were readmitted within 30-days of discharge over the past two years to identify organizational trends for readmission for this patient population. Both of these steps allowed for a precise definition of which patients were at risk of complications or readmission after spine surgery.

The plan also required a formal process to identify patients who were at risk of readmission. The RNPN reviewed the operative schedule a week in advance to identify at risk patients based on the high-risk criteria that was developed. Although the operative schedule was easily accessible in the electronic charting system, it was difficult to navigate as the system module used to schedule pre-operative patients lacked features, functionality, and overall user-friendliness. For example, when a patient was found on the schedule, there were many additional steps to perform a chart review instead of being able to access the chart from that screen. Also, the schedule was organized by general specialties and start times instead of surgeon daily schedules which created a more tedious process than anticipated. Furthermore,

some patients were missed in the identification process due to the alteration in surgeon schedules, cancellation and addition of patients, and patients who were admitted through the emergency room that went directly to surgery. Ultimately, the use of the operative schedule to conduct chart reviews to identify patients who were at high risk of readmission was time consuming, laborious, and did not guarantee all pre-operative spine surgery patients would be reviewed for defined risk factors.

Moreover, due to the fast pace of the clinic or forgetfulness, nurses neglected to notify the RNPN when a surgeon consented a patient for surgery. This has been recognized as another missed opportunity for the identification of high-risk patients. Although multiple emails, discussions, and signage attempted to correct the negligence, many patients continued to go unidentified at the time of their pre-operative visits. The surgeons, at times, did notify the RNPN of patients who were going to surgery that needed additional teaching, testing, clearances, family support, or emotional support. When the RNPN was notified of pre-operative patients who were in the office, the RNPN provided ample education to the patient and their families, ensured that the patient had appropriate literature to take home and review, formed a relationship with the patient and family, assessed potential discharge needs and special needs for their admission, and established a contact person if the patient or family had any additional questions or needs. Modifications are needed to ensure that the RNPN is made aware of each patient who is in the office for their pre-operative visit or if being consented for surgery.

The next step, “do”, consisted of the development of communication avenues between the inpatient and outpatient units. The use of secure email between the RNPN and the COL during the week was an effective way to communicate to patients who were at high-risk for complications or readmission after spine surgery that were being admitted that week. A calendar

was kept by the RNPN with patient information and a surgery date. An email would then be sent the day of or the day prior to the patient's surgery that consisted of basic patient information, pertinent history, planned procedure, surgeon, special needs, and any other necessary information. Phone calls were also periodically made directly between the RNPN and the COL as there were a few patients who were readmitted from the outpatient unit after a post-operative visit with the surgeon.

Face-to-face hand-off was beneficial and allowed the RNPN and the COL to discuss in depth patients who were being admitted and discharged, discuss any changes in surgeon preferences or practices, and allowed for discussions about patients that may not have warranted an email. It also served as a meeting to give feedback about unit practices. For example, a few patients were discharged home or to a rehab facility with insufficient orders and/or instructions on the W-10 which triggered a phone call to the outpatient unit for clarification. The COL would be made aware via email to investigate the problem and then during the face-to-face meetings the issues would be discussed more in depth. Originally, these meetings were planned for Monday mornings but schedules were changed based on the needs of the units.

Face-to-face hand-off also provided time to round on patients who were currently on the unit. Although some of the patients were not high-risk for readmission, rounding was provided to all patients that were patients of the specific outpatient unit. At the inpatient rounding visits, pain control, discharge plans, and treatments were discussed. Emotional support was also provided and any additional questions that they had were answered. Although qualitative data was not received or sought after, positive feedback was given to RNPN, nurses at the outpatient unit, surgeons, and was mentioned once on a HCAPS survey. Two patients felt that the outpatient RNPN rounding on the inpatient unit showed concern, compassion, and teamwork

which led the patients to feel comfortable enough to call or electronically message the RNPN with additional questions and needs.

The “do” stage also involved post-operative phone calls to the patients from both the inpatient and outpatient unit. The inpatient unit’s COL or RN contacted all patients 24 to 48 hours after discharge. The RNPN then called patients who were at high-risk of readmission seven to ten days after discharge to assist with any questions or needs. Education regarding incision care, pain medication regimen, activity restrictions, mobility devices, and braces (as ordered) were reinforced and a series of questions were asked about pain control, bowel movements, bladder function, food and fluid intake, mobility, and overall health and wellbeing. The post-operative appointment was also confirmed and any additional inquiries were resolved. Again, no formal qualitative data was obtained, but many patients reported that they appreciated a follow-up phone call.

The next step in this process will be to educate the nurses and surgeons on the benefits of notifying the RNPN when a patient is in clinic for their pre-operative appointment or when a surgical consent is signed. This will allow the RNPN to provide education and a risk assessment for readmission and/or complications after elective spine surgery. Nurses will also be reeducated on physician’s preferences, pre-operative discussions key points, and an outline of talking points will be made. The PDSA cycle illustration in Appendix B depicts the second cycle of this quality improvement project.

CHAPTER 5. CONCLUSION AND IMPLICATIONS

Project Impact on Quality Care and Cost

Decreasing hospital readmissions will reduce healthcare expenditures and improve patient care. According to Lawson et al. (2013), “The average costs of a 30-day postoperative

readmission for patients with and without a complication were \$13,532 and \$8469, respectively” (p. 14). Rizzo (2013) also reported that the average cost for any readmission to a hospital costs about \$11,200. Furthermore, Purzner, Purzner, Massicotte, and Bernstein (2011) estimate that a one night stay on a surgical unit costs about \$1,200. Readmissions also impact all aspects of inpatient units including staffing, bed availability, resources (both in the hospital and in the community), operating rooms, dietary, pharmacy, physicians, and all other aspects of the healthcare delivery team. If readmissions are decreased, all costs of care will be reduced for the facility, insurer, and patient.

Decreasing readmission rates by increasing communication across the continuum of care will improve patient care and the patient experience. By identifying patients that are at high-risk for readmission or complications after spine surgery prior to their admission allows for additional precautions to be taken prior to surgery, during your hospital stay, and throughout their post-operative course. Although care teams should always provide the best care possible, the ability to anticipate patient needs prior to their arrival and prior to their discharge is optimal and will result in best practice. Many patients also verbalized their appreciation for the communication that they received throughout their surgical course and felt that they were actually being cared for. This project promotes patient-centered care, communication, and patient education. Also, patients who feel that they had a great experience are likely to recommend friends or family who have spine needs to the same surgeon or facility which will increase patient population and overall revenue for these services.

Readmissions and complications could also impact patients' lives profoundly. Once a patient is discharged, they assume that they will not develop any complications and may not seek medical care. This project provides a designated contact person for the patient to contact with

any abnormalities, questions, or concerns. Communicating with a patient after surgery with a potential complication is beneficial as the symptoms can be triaged and further recommendations can be made instead of taking an unnecessary trip to the emergency room. Further studies need to be done to assess the relationship between post-operative phone calls or triage phone calls and its effect on emergency rooms.

Significance

This evidence-based project suggests that persistent communication across the continuum of care for high-risk patients decreases hospital readmissions 30-days after discharge. Although the data presented lacks strong validation, the concept of communication across the continuum and lateral integration of care will decrease hospital readmissions and potentially decreases complications after surgery which will ultimately improve patient care. Additional studies need to be conducted to evaluate the correlation between communication across the continuum and post-operative complications.

Of the many responsibilities of a CNL, improving clinical outcomes and lowering cost are top priority. According to Harris and Roussel (2010), studies validate the effectiveness of CNLs by analyzing reported outcomes (such as hospital readmission rates, patient satisfaction, physician satisfaction, nurse retention, falls, pressure ulcers, event reporting, CLABSI, CAUTI, core measures, etc.) and cost savings. CNLs will lead the future of quality improvement in healthcare at all levels (Harris & Rossel, 2010). “Particularly in this era of healthcare reform, cost containment and changing reimbursement policies, the integration of the CNL into care delivery across settings offers a positive means of addressing these system-wide priorities” (Harris & Rossel, 2010, p. 17).

The results of this project are significant to CNLs as they have the knowledge and ability to implement changes in practice that benefit patient care and outcomes, interdisciplinary teams, and the overall organization. CNLs also lead care teams in communication, patient advocacy, coordination, lateral integration of care, and serve as a generalist in the care team. It is imperative that their use, function, and abilities are effectively utilized.

CNLs are essential in decreasing the fragmentation of care in all patient populations. First, CNLs provide thorough, patient-centered education and care that is specific to each individual patient, answers their questions, and ensures that their knowledge base is sufficient to manage themselves effectively. Additionally, they coordinate care to ensure that follow-up visits are scheduled, appropriate testing, consultations, and therapies have been implemented and completed. Also, CNLs provide health promotion discussions, provide education regarding alternative therapies, and act as a liaison between the patient/family, treating physicians, and care team. Furthermore, CNLs evaluate processes in microsystems, identify needs for change based on patient outcomes or satisfaction, use evidence-based practice to make changes, and evaluate the changes that were made. CNLs use their leadership skills to guide their team to implement meaningful changes to healthcare to ensure better care and outcomes for patients.

There are many skills that are unique to CNLs. First, they must have the confidence, knowledge, stamina, and background to lead the interdisciplinary team. This requires impeccable communication and organizational skills to coordinate and navigate patients, families, and caregivers through the complex, multifaceted healthcare system. They must be personable to develop relationships with a variety of departments to ensure that patients receive the most optimal care with an absence of fragmented care. CNLs also serve as patient and family advocates. They also serve as a resource and advocate for all members of the care team.

CNLs promote institutional culture and provide leadership based on the values and mission of the organization. It is also essential that CNLs are life-long learners and are continuously up to date on best practices, new evidence-based practices, policies, and guidelines. Lastly, CNLs must be innovative, constantly thinking outside the box, and willing to contribute with organizational change.

Evidence-based projects are vital to nursing practice. Nurses are at the forefront of the healthcare reform and will be utilized in all positions possible. They take on roles from caregivers to vice presidents of institutions and from quality and safety leaders to policy writers. Nurses on all levels should be empowered to provide the best care to patients and propose change if it is needed. Using evidence to change current processes and implement new practices to improve patient care is remarkable and will benefit nursing practice and healthcare in general. Nurses must strive to innovate and help shape the future of healthcare.

Conclusion

Transition of care between healthcare settings can be overwhelming for patients and their families, especially upon discharge home. It is essential that healthcare providers across the multitude of settings communicate with each other and to patients to decrease fragmentation and prevent shortcomings in care. Identifying patients who are at high-risk for complications and readmissions after spine surgery during their pre-operative course and communicating their needs with the inpatient unit has been shown to decrease readmission rates. Additional research is necessary to validate this research and to understand the substantial connection between communication and positive outcomes. This includes the benefits to patients, their care, and cost reduction in healthcare organizations. As CNLs and other nursing specialties continue to develop, effective communication between all members of the healthcare team and the patient

will continue to be vital in decreasing gaps in care. Effective communication across the continuum of care leads to a decrease in readmissions and provides a patient-centered approach to the ever-changing healthcare industry.

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Appendix A.

Evidence Appraisal

Matrix

Source (APA format)	Type of Study design (RCT, phenomenology, etc.)/Purpose	Level of Evidence (According to Melyk & Fineout-Overholt)	Sample, setting Inclusion/Exclusion Criteria	Methods, instruments, data analysis	Findings/ Implications
Bender, M, Connelly, C., & Brown, C. (2015). Interdisciplinary collaboration: The role of the clinical nurse leader. <i>Journal of Nursing Management, 21</i> (1). DOI: http://dx.doi.org/10.1111/j.1365-2834.2012.01385.x	Descriptive non-experimental design Purpose: to explore the feasibility and acceptability of a clinical nurse leader role to improve interdisciplinary collaboration within the fragmented acute-care microsystem	Level VI	n/a	n/a	Findings indicate the CNL role is feasible and acceptable and may be an effective intervention to facilitate the interdisciplinary team. Implication: more research is needed to support the CNL role
Bernatz, J., & Anderson, P. (2015). Thirty-day readmission rates in spine surgery: Systematic review and meta-analysis. <i>Neurosurgical Focus, 39</i> (4). http://thejns.org/doi/abs/10.3171/2015.7.FOCUS1534	Systematic review, meta-analysis Purpose: To understand the rate of 30-day readmissions in spine surgery and examine risk factors and cause of 30-day readmissions	Level I	Sample: 24 studies, total number of patients included was 487,780, with studies ranging from 412 to 343,068 patients Inclusion: studies that quantified 30-day readmission rates following any orthopedic procedure or admission; twenty-five did not report an all-cause 30-day readmission rate. Exclusion: the study tested a specific medical device, surgical technique, or post-operative care protocol, the patients were already subgrouped, the majority were outpatient procedures, there were fewer than 100 patients, the study did not report on orthopedic procedures/admissions, or if	Data extraction: single author: sample, readmissions within 30 days, subspecialty, cause of readmission, risk factors for readmission, data source, date of enrollment, inpatient versus outpatient procedures, and tracking of admissions to outside hospitals.	Populations that only included Medicare patients had a higher 30-day readmission rate than populations of all insurance. Age, length of stay, discharge to SNF, higher BMI, ASA score greater than 3, and Medicare/Medicaid insurance showed positive correlation with increased 30-day readmissions in greater than 75

			the data collection began before the year 2000.	Instruments: Comprehensive Meta-Analysis, version 2.2050 used for data pooling Data Analysis: Sensitivity analysis was performed by sequential removal of all studies from the analysis	percent of studies. Surgical-site complications accounted for 46% percent of 30-day readmissions.
Center for Healthcare Research & Transformation. (2014). Care transactions: Best practices and evidence- based programs. Retrieved from file:///C:/Users/Coleen/Downloads/CHRT-Care-Transitions-Best-Practices-and-Evidence-based-Programs.pdf	Expert Source Best Practice Guidelines This paper summarizes best practices in care transitions and describes successful programs that reduced readmissions and overall costs.	Level VII	n/a	n/a	Best practices: Comprehensive discharge planning, complete and timely communication of information, medication reconciliation, patient/caregiver education using “teach-back” method, open communication between providers, prompt follow-up visits after discharge with outpatient provider.
Coleman, E., Smith, J., Frank, J., Min, S., Parry, C., & Kramer, A. (2004). Preparing patients and caregivers to participate in care delivered across settings: The care transition intervention. <i>Journal of American Geriatrics Society</i> , 52, 1817-1825. DOI: 10.1111/j.1532-5415.2004.52504.x	Quasi-experimental design Objective: To test whether an intervention designed to encourage older patients and their caregivers to assert a more active role during care transitions can reduce rehospitalization rates.	Level III	Intervention: n=158 Control: n=1,235 Setting: Colorado delivery system with contracts to one hospital, eight SNFs, and one home care agency Inclusion Criteria: 65 years old and over hospitalized between July 1, 2001 to September 1, 2002 that resided in the community and were enrolled in health system as of July 1, 2001 with: CHF, COPD, CAD, DM, stroke, medical and surgical back conditions, hip fracture, peripheral vascular disease, and cardiac arrhythmias. Exclusion criteria: elective admission	Methods: Data abstracted from system’s administrative data files including demographics, diagnoses, pharmacy data, comorbidity index, chronic disease scores, Instruments: The Care Transition Measure administered via telephone 24-28 days after hospital discharge	The adjusted odds ratio comparing rehospitalization of intervention subjects with that of controls was 0.52 (95% confidence interval (CI)=0.28–0.96) at 30 days, 0.43 (95% CI=0.25–0.72) at 90 days, and 0.57 (95% CI=0.36–0.92) at 180 days. Interventional patients reported high

					levels of confidence in obtaining essential information for condition management, understanding medication regimen, and communicating with the healthcare team.
Collins, R. (2014). Introduction: Seamless communication across the continuum of care. <i>Health Management Technology, 35</i> (9), 23.	Expert Opinion Purpose is to describe the importance of communication	Level VII	n/a	n/a	Successful organizations create seamless, consistent experience for patients from pre-admission to after discharge. Hospitals that reduce readmission rates while improving patient experiences will gain maximum reimbursements
Haas, S., Vlasses, F., & Havey, J. (2016). Developing staffing models to support population health management and quality outcomes in ambulatory settings. <i>Nursing Economics, 34</i> (3), 126-133.	Expert Opinion	Level VII	n/a	n/a	Discussed need for nurses to work to the top of their scope of practice, need to develop EBP standards for communication tools, and develop strategies for providing quality care.
Hansen, L., Young, R., Hinami, K., Leung, A., & Williams, M. (2011). Interventions to reduce 30-day rehospitalization: A systematic review. <i>Annals of Internal Medicine</i>	Systematic Review Purpose: To describe interventions evaluated in studies aimed at reducing rehospitalization within 30	Level I	Sample: 43 articles Inclusion: English-language randomized, controlled trials; cohort studies; or noncontrolled before–after studies of interventions to reduce rehospitalization with rehospitalization rates reported within 30 days. Exclusion: Studies of pediatric, obstetric,	Data extraction: MEDLINE, EMBASE, Web of Science, and the Cochrane Library were searched for reports published	No single intervention implemented alone was regularly associated with reduced risk for 30-day rehospitalization.

<i>Medicine</i> , 155(8), 520-528.	days of discharge.		and psychiatric populations	between January 1975 and January 2011. 2 reviewers independently identified articles based on titles and abstracts. 2 physician reviewers teams then reviewed full text articles to identify interventions and quality of study.	Limitations: Inadequate description of individual studies' interventions precluded meta-analysis of effects
Malley, A., Kenner, C., Kim, T., & Blakeney, B. (2015). The role of the nurse and the preoperative assessment in patient transitions. <i>AORN J</i> , 102(2), 181.e-181.e9 doi: 10.1016/j.aorn.2015.06.004	Qualitative descriptive design Purpose: to identify nursing's contributions to transitions in care in the perioperative environment and to identify the role of the preoperative assessment in this transition.	Level VI	Sample: 24 nurses Setting: 975-bed medical center Inclusion: Exclusion:	Themes: (1) Understanding patient vulnerabilities, (2) Multi-dimensional communication, (3) managing patients' expectations, (4) nursing's role in compensating for gaps	Nursing preoperative assessment is useful in identifying and defining patient's risk factors for surgery and for the perioperative care trajectory.
Manderson, B., McMurray, J., Piraino, E., & Stolee, P. (2012). Navigation roles support chronically ill older adults through healthcare transitions: a systematic review of the literature. <i>Health and Social Care in the Community</i> , 20(2), 113-127.	Systematic Literature Review Purpose: to describe existing navigator models relevant to chronic disease management for older adults and to investigate the potential impact of each model.	Level I	Sample: 15 articles of which 9 were RCTs Inclusion: description of patient navigation intervention or pilot, focus on older adults with chronic illness, involved patients who are transitioning across care environments or providers, described the position of navigator and roles and responsibilities, involved intervention, measure of impact of intervention Exclusion: Languages other than English, papers focuses on mental health, cancer	Data Extraction: Medline, CINAHL, the Cochrane database, Embase and PsycINFO between January 1999 and April 2011. Two authors separately reviewed articles following inclusion criteria and a	demonstrated mixed support for the effectiveness of navigation roles. Two of the studies revealed little to no effect of the navigation position, one resulted in higher use of emergency health services. Limitations: lack of standardized

			care, children, or homeless populations.	third adjudicated if there was a disagreement of an article. A data abstraction tool collected information regarding research methods and analysis, role descriptions, qualifications, role goals and responsibilities, and outcomes information.	definition of navigation which made search difficult
McCormack, R., Hunter, T., Ramos, N., Michels, R., Hutzler, L., & Bosco, J. (2012). An analysis of causes of readmission after spine surgery. <i>Spine</i> , 37(14), 1260-1266. doi: 10.1097/BRS.0b013e318245f561	Retrospective review of medical records Purpose: is to review the reasons for unplanned early readmissions to the hospital after spine surgery.	Level III	Sample: 156 early readmissions with 141 unplanned out of 3673 patients Setting: NYU Hospital for Joint Diseases or affiliated hospital Inclusion: readmission after one of 12 ICD-9-CM codes: decompression laminectomy, laminectomy/discectomy, cervical fusion— anterior approach, cervical fusion—posterior approach, thoracolumbar fusion— anterior approach, thoracolumbar fusion— posterior approach, lumbar fusion— anterior approach, lumbar fusion—posterior approach, refusion of thoracolumbar fusion— posterior approach, refusion of lumbosacral spine— anterior approach, refusion of lumbosacral spine— posterior approach, and kyphoplasty	Data abstracted from administrative data from 2007-2009	10% readmissions were planned for either a staged procedure or reschedule of surgery 90% unscheduled Most common cause of readmission was infection 32%, 22% nonsurgical complications, 15% hardware complication,, 12% prolonged wound drainage, 8% uncontrolled pain. 57% of unscheduled admissions required returning to the operating room.
Nadzam, D. (2009). Nurses' role in communication and patient safety. <i>J Nurs Care Qual</i> , 24(3), 184-188.	Expert Article Purpose of this article is to discuss the importance of communicatio	Level VII	n/a	n/a	Effective communication is worth the time and investment of both the organization

	n and it's relation to patient safety.				and the individuals at the organization because of the positive outcomes it produces.
Puls, S., Guerrero, K., & Andrew, D. (2014). Facilitating safe patient transition of care: A qualitative systematic review. <i>Journal of Nursing Education and Practice</i> , 4(5), 37-52. DOI: 10.5430/jnep.v4n6p37	Qualitative systematic review The objective of this qualitative systematic review was to synthesize the evidence for interventions aimed at reducing readmissions through a transition of care program	Level V	Sample: 33 Articles Exclusion criteria: populations such as postpartum, psychiatric, transplant, neonate, pediatric, settings such as hospice, SNF, ER, and interventions provided to patient by a clinician other than a nurse. Inclusion criteria: written in English, studies with transition of care intervention with a nursing component, was implemented before, during, or after hospital admission to adult patients who were being discharged home.	Method: database search using PubMed and Medline (OVID) with search terms including home care services, continuity of patient care, patient discharge, patient-centered care, health planning, and patient readmission	Transitional care interventions resulted in statistically significant reduction in readmission rate, or a rate trending lower, or the rate remained the same. Several studies evaluating interventions occurring during and after hospitalization demonstrated significant results.
Snow, V., Beck, D., Budnitz, T., Miller, D., Potter, J., Wears, R., ... Williams, M. (2009). Transitions of care consensus policy statement American college of physicians- society of general internal medicine-society of hospital medicine-American geriatrics society-American college of emergency physicians-society of academic emergency medicine. <i>J Gen Intern Med</i> , 24(8), 971-976. DOI: 10.1007/s11606-009-0969-x	Best Practice Guidelines The purpose was to develop consensus standards to address the quality gaps in the transitions between inpatient and outpatient settings	Level VII		The executive committees of the ACP, SGIM, and SHM agreed to jointly develop a policy statement on transitions of care. consensus conference was convened to develop consensus guidelines and standards around transitions between inpatient and outpatient settings through a multi-stakeholder process.	Summarized principles: 1) Accountability; 2)Communication 3) Timely interchange of information 4) Involvement of the patient and family member; 5) Respect the hub of coordination of care 6) All patients and family/ caregivers should have a medical home or coordinating clinician 7) At every point of transitions the patient and/ or their family/ caregivers need to know who is responsible for their care at that

					point 9) National standards and 10) Standardized metrics related to these standards in order to lead to quality improvement and accountability
Stavrianopoulos, T. (2012). The clinical nurse leader. <i>Health Science Journal</i> , 6(3), 392-401.	Literature Review The aim of the present study was review the literature about the role of Clinical Nurse Leader.	Secondary source	Sample: 25 articles	Method: database search using PUBMED, & SCOPUS to identify articles related to the role of clinical nurse leader	CNL role is a way to engage highly skilled clinicians in outcomes-based practice and quality improvement strategies.
Tsai, T., Orav, J., & Jha, A. (2015). Care fragmentation in the postdischarge period: Surgical readmissions, distance of travel, and postoperative mortality. <i>JAMA Surgery</i> , 150(1), 59-64. doi:10.1001/jamasurg.2014.2071	Correlational Design Objective: To determine whether post-discharge surgical care fragmentation is associated with worse outcomes and whether distances between hospitals explain differences in patient outcomes.	Level IV	Sample: 93,062 patients, 100% Medicare inpatient file claims from January 1, 2009, through November 30, 2011 Setting: 50 states or in the District of Columbia in nonfederal hospitals. Inclusion: underwent coronary artery bypass grafting, pulmonary lobectomy, endovascular abdominal aortic aneurysm repair, open abdominal aortic aneurysm repair, colectomy, and hip replacement using Medicare Part A and Part B data Exclusion: younger than 65 years or not continuously enrolled in the fee-for service program for 12 months	Measures: 30-day surgical mortality Patient-level data by patient state of residence was used to calculate percentages of patients who were readmitted. χ^2 and Wilcoxon rank sum tests for categorical and continuous variables Elixhauser approach to risk-adjust for age, sex, race, procedure type, and comorbidities	Of the 93,062 patients, 23,278, 25% were readmitted to a hospital other than the one where they had their surgery and typically lived further away. Patients readmitted to a different hospital had 48% higher odds of mortality (odds ratio, 1.48; 95% CI, 1.24-1.78; P < .001) than patients who were admitted to the index hospital

Appendix B.

Second PDSA Cycle for Bridging the Gap in the Continuum of Care for Spine Surgery Patients

