

EFFECTIVENESS OF TRAUMA NURSE PRACTITIONER-LED
PATIENT-CENTERED DISCHARGE PLAN:
A QUALITY IMPROVEMENT PROJECT

by

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A scholarly project submitted in partial fulfillment
of the requirements for the degree

of

Doctor of Nursing Practice

in

Family and Individual Health

MONTANA STATE UNIVERSITY
Bozeman, Montana

May 2023

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DEDICATION

I dedicate this doctoral scholarly project to my family. My husband, Joe, for being a constant and unwavering support. You are the love of my life. To my children, Lindsay and Tyler, my most favorite people, you are so very important to me and I am so thankful for your continued support. I love you both more than the sun, moon, and stars. Thank you to my parents for encouraging me along every step of my education. I love you very much.

ACKNOWLEDGEMENTS

I would like to acknowledge the unwavering support, guidance, and grace of my committee chair, Dr. Alice Running. I will never forget your encouragement along the way. I would also like to express a heartfelt appreciation to Dr. Amanda Lucas, my co-chair for the support, guidance, and feedback. A special thanks to Dr. Elizabeth Johnson, what a wonderful professor and mentor. I learned so much for you and am thankful for your constant encouragement.

I also extend gratitude to April Luft MSN for the support and encouragement along every step of the way. A special thank you to Intermountain Health, Dr. Schabacker, Dr. Goodman, Dr. Lynaugh, Katie Demarais PA, Kaycee Schriber PA, and Zack Hayden MSN for your patience, guidance, and leadership. I would not have been able to complete this scholarly work without your support.

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GLOSSARY

APN = Advanced practice nurse
APP = Advanced practice provider
ASA = American Society Anesthesiologist
CEU = Continuing education units
CI = Confidence interval
DC = Discharge
DBN = Discharge before noon
ED = Emergency department
FEM = Femoral
FXS = Fractures
GTS = Geriatric trauma service
IPC = Interprofessional collaboration
ISS = Intensity severity score
LAP = Laparotomy
LOS = Length of stay
MD = Medical doctor
MSPB = Medicare Spending per Beneficiary
NP = Nurse practitioner
NTDB = National Trauma Data Bank
PCP = Primary care provider
PEL = Pelvic
PT = Physical therapy
RCT = Random controlled trial
RR = Medical resident
SD = Standard deviation
SHO = Senior house officer (medical resident)
TIB = Tibial
UBNP = Unit-based nurse practitioner

ABSTRACT

Trauma Nurse Practitioners (TNPs) in Trauma Centers have been shown to expand the multidisciplinary team approach in caring for that patient population. TNPs create opportunities for increased patient throughput, decreased length of hospital stay, increased staff support for TNP collaboration, and the development of a comprehensive, detailed, patient-centered discharge plan. To evaluate peer-reviewed evidence-based articles assessing the impact of TNPs in developing a patient-focused, detailed discharge plan, a review of current literature (2007–2022) was completed by searching CINAHL, Google Scholar, PubMed, and Web of Science using mesh terms “trauma nurse practitioner,” “trauma,” “staff satisfaction,” “throughput times,” and “patient-centered plan of care.” Thirty-nine articles were found and, of those, 28 are included in this review. Evidence supports the TNP’s role in developing patient-focused discharge plans leading to increases in communication, increased focus on planning for unmet needs, efficiency in rounding, and decreases in length of stay. These changes result in increased satisfaction from physicians and nursing staff related to the TNP-centered role in discharge plan development. TNPs can be a valuable addition to trauma services as they coordinate the development of a comprehensive, individualized plan of care for patients throughout the hospital stay, allowing for a successful transition of care.

CHAPTER ONE

REVIEW OF LITERATURE

Background

Trauma accounts for over three million nonfatal injuries annually and more than five million associated deaths in the same period. In the United States, trauma remains one of the leading causes of death in individuals over the age of 45. According to the Centers for Disease Control and Prevention (CDC), the incidence of nonfatal traumatic injuries ranging from years 2000 to 2020 was greater than 22 million events. The estimated financial burden exceeds 500 billion dollars around the world. Traumatic injuries have immediate physical effects as well as complex long-term effects (CDC, 2022; Yellman, 2022). Traumatic injuries affect patients and families and influence the need of specialized care demands within the medical community.

In 2003, the Accreditation Council for Graduate Medical Education (ACGME) published recommendations for standard work hours for medical residents. This initiated a reduction of clinical residency hours, which caused gaps in addressing the medical needs of patients (Eaton et al., 2020; ACGME, 2001; Aiken et al., 2021; Bethea et al., 2019). From this disparity, the use of advanced practice nurses (APN) began to grow. APNs are positioned to provide efficient, high-quality care with positive patient results (Aiken et al., 2021; Bethea et al., 2019; Choudhry et al., 2021; Collins et al., 2014; Eaton et al., 2021; Jarrett et al., 2009; Johal & Dodd, 2017). The integration of APNs into a trauma service is an ideal solution to help meet the individual needs of trauma patients and navigate transitions in care through the development of a patient-centered discharge plan.

The nurse practitioner role can be envisioned as an adjunctive supportive role to that of medicine. Since the first nurse practitioner programs were introduced in the 1960s, their role has evolved from managing primary care needs for underserved patients into members of acute care teams in healthcare systems across the globe (Kutzleb et al., 2015; Woo et al., 2017; Jarrett et al., 2009).

As a patient's healthcare needs become more complex, often involving challenges with social constraints, resources or lack thereof, and issues with follow-up, nurse practitioners can provide leadership in this role. Nurse practitioners can provide equivalent high-quality care alongside physicians, with cost-effective measures and high patient satisfaction scoring (Kutzleb et al., 2015; Woo et al., 2017; Jarrett et al., 2009; Eaton et al., 2021; Ryan & Rahman, 2012; Bethea et al., 2019; Holliday et al., 2018).

Significance and Evidence of the Clinical Problem

Trauma services utilize a multidisciplinary approach when caring for trauma patients. Included in this approach are advanced practice nurses (APNs) who function as trauma nurse practitioners (TNP). TNPs can safely manage low-acuity trauma patients in collaboration with a team of trauma surgeons (Eaton et al., 2020; Bethea et al., 2019; Collins et al., 2014; Jarrett et al., 2009; Choudhry et al., 2021; Aiken et al., 2021; Leede et al., 2020). As members of this team, TNPs are accessible to other disciplines and can create a detailed, patient-centered care plan allowing surgeons time to see patients in the operating suites.

The American College of Surgeons (ACS) updated a version of the Resources for Optimal Care of the Injured Patient Guidelines detailing ideal resources for care of patients who

suffer traumatic injuries (2022). These guidelines provide descriptions of trauma designations and identify TNPs for their ability to augment patients' services, which leads to thorough care for patients admitted after a traumatic injury (American Trauma Society, 2022).

Methods

CINAHL, Google Scholar, and PubMed databases were searched using terms “trauma nurse practitioner,” “trauma,” “staff satisfaction,” “throughput,” “discharge planning,” and “patient-centered care.” Inclusion criteria included patients admitted to trauma service, TNP-led discharge plan development, and peer-reviewed articles from 2007 to 2022. Focused outcome measures were staff satisfaction, patient-centered planning, and length of stay. Excluded articles were those that provided a foundation for nursing case management, but were not directly related to the nurse practitioner's role in a patient-centered discharge plan. Findings were summarized using the Preferred Reporting Items for Systematic Review and Meta-Analysis guidelines (PRISMA) (Moher et al., 2009). A total of 39 articles were identified, and 28 met the inclusion criteria. Eleven articles were excluded in the review based on the criteria listed above. (Appendix A PRISMA).

Results

An extensive literature search resulted in a variety of published works. Studies reveal TNPs have a positive impact on patient throughput, cost reduction, increased patient satisfaction with hospital experience, and understanding of meeting discharge goals (Eaton et al., 2020;

Bethea et al., 2019; Kutzleb et al., 2015; Walter et al., 2015; Johal & Dodd, 2017; Collins et al., 2014; Biffi et al., 2021).

By developing a patient-centered plan of care, TPNs are able to lead the coordination of efficient care provided to trauma patients. The efficiencies have positive impact on patient outcomes and financial burdens, and provide cost-saving to organizations (Eaton et al., 2021; Hardway et al., 2020; Holte et al., 2015; Bardes et al., 2017; Holliday et al., 2017).

TPNs incorporated into a trauma team interact collegially with team members. While the patient remains at the center of the plan, multidisciplinary team members collaborate and develop treatment plans and goals. The TPN coordinates patient needs and is a resource for other team members. Refining goals and augmenting communication between patient and the healthcare team ensures a successful transition in levels of care (Akuamoah-Boateng et al., 2019; McFadden et al., 2022; Cowan et al., 2006; Holliday et al., 2018).

Detailed care plans have been utilized in nursing for many years (Desai et al., 2019). The nursing process serves as a foundation and can support a comprehensive plan to maintain forward communication between team members, family, and ultimately, the patient (Cajanding, 2016; Johal & Dodd, 2017; Jarrett et al., 2009).

Quantitative Studies

Included in the review were 25 quantitative studies. The majority highlighted trauma-specific nurse practitioner roles. Twelve retrospective reviews identified similar themes related to enhanced communication contributing to effective discharge planning, which leads to decreases in length of stay while increasing patient and staff satisfaction with the trauma nurse practitioner role (Bardes et al., 2017; Bethea et al., 2019; Choudhury et al., 2021; Collins et al.,

2014; Haan et al., 2017; Harway et al., 2020; Holliday et al., 2017; Holte et al., 2015; Leede et al., 2020; Biffle et al., 2021; Morris et al., 2012; Schaffer et al., 2022).

Three integrative reviews reported similar findings. TNPs expedite throughput, improve documentation, increase patient and staff satisfaction, and reduce workload for other healthcare providers (Johal et al., 2017; Walter et al., 2015; Woo et al., 2017). Three convenience sample studies evaluated several measures utilized by TNPs in planning complex discharge for patients. These articles dissected various aspects of TNP discharge plans and frameworks used to decrease LOS, increase discharge orders written by noon (DBN), and make trauma rounding recommendations in order to enhance continuity of care. (Akuamoah et al., 2019; Eaton et al., 2020; Sammann et al., 2019)

One cross-sectional study assessed patient outcomes from three hospitals with varying nurse practitioners-to-bed ratios. Results showed positive outcomes with increased APNs embedded in the organizational structure as evidenced by lower staff burnout rates, Medicare costs with favorable quality indicators, and decreased mortality with shorter LOS (Aiken et al., 2021)

An RCT was designed to determine the effectiveness of a structured nurse-led discharge plan. The intervention group developed a 3-day structured discharge plan compiled of patient-focused education, problem-solving strategies, goal setting, and planning. The control group received standard discharge process. Patients in the intervention group realized better post-discharge functioning, satisfaction, and follow-up with fewer questions or clarification calls post-discharge (Cajanding et al., 2016).

A quasi-experimental, two-group study compared a control group traditional hospital care team to an experimental physician/APRN collaborative group leading to a nurse practitioner-developed comprehensive discharge plan. The experimental group exhibited a significant decrease in LOS and hospital costs (Cowan et al., 2006).

In a pilot study conducted to examine TNPs as discharge trauma team leaders, TNPs provided for consistent education and planning interventions that led to positive throughout (Jarrett et al., 2009). A quality improvement study examined an electronic medical record tool's effectiveness at providing visual cues to staff indicating projected discharge timelines. This visual tool helps in planning for patient education, durable medical equipment for home use, or transitional-care needs for ongoing skilled-care needs that are outside the barriers of being met in the home setting (Perry et al., 2006).

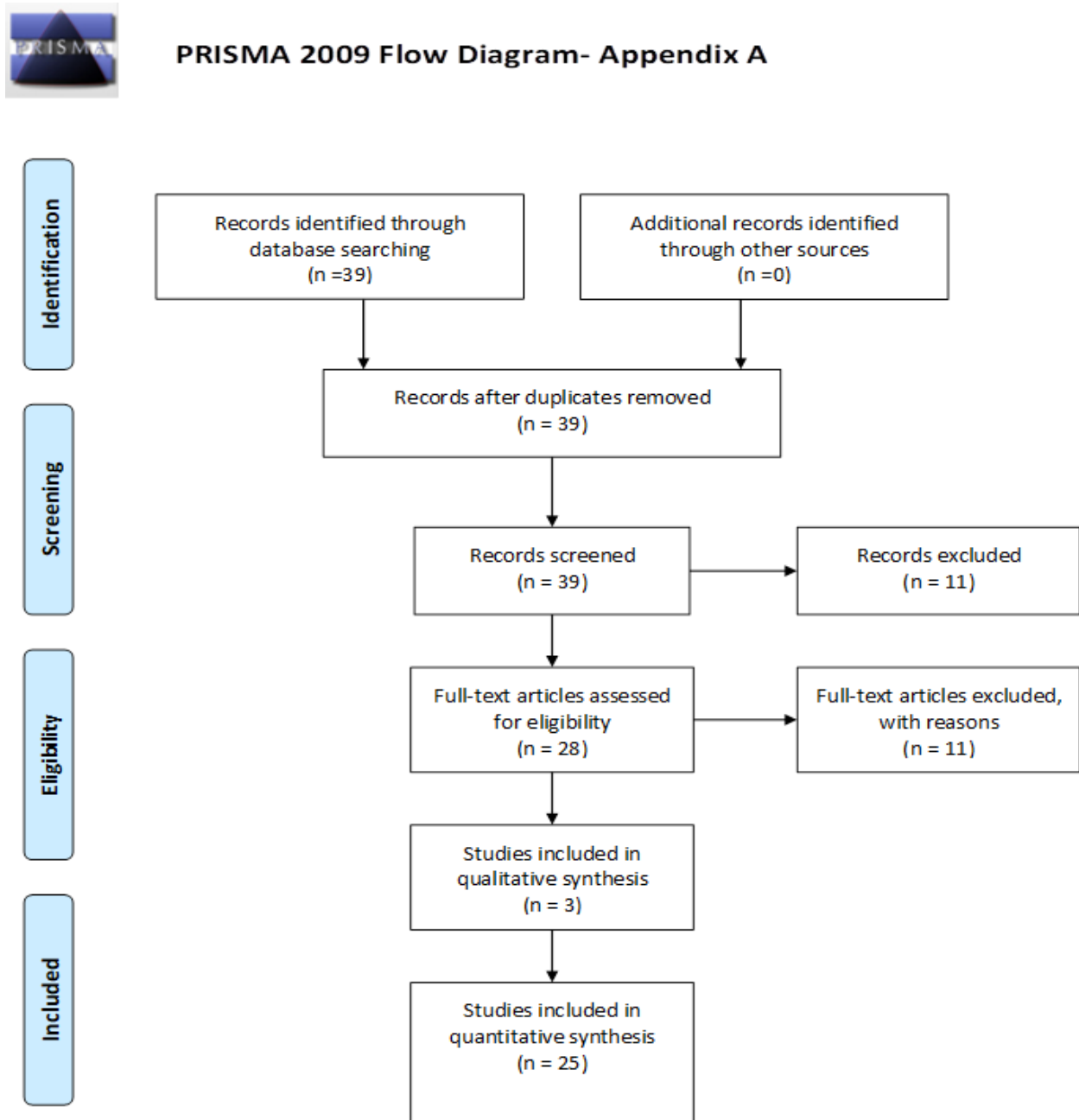
Qualitative Studies

Authors of an exploratory descriptive study conducted interviews with nursing and allied health professionals who were providing for complex needs in patients as they transition in a care-delivery setting. Findings revealed a communication tool helps direct coordination between interdisciplinary teams in order to direct effective discharges (Allen et al., 2020).

In a second study focusing on specific discharge planning needs for complex patients, three themes emerged. These themes included concepts to address communication, discharge teaching, and outpatient care coordination. By addressing communication techniques such as closed loop communication, improvements in discharge summaries and collegial cooperation are achieved (McFadden et al., 2022).

A combined quantitative and qualitative study examined a framework design for trauma rounds in order to provide efficiencies by using a formal guide for patient presentation. This framework design decreased wasteful wait times, generated patient-focused decisions, and increased time for trauma surgeons to be available in the operating suite (Samman et al., 2019). See Figure 1 for the systematic literature review using the PRISMA flow diagram.

Figure 1. Systematic Literature Review Using PRISMA Flow Diagram. PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses. From Moher et al. (2009).



Implications for Practice

Trauma centers are a component of larger, comprehensive public health services providing a broad range of care to trauma patients (Choi et al., 2021; ACS, 2022). The foundation of nursing care is determinant by the idea that patients are treated holistically (Sasser et al., 2009; Frisch & Rabinowitsch, 2019; Jarrett et al., 2009; McFadden et al., 2022; Lome et al., 2010).

A hospital in the Rocky Mountain Region has initiated trauma category redesignation. The trauma team expressed a desire to add TNPs to their team in anticipation of increases in trauma patients. TNPs create opportunities for holistic patient care by increasing patient throughput, decreasing length of hospital stay, and increasing support staff collaboration with TNPs through development of a detailed patient-centered discharge plan.

This quality improvement project will examine the TNP role of increasing throughput for patients leading to a decreased length of stay, increased discharges by noon, development of a patient-centered discharge plan, and increased staff satisfaction. The evidence from this project will impact policy change by presenting the benefit of TNPs in increasing throughput with enhanced collaborative communication in the multidisciplinary team, patients, and families, and increased staff satisfaction.

CHAPTER TWO

PROJECT PLAN

Introduction and Problem

Trauma centers are positioned to provide timely, efficient, and specialized emergent care to patients who are injured traumatically. Trauma Center Verification is a categorical evaluation designed by the American College of Surgeons (ACS) (American Trauma Society, 2022). Level I trauma centers provide the most thorough resources from emergent care to rehabilitation services. Level V trauma centers provide basic emergent care; initial pain control with a focus on stabilization and transportation of the patient to a higher level of care. Trauma center designations differ in resources, surgical specialty availability, and allied health professionals at the ready for complex trauma patients. The more complex the traumatic injury, the more likely a patient will be transferred to a higher level of trauma acuity (Toney-Butler & Varacallo, 2021).

A Level II trauma center in the Rocky Mountain Region has recently applied for redesignation to a Level I trauma category. With this change, the trauma surgery team expects an increase in trauma patients. Early planning to accommodate for anticipated increase in trauma patient admissions has begun. The trauma team has expressed interest in expanding to include a trauma nurse practitioner (TNP). TNPs are strategically positioned to focus on the forward flow of patients throughout their hospital stays and address collaborative communication approaches to keep discharge goals in focus. TNPs are uniquely qualified to lead the development of patient-focused discharge plans (Collins et al., 2014; Lu et al., 2021; Aiken et al., 2021; Cowan et al., 2006; Woo et al., 2017).

Level I and II trauma centers are staffed by trauma surgeons who are staged in the hospital 24 hours per day, 7 days per week. Trauma patients' initial needs often include emergent visits to the operating suite where they are cared for by the trauma surgeons. Nurse practitioners are not qualified to replace this type of expertise. However, once the emergent resuscitation and stabilization is complete, nurse practitioners can take an active role in the acute hospitalization period with guidance from the surgeon. This allows the surgeon to remain at the ready for the next trauma arrival.

As advanced practice nurses, TNPs have developed a familiarity with hospital policies, protocols, and the complementary functioning of interdisciplinary specialists. Nursing's foundational background lies in the day-to-day care of patients while meeting the holistic needs that, if unmet, may hinder recovery (Noffsinger et al., 2020; Lome et al., 2010; Haan et al., 2007; Hardway et al., 2020). This background provides a level of comfort with hospital processes and multidisciplinary teams making TNPs ideally suited to provide patient and family education, advancing throughput, and positioning the patient for a positive discharge experience (Eaton et al., 2021; Walter et al., 2015; Aiken et al., 2021).

Trauma patients may exhibit challenging and complex needs throughout their hospital stay, and these issues become more apparent as discharge approaches. TNPs have the ability to provide efficient, high-quality care with an overriding focus on fiduciary responsibility while striving for elevated satisfaction scores with team members and patients (Kutzleb et al., 2015; Woo et al., 2017; Jarett et al., 2009; Eaton et al., 2021; Ryan & Rahman, 2012; Bethea et al., 2019; Holliday et al., 2018).

Efficient throughput helps relieve pressure on the hospital organization, has the potential to increase profitability, and to help patients in need (Holliday et al., 2017; Bardes et al., 2017). TNPs can coordinate the hospital stay by customizing and planning for transitions in care dependent on patient acuity changes (Collings et al., 2014; Morris et al., 2012; Holliday et al., 2017; Cowan et al., 2006). Collaborative interactions with the trauma surgeon add a layer of medical expertise, allowing TNPs to focus on patient needs, tailoring plans that directly meet the holistic foundation of care (Hardway et al., 2020; Bethea et al., 2019; McNicholas et al., 2017).

A dedicated TNP can increase patients' continuity of care and lead coordination of teamwork. This helps increase efficiency of the throughput process and help with decreasing length of stay (LOS) while increasing the collaborative communication between the multidisciplinary team to achieve balance and increased staff satisfaction (Noffsinger et al., 2020; Bowcutt et al., 2006; Jeffers, 2021; Jarrett et al., 2009; Thoma & Waite, 2018).

Problem Statement

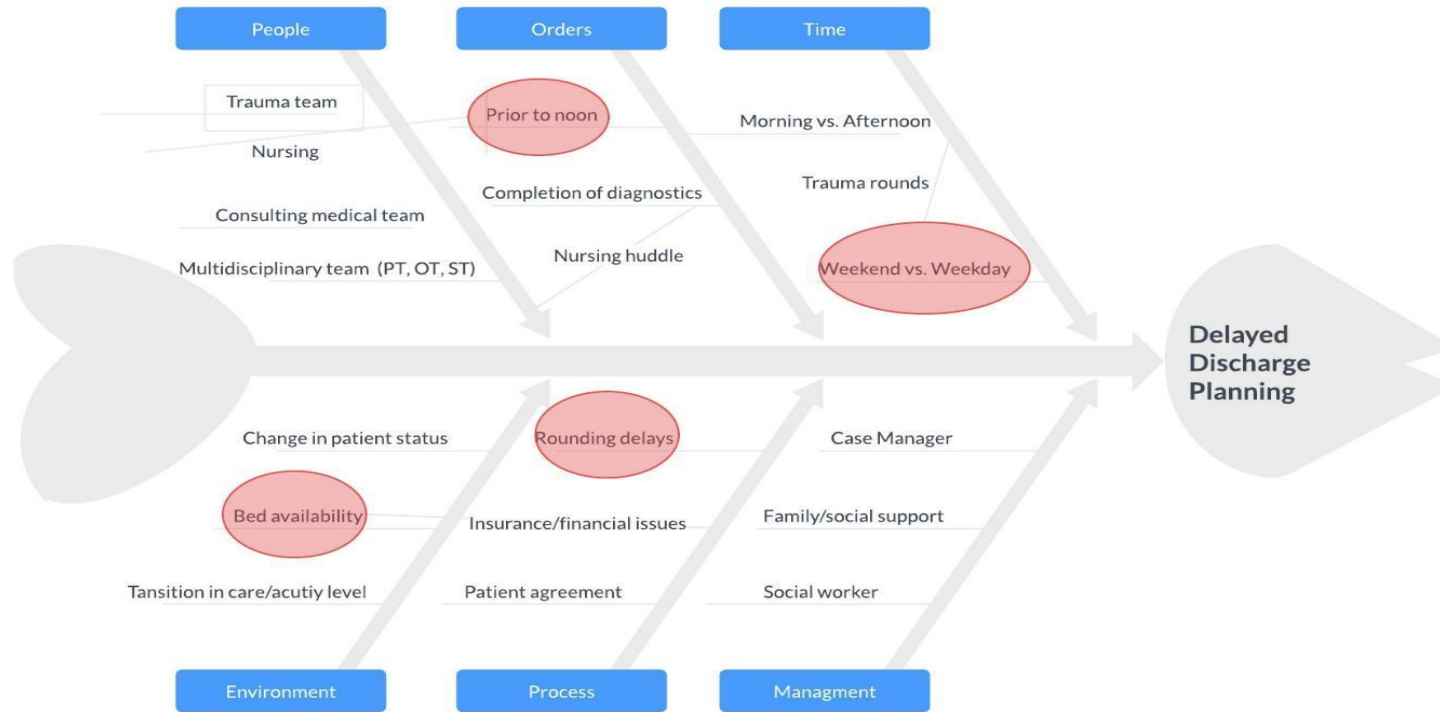
The lack of coordinated communication in healthcare can cause barriers to patient throughput. These barriers cause delays in discharge planning and have negative impacts on the LOS (Akuamoah-Boateng et al., 2019; McFadden et al., 2022). One component of continuity of care implies that all team members share in the communication process, each member adding input from their distinct specialty. To improve continuity of care, this quality improvement project will compare a TNP-coordinated patient-centered discharge plan for trauma patients to the current practice of general multidisciplinary discharge planning.

The goal of this improvement project is to explore improved throughput for trauma patients with TNP-developed patient-centered discharge plans. This, in turn, could lead to the creation of a policy to support the creation of a trauma nurse practitioner position. The project will assess how the TNP role can impact length of stay and staff satisfaction levels. In patients admitted to the hospital following a traumatic injury, a TNP-coordinated patient-centered discharge plan will have a positive impact on length of stay and staff satisfaction compared to traditional discharge planning. A fishbone diagram was created to provide a visualization of potential root causes for delayed discharge planning.

Figure 2. Fishbone Diagram

TNP Fishbone Diagram

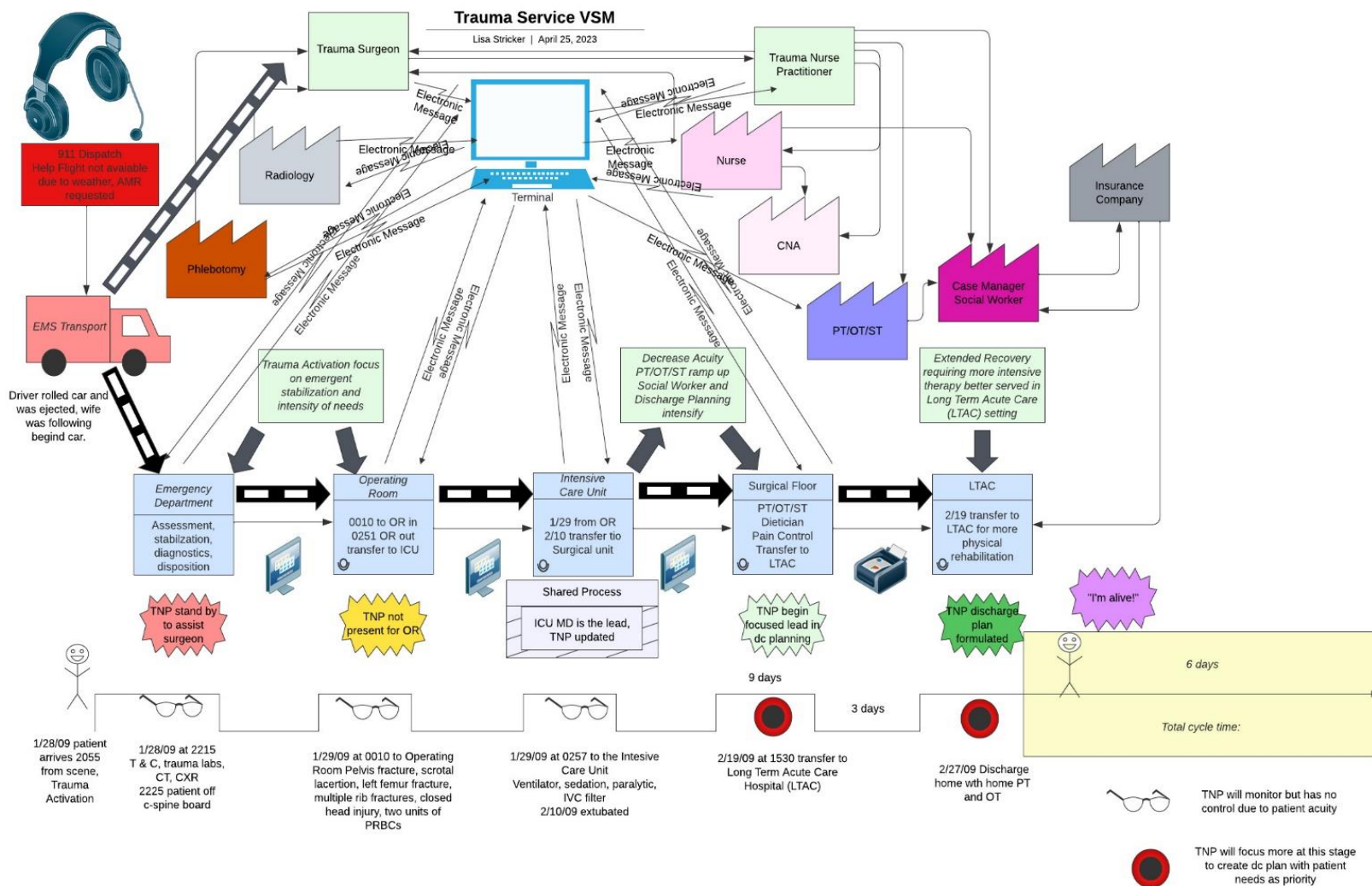
 = Delays (root cause)



Organizational Microsystem Assessment

A value stream map (VSM) has been developed to provide a visual representation of where maximizations of timely, focused decisions can be made. The data utilized are from a retrospective chart review of a trauma patient. In trauma patients with increased Injury Severity Scoring (ISS), the initial stabilization, resuscitation, and high acuity of technological needs may be out of the control of the TNP to have impact on early LOS.

Figure 3. Value Stream Map



Rationale

The proposed inclusion of a TNP into the trauma service team is an adjunctive role relying on the guidance of the trauma surgeon. TNPs are suited to be a complement to the trauma team, but not a replacement (Hardway et al., 2020; Johal & Dodd, 2017). There will be some aspects of patient throughput not directly impacted by the work of the TNP in this project. For instance, the ISS is calculated in trauma patients to provide a quantitative probability of mortality and morbidity.

The ISS scoring can give predictive measure to the trauma team about expected services that will be utilized by patients who score higher in the ISS. Often patients whose ISS scores are high can be more difficult for a TNP and the trauma team to manage (Javali et al., 2019; Jarrett et al., 2009). However, ISS scores can predict post discharge needs patients may require, including discharge disposition needs that may involve a stay at a long-term acute hospital (LTAC) or an inpatient rehabilitation facility for ongoing physical and occupational therapy. There is also a linear relationship between ISS and LOS in trauma patients (Lu et al., 2021; Javali et al., 2019).

Nursing Leader and Mentor

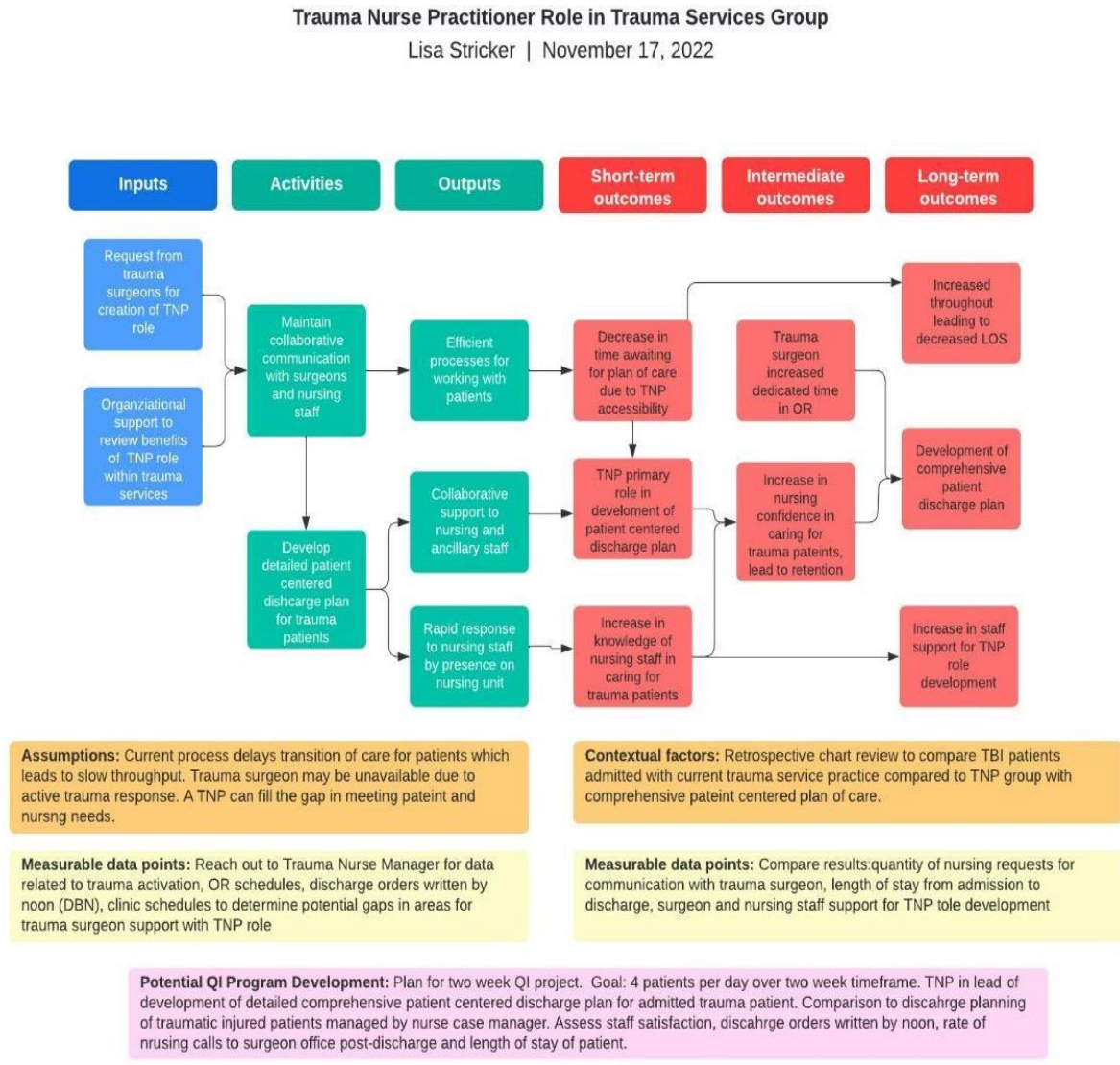
An additional benefit with the TNP role is providing nursing leadership and mentoring activities to teach nurses about the complexities in caring for trauma patients. TNPs are positioned to not only have time to spend with patients and families, but also to have time to mentor bedside trauma nurses, which may reflect increases in job satisfaction and ultimately retention. With the TNP able to remain on the nursing unit, trust is incorporated in the

collaborative relationship between nurses. Acknowledging that bedside nurses have varying years of experience, the TNP can take the lead as a clinical expert, addressing and adapting teaching styles to meet the various levels of knowledge and increase the critical thinking skill level of the bedside nurse (Bowcutt et al., 2006; Lome et al., 2010; Collins et al., 2014).

Financial Implications with TNPs

Another layer of benefit with the TNP role would be overall profitability of the organization. The project leader prediction is a measurable decrease in length of stay (LOS) by 0.5 days over the course of the hospital stay when compared to trauma patient hospital stay without the effort of the TNP. The burden of expenses related to trauma care is not felt in Montana alone; this affects all states in America. Trauma hospitalization costs encompass one of the most expensive medical-related hospital stays across the nation. The inclusion of a TNP in a trauma team has been shown to decrease LOS, which is reflective in decreased hospital costs, and can potentially be offset by enhanced documentation allowing for higher acuity hospital coding (Collins et al., 2014; Johal & Dodd, 2017; Crawford, 2019).

Figure 4. Logic Model



Intervention and Implementation

The quality improvement project will begin with an observation of the current transition of care process for an admitted trauma patient. This observational process will provide the data that will detail the timing of transitions in care, clarify potential areas of delays in care, and reveal gaps that need precise focus. An underlying focus will be the collaborative work focused

on discharge planning within interdisciplinary teams (Eaton et al., 2021; Akuamoah-Boateng et al., 2019; Holliday et al., 2017).

The initial plan was to have an observational experience with the current general surgery nurse practitioner. However, sluggish response and several challenges made reaching a job shadow agreement impossible. This led to the project leader reaching out to the nurse discharge planning group, specifically the case managers who focus on discharge needs for trauma patients. The same observational technique plan will be initiated with the discharge team instead of the general surgery nurse practitioner with collection of data as described. No patient data will be collected during the observational experience.

During the implementation phase, the project lead will use the patient-centered discharge plan draft for trauma patients over a period of 2 weeks. The discharge plan will then be provided to the case manager to use for 2 weeks without the project lead involved. The patient-centered discharge plan draft was developed after review of literature. The form is a chart divided into hospital course and discharge needs. Daily columns will divide the information into daily changes and provide a visualization of progression to prepare for discharge.

Figure 5. Patient-Centered Discharge Plan

Patient Centered Discharge Plan

Patient Identifier X
Trauma Surgeon
Trauma Nurse Practitioner

TRAUMA
T= Treatment/Surgery
R = Restrictions
A= Assess medical, social, financial
U =Unmet needs
M=Medication Reconciliation
A= Access to follow up

| TRAUMA | • Trauma Activation Level Diagnoses | • Hospital Day # ____ | • Hospital Day # ____ | • Hospital Day # ____ | • Hospital Day # ____ |
|-----------------|----------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Hospital course | Surgical intervention | | | | |
| | Complications | | | | |
| | Consultations | | | | |
| | Treatment & Procedures | | | | |
| | Transition of care | | | | |
| | Medications | | | | |
| | Diagnostics/imaging/labs | | | | |
| | Therapy Services PT,OT, ST | | | | |
| Discharge Needs | Case Manager | | | | |
| | Social Services | | | | |
| | Discharge disposition | | | | |
| | Medication reconciliation | | | | |
| | Prescription needs at discharge | | | | |

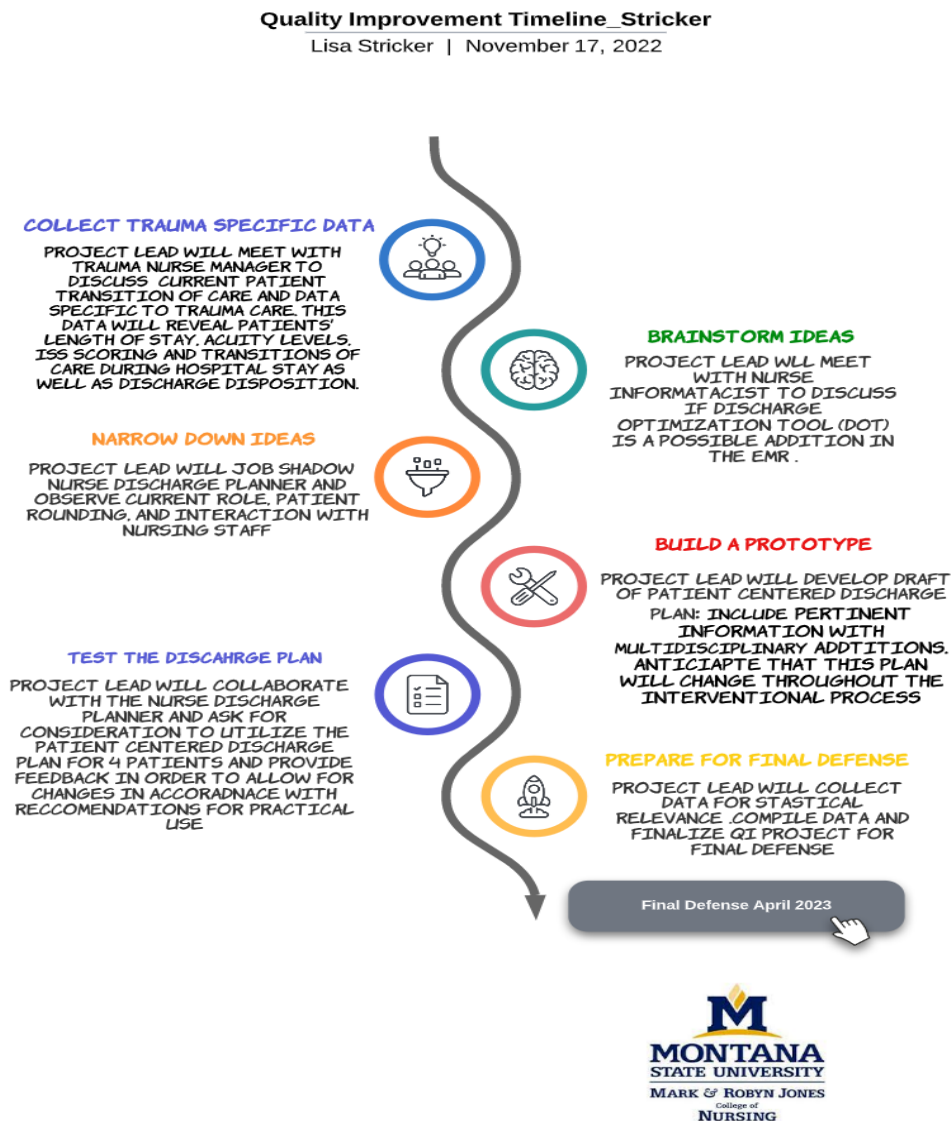
This revised team design provides the project lead an opportunity to lead a focus group discussion to the nurse discharge planning team members about opportunities TNPs can add to the development of the patient-focused discharge plan. Additional benefits include patient and family education and addressing unmet needs to prevent roadblocks in the discharge process. The project lead will attend a nurse discharge planning staff meeting. This will provide an opportunity to explain the role of the TNP, an outline of the project plan, and how the patient-centered discharge plan is utilized.

A focus group discussion will center around four questions from a survey provided to nurse discharge planners. The focus group conversation will identify current knowledge about trauma nurse practitioners, effectiveness of the TNP role, and overall satisfaction with the patient-centered discharge plan. This will be provided to nurse discharge planners and the Chief Trauma Surgeon prior to the implementation plan and 4 weeks after the implementation ends.

Figure 6. DNP Project TNP Focus Group Discussion Questions

- **Question 1 (Range 1-5)**
- I understand the role of the trauma nurse practitioner
- **Question 2 (Range 1-5)**
- The trauma nurse practitioner was able to address patient and family concerns
- **Question 3 (Range 1-5)**
- The patient-centered discharge plan will help multidisciplinary team members have a better understanding of how the patient is progressing
- **Question 4 (Range 1-5)**
- I would like to see the creation of a trauma nurse practitioner role as part of the trauma team

Figure 7. Proposed Timeline



The initial observational experience will occur over the course of 2 days. This opportunity is aligned with the Gemba walk in the Lean methodology. This initial process is incorporated to find gaps in efficiency rather than fault in the system flow. The observation allows for real-time visualization of processes that can be streamlined and address potential bottlenecks focusing on smooth transitions in care as the patient health status allows. With full

understanding of processes, development of improvement plans can begin and add to the core of confident decision-making. It is the TNP role that can affect these changes by minimizing unneeded, time-consuming, or wasteful steps, maintaining focus on forward movement of the patient through the hospitalization experience (Sarantopoulos et al., 2018; Thull-Freedman et al., 2020).

Following IRB approval, the second phase of the implementation project can begin. The TNP will use the patient-centered discharge plan draft while performing daily rounds on admitted trauma patients who have progressed to the intermediate care unit or surgical floor. The TNP will not be focusing on patients who are critically ill and require critical care in the intensive care unit. The intensivist and trauma surgeon will direct this care. These patients are predicted to have longer recovery times, complex discharge needs, and extensive rehabilitation.

In this process, the TNP will complete morning rounds independently from the surgeon. In consideration of Lean methodology, which strives to improve production and efficiency, a full trauma team rounding can be viewed as an inefficient utilization of the entire team (Sammann et al., 2020; Morris et al., 2012). Morning rounding gives the TNP an opportunity to compile updates of patient status or assess unmet needs from the previous shift and to address any issues that require attention early in the day (Sammann et al., 2020; McNichlas et al., 2017; Bethea et al., 2019; Lu et al., 2021).

The project will enlist a limited number of patients to the initial TNP rounding group. The goal will be a minimum of four trauma patients followed from admission through discharge. The TNP will remain available on nursing units to clarify orders, interpret data, coordinate collaboration with consult or interdisciplinary members, educate nursing staff and patients, and

initiate consulting needs and develop the ongoing discharge plan (Lome et al., 2010). The patient-centered plan draft has been created from evidence-based research pinpointing challenges specific to discharge needs. Information gathered will direct coordination of patient care, identify labs to be ordered, suggest diagnostic evaluations, and address daily changes in patient needs.

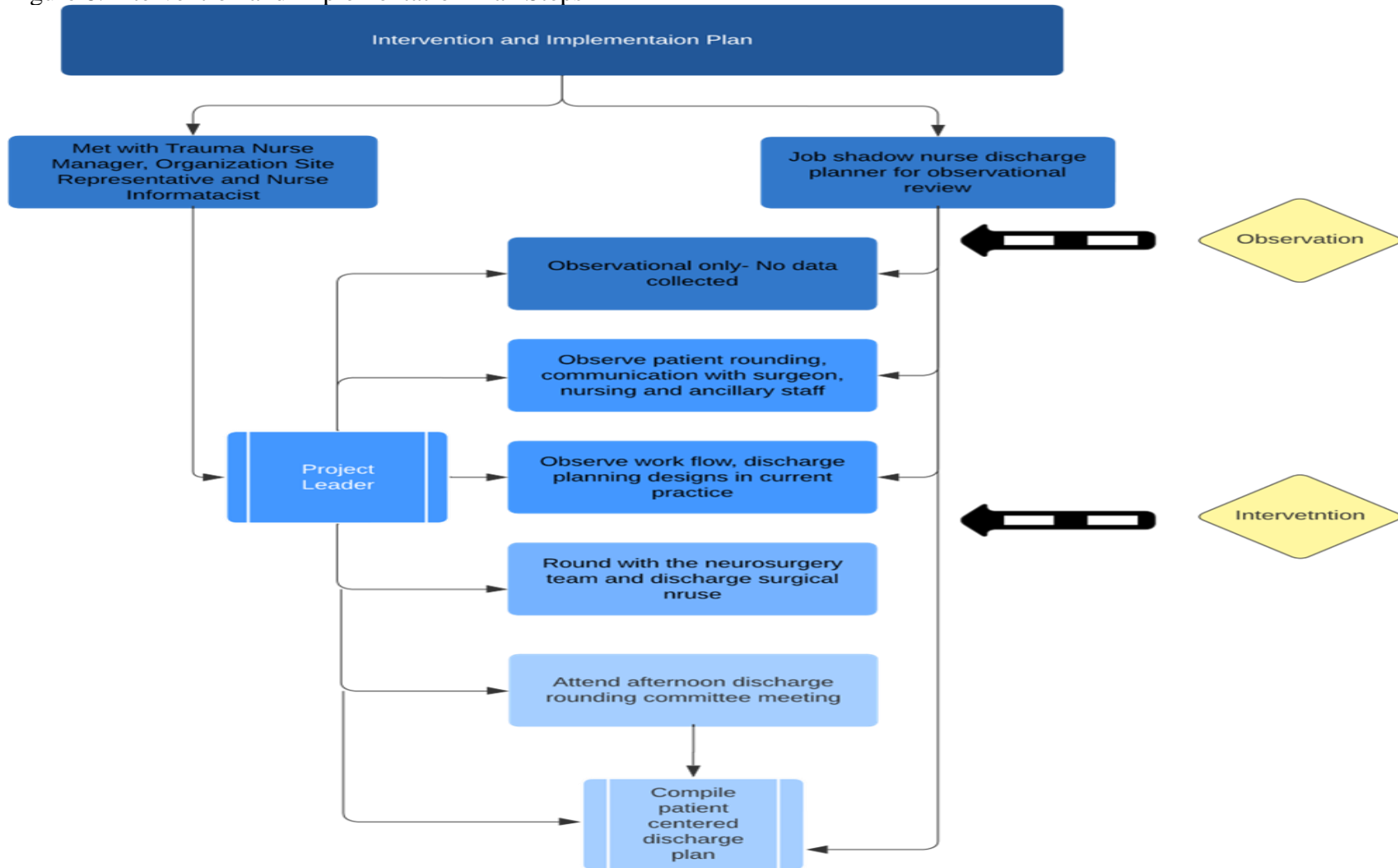
This plan will also ensure that nursing staff understand the most current plan of care and recognize that multidisciplinary teams are available to meet the patient needs (Hardway et al., 2020; Bethea et al., 2019; Collins et al., 2014). The daily plan of care will be updated in paper format outlining the events of the day. In the afternoon, or as the surgeon is available, trauma team rounding will commence with verbal update to the surgeon regarding the patient's progress and goals for following days' care (Haan et al., 2007; Bardes et al., 2017). The plan of care will be available for all parties involved in direct patient care, allowing for continued collaborative communication and progression details for patient care and eventual discharge. Input from the surgeon will guide the details of the plan. The final patient-centered discharge plan can also serve as a template for final discharge summary dictation notes.

In preparation for final proposal design, the project leader has met with the Trauma Nurse Manager to explain the project and receive an overview of the current trauma patient flow. The trauma surgeon directs patient progression from the emergency department. Currently, patients are managed by trauma services until their status is stable and they can be safely signed over to the orthopedic or hospitalist service team. Once patients are stable and nearing discharge, case managers will solidify a final discharge plan with guidance from the attending group. The Trauma Nurse Manager has extended an invitation to the Chief Trauma Surgeon regarding the project and created a weeklong opportunity for the project leader to round with the Chief

Surgeon during the first week of January. This opportunity will afford priceless information adding rich detail for the implementation process.

The Quality Director has been appraised of all project plans and has approved a collaboration between the project leader and nurse case managers who work closely with trauma patients as they near discharge. The project leader has contacted the Director of Nurse Discharge Planning who has expressed support in the observation and implementation component. He has coordinated an introduction with the nurse discharge planners and project leader in early December.

Figure 8. Intervention and Implementation Plan Steps



Evaluation

Upon completion of the implementation portion of the project, the results will be compared to the current discharge care plan. Comparisons using descriptive statistics will be used for comparative results to reveal the differences in length of stay and timing of discharge order placement. Because TNPs may not impact length of stay in the emergency department, operating suite, or intensive care unit, as those complexities are excluded from impactful control of the trauma nurse practitioner, those units are excluded from this project. This project will focus directly on trauma patients who have progressed to intermediate care or surgical care settings as their acuity level allows. This is where the direct impact of TNP-directed discharge plans will be quantified.

Another important evaluation cornerstone is the satisfaction from Chief Trauma Surgeon and nurse discharge planning staff with the patient-centered discharge plan. Anticipatory surgeon response will demonstrate satisfaction with TNPs discharge planning, allowing more time to perform scheduled and emergent surgical procedures. Prior to the implementation project, a five-question survey will be provided to the nurse discharge planners and the Chief Trauma Surgeon. This survey will be developed using a Likert scale with the “Survey Planet” platform. After the implementation project is complete, a post-survey will be forwarded to the same groups. The survey should glean increased satisfaction from staff with the TNP role.

TNPs are experienced in dealing with patient and familial concerns and communicating with therapy services, social workers, and nurse discharge planners. Alleviating time pressure from a surgeon’s schedule allows them to focus on resuscitating and stabilizing acutely injured patients. TNPs can also address nursing and administrative issues for the surgeon by acting as an

autonomous buffer. This should decrease unnecessary pages to surgeons or phone calls to the outpatient office (Johal & Dodd, 2017; Lu et al., 2021; Collins et al., 2014; Haan et al., 2007).

Nursing satisfaction with the TNP role can impact overall nursing job satisfaction. Several studies examining nursing satisfaction with the TNP role describe nurses feeling more involved as they are incorporated into daily rounding with the team, more informed about the plan of care for the patients, and better able to develop critical thinking skills and an added sense of value, which can lead to nursing retention (Jarrett et al., 2009; McNicholas et al., 2017; McFadden et al., 2022; Lu et al., 2021; Aiken et al., 2021; Cajanding, 2016; Haan et al., 2007). TNPs can help further nursing knowledge surrounding care of trauma patients by mentoring nursing staff, encouraging engagement, and fostering collaborative communication exchanges (Woo et al., 2017; Cowan et al., 2006).

Though not specifically outlined as a measure for this project, organizational satisfaction has an influence on TNP role creation. Firstly, a budget expansion to allow an increase on the trauma team to support the role would be necessary. Secondly, creating this new TNP role can lead to potential decreases in length of stay, increased availability of surgeons in the operating suite, and improved patient and family satisfaction regarding the hospital experience (Haan et al., 2007; Bardes et al., 2017; Sammann et al., 2020; Morris et al., 2012; McNicholas et al., 2017; Lu et al., 2021).

A challenge with patient-focused discharge planning is to avoid perceptions that the plan developed by the TNP is a basic nursing care plan, which it must not be viewed as. This discharge plan, inclusive of all members of the disciplinary team, should enhance collaborative communication and provide an outline for a complete discharge summary. Often, due to time

constraints, discharge summaries may lack key details of the hospital stay or potential barriers affecting the patient after discharge (McFadden et al., 2021). This discharge plan would provide those key details that may influence post-hospital care and avoidance of readmission or failure at the desired discharge designation.

Discharge planning in trauma patients can be complex and prolonged. A multifaceted approach can avoid duplication of services and medical errors, and ensure that the patient experiences a safe discharge process while remaining efficient (Jeffers, 2021; Perry et al., 2020; Bardes et al., 2017). TNPs have years of experience as registered nurses and are familiar with general patient care needs in the hospital as well as more advanced specialized care.

TNPs provide efficient quality care focusing on the needs of the patient, nursing, and multidisciplinary staff. Discharge planning efforts with positive outcomes are best when started on the day of admission (Jeffers, 2021; Cajanding, 2016; Lu et al., 2021).

This quality improvement project promotes cost-effective care, improved communication, increased throughput with decrease in length of stay, and better patient understanding of discharge expectations and goals (Cajanding, 2016; Collins et al., 2014; McNicholas et al., 2017; Holliday et al., 2017; Jeffers, 2021).

Table 1. SMART Goals

| |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>SMART Goal #1: decrease in LOS With the development of a trauma nurse practitioner (TNP) led patient centered discharge plan, patients will experience a decrease in length of stay by 0.5 days. This discharge plan will include detailed descriptions of trauma patient progression throughout the hospital stays and detailed discharge needs.</p> <p>SMART Goal #2: positive staff support for the creation of TNP role Surgeons and nursing staff will report a positive experience with the role of the TNP as well as satisfaction with the detailed patient-centered care plan.</p> <p>The project goal is to follow 4 patients over the course of 2 weeks. January 3-February 13, 2023</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 1. SMART Goals Continued

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Description of strategies to be utilized to accomplish goal including any needed resources. (Can be in outline or bullet list format.)</p> <ul style="list-style-type: none"> • The Surgical Associates Trauma Team has expressed interest in expanding their service line to include the addition of two nurse practitioners. • Intermountain Health has initiated a redesignation trauma status. This process is accomplished through certification from the American College of Surgeons. There is structural support for trauma team expansion as the redesignation from a Level II to a Level I trauma center process has met approval at an organization level (ACS, 2022). • Project lead will meet with Manager of Trauma Services for an overview of trauma flow of admitted patients <ul style="list-style-type: none"> • LOS • ISS Score • Transition of care (timing in ER, OR, ICU, Nursing unit) • Discharge disposition • A Value Stream Map will be developed as a visual representation of transitions of care a trauma patient from hospital admission through discharge. Specific detail will be made on timing of transitions in care: <ul style="list-style-type: none"> ○ length of time in the ED ○ length of time in OR ○ time on nursing unit ○ time to discharge- goal for discharge orders written by noon • In the quality improvement project, a patient-centered discharge plan will be developed and updated through monitoring patient progression through the hospital stay. • A focused group discussion with the nurse discharge planners and neurosurgery team will be done pre and post intervention to provide education regarding the TNP role. The information will describe the role of the TNP: <ul style="list-style-type: none"> ○ A 4-question survey will be after the final focused group discussion. Responses will be recorded verbatim and will be de-identified. | | |
| Data to be collected | Method of Collection and who is responsible | Planned data analysis |
| Query about whether TNP in the United States, in general, are using a trauma patient-centered discharge plan. | Post to open thread at Society of Trauma Nurses (STN) to query if any TNP are using a patient-centered discharge plan | October 14, 2022 STN an organization of trauma nurse professionals in the United States. There is an open forum section for members to post and share forms, policies or pose questions. This is for informational inquiry. |

Table 1. SMART Goals Continued

| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Query to Intermountain Healthcare, a Level I trauma center in Utah. This hospital has a Trauma and Surgical Critical Care Fellowship Program designed for NP and PA's.</p> | <p>Email sent for query reach out to TNP at Intermountain Healthcare to explore what the current practice is. Intermountain Health is a Level I trauma center with 22 TNP in current practice.</p> | <p>October 18, 2022 This organization has recently acquired a hospital in the Rocky Mountain Region. https://intermountainhealthcare.org</p> |
| <p>Met with nurse informaticist to discuss if discharge optimization tool (DOT) is a possible addition in the EMR.</p> | <p>Project lead this is informational and would not be implemented. (See Appendix C)</p> | <p>October 27, 2022 Discussed the potential for DOT like incorporation, just as background</p> |
| <p>Meet with current surgical NP. She works M-F 8-5pm and currently cares for general surgery and trauma patients.</p> | <p>Challenges existed with solidifying dates for observation with trauma service team. Trauma services has one NP, often had several medical students rounding with the team.</p> | <p>October 28 and 31, 2022 I have met with current NP and plan for these dates for job shadowing experience. I had one face to face discussion with NP. I wrote a letter and provided chapter one draft. I attempted telephonic interaction, but nothing came to fruition. This is when the project plan shifted to collaborating with the nurse discharge planning group.</p> |

Table 1. SMART Goals Continued

| | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Finalize draft of patient-centered discharge plan.</p> <p>Will review with site rep and nurse informaticist.</p> | <p>Trauma Activation Level Diagnoses Course of illness PMH Surgical intervention Complications Transition of care Pertinent diagnostics/lab Treatment Procedures Consultations Therapy Services PT, OT, ST Medications Social services Case manager Family support Discharge disposition Patient education Med reconciliation Psychosocial needs</p> | <p>November 13, 2022 I have developed a draft of the discharge plan document and will adjust as the clinical experience unfolds.</p> |
| <p>Met with Trauma Nurse Manager to discuss planned project. Also asked for the following data ISS score Disposition LOS Discharge disposition</p> | <p>Met with Trauma Nurse Manager, she was provided with draft copies of chapters one and two of the project proposal.</p> | <p>November 15, 2022 She had a positive response. Every Thursday there are trauma staff meetings, she will share the proposal design with trauma team and will connect project manager with Chief Trauma Surgeon. Scheduling challenges prohibited rounding with trauma team.</p> |
| <p>Email sent to Quality Manager (also site representative) to introduce project led to case manager/discharge planning group.</p> | <p>Project lead is provided with the name of the manager of discharge planners. The site representative ensures that the project lead will be incorporated with a team for completion of project.</p> | <p>November 16, 2022 Would also ask the nurse discharge planner who works with post-trauma patients to use the patient-centered discharge plan on their own, and provide feedback to formulate adjustments as needed to the plan.</p> |

Table 1. SMART Goals Continued

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IRB approval for project proposal | All patient data will be de-identified to protect human subjects | December 2023 The IRB application will be submitted after approval of project proposal. This must be done prior to the implementation phase. |
| Pre-intervention survey to nurse discharge planners | 4 questions (Likert scale) provided to case managers after an overview of TNP role and description of DNP project. | January 2023 Will provide a 4-questions to nurse discharge planning group, the results will help guide a focus group discussion about understanding the TNP role. |
| Implementation of project begins with goal to obtain data on four trauma patients. Collect de-identified data into care plan capturing ISS score, trauma category, multidisciplinary (PT, OT, ST) social worker and nurse case manager plans. | Project lead update discharge plan with patient daily status will be updated in the project electronic discharge plan, revealing progression of patient status and anticipatory discharge needs and plans for disposition. | Jan 30-Feb 13, 2023 (or until 4 patient threshold met) Progress toward goal and unexpected changes will be evaluated at the end of each week to determine if adjustments in the workflow need to be considered. Was able to secure rounding time with the neurosurgery team (who also see trauma patients) and one NP from the hospitalist service. This became part one of the implementation. Part two became the time spent with the surgical discharge nurse |
| Post-intervention group discussion with the nurse discharge planners and Chief Trauma Surgeon | 4 questions (Likert scale) provided to nurse discharge planners and neurosurgery team after an overview of TNP role and description of DNP project. | February 2023 Will provide a 4-question survey to nurse case managers post-intervention to assess understanding TNP role. |

Table 1. SMART Goals Continued

| | | |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Data interpretation Review results with site rep. | Project lead will compile data for statistical relevance. Demographic comparisons will be used. | March 5, 2023 Will examine the results from implementation phase, descriptive statistics will be developed. |
| Final draft complete | Review with chair and co-chair, make final revisions | March 22, 2023 |
| Final defense | Project lead | April 6, 2023 |

CHAPTER THREE

QI MANUSCRIPT

Introduction and Background

Globally, trauma accounts for over three million nonfatal injuries annually and more than five million associated deaths in the same period (The American Association for the Surgery of Trauma, 2020). In the United States, trauma remains one of the leading causes of death in individuals over the age of 45. The estimated financial burden related to traumatic injuries exceeds \$500 billion around the world (CDC, 2022; Yellman, 2022).

In 2003, the Accreditation Council for Graduate Medical Education (ACGME) recommended a reduction in clinical residency hours, which caused gaps in addressing medical needs of patients, including trauma patients (Eaton et al., 2020; ACGME, 2001; Aiken et al., 2021; Bethea et al., 2019). From this disparity, the use of advanced practice nurses (APN) began to grow, as APNs are positioned to provide efficient, high-quality care with positive patient results (Aiken et al., 2021; Bethea et al., 2019; Choudhry et al., 2021; Collins et al., 2014; Eaton et al., 2021; Jarrett et al., 2009; Johal & Dodd, 2017; Kutzleb et al., 2015; Woo et al., 2017).

Trauma services utilize advanced practice nurses (APNs) who function as trauma nurse practitioners (TNP) in their multidisciplinary patient care approach. TNPs can safely manage low acuity trauma patients in collaboration with a team of trauma surgeons, providing cost-effective measures with high patient satisfaction scores (Eaton et al., 2020; Bethea et al., 2019; Collins et al., 2014; Jarrett et al., 2009; Choudhry et al., 2021; Aiken et al., 2021; Leede et al., 2020;

Kutzleb et al., 2015; Woo et al., 2017; Jarett et al., 2009; Eaton et al., 2021; Ryan & Rahman, 2012; Bethea et al., 2019; Holliday et al., 2018).

Local Problem

A hospital in the Rocky Mountain Region has initiated trauma category redesignation. The trauma team expressed a desire to add TNPs in anticipation of increased admissions. Admissions require discharge planning and provide opportunities for holistic care. Trauma nurse practitioners are well suited to create these discharge plans in order to increase patient throughput, decrease length of hospital stay, and increase support staff collaboration (Johal et al., 2017; Walter et al., 2015; Woo et al., 2017).

Summary

Trauma centers are a component of larger, comprehensive public health services providing a broad range of care to their patients. (Choi et al., 2021; ACS, 2022). The foundation of nursing care is contingent on the idea that patients are treated holistically (Sasser et al., 2009; Frisch & Rabinowitsch, 2019; Jarrett et al., 2009; McFadden et al., 2022; Lome et al., 2010). This quality improvement project will provide the opportunity for TNP discharge plan development with collaborative input from the surgical nursing staff at one trauma center in the Rocky Mountain Region. The evidence from this project will impact policy change by presenting the benefit of TNPs increasing throughput, enhancing collaborative multidisciplinary team communication, and holistic care for patients and families.

Methods

An extensive literature review was conducted using the following databases: CINAHL, Google Scholar, and PubMed. Databases were searched using terms “trauma nurse practitioner,” “trauma,” “staff satisfaction,” “throughput,” “discharge planning,” and “patient-centered care.” Inclusion criteria included patients admitted to trauma service, TNP-led discharge plan development, and peer-reviewed articles from 2007 to 2022. Focused outcome measures were staff satisfaction, patient-centered planning, and length of stay. Excluded articles were those that provided a foundation for nursing case management, but were not directly related to the nurse practitioner’s role in a patient-centered discharge plan (Moher et al., 2009).

Results

Efficiencies in Care

By developing a patient-centered plan of care, TNPs have a positive impact on patient throughput, improved documentation, providing cost saving to organizations, easing financial burdens for patients, and increased patient satisfaction (Eaton et al., 2020; Bethea et al., 2019; Kutzleb et al., 2015; Walter et al., 2015; Johal & Dodd, 2017; Collins et al., 2014; Biffi et al., 2021; Woo et al., 2017; Hardway et al., 2020; Holte et al., 2015; Bardes et al., 2017; Holliday et al., 2017).

Collaborative input from trauma surgeons adds a layer of medical expertise, allowing TNPs to focus on tailoring discharge plans that meet the holistic care needs of patients. This cooperation increases throughput leading to a decrease in length of stay (LOS) while increasing communication between the multidisciplinary teams leading to increased staff satisfaction

(Collings et al., 2014; Morris et al., 2012; Holliday et al., 2017; Cowan et al., 2006; Hardway et al., 2020; Bethea et al., 2019; McNicholas et al., 2017; Noffsinger et al., 2020; Bowcutt et al., 2006; Jeffers, 2021; Jarrett et al., 2009; Thoma & Waite, 2018).

Collaborative Communication

TNPs incorporated into a trauma team interact collegially with team members. While the patient remains at the core, multidisciplinary team members collaborate and develop treatment plans and goals. The TNP coordinates patient needs, refines goals, augments communication, and ensures a successful transition in care (Akuamoah-Boateng et al., 2019; McFadden et al., 2022; Cowan et al., 2006; Holliday et al., 2018; Cajanding, 2016; Johal & Dodd, 2017; Jarrett et al., 2009; Bardes et al., 2017; Bethea et al., 2019; Choudhury et al., 2021; Collins et al., 2014; Haan et al., 2017; Harway et al., 2020; Holliday et al., 2017; Holte et al., 2015; Leede et al., 2020; Biffle et al., 2021; Morris et al., 2012; Schaffer et al., 2022).

Complexities of Trauma Care

The proposed inclusion of a TNP into a trauma service team is an adjunctive role relying on the guidance of the trauma surgeon. TNPs are suited to be a complement to the trauma team, but not a replacement (Hardway et al., 2020; Johal & Dodd, 2017). Trauma patients have complex discharge needs emphasizing strategies the TNP can utilize to decrease LOS, increase discharge orders written by noon (DBN), and make trauma rounding recommendations to enhance continuity of care. (Akuamoah et al., 2019; Eaton et al., 2020; Sammann et al., 2019).

Nursing Leader and Mentor

An additional benefit of the TNP is providing nursing leadership and mentoring activities to teach nurses about the complexities of caring for trauma patients. Acknowledging that bedside nurses have varying years of experience, the TNP can take the lead as a clinical expert, addressing and adapting teaching styles to meet the various levels of knowledge and increase the critical thinking skill level of the bedside nurse (Bowcutt et al., 2006; Lome et al., 2010; Collins et al., 2014).

Introduction and Problem

A Level II trauma center in the Rocky Mountain Region has recently applied for redesignation to a Level I trauma category. Early planning to accommodate for the anticipated increase in trauma admissions has begun and the trauma team has expressed interest in expanding their team to include nurse practitioners (Collins et al., 2014; Lu et al., 2021; Aiken et al., 2021; Cowan et al., 2006; Woo et al., 2017).

TNPs have experience with hospital policies, protocols, and the complementary addition of interdisciplinary specialists. TNPs are ideally suited to provide patient and family education, advancing throughput while positioning the patient for a positive discharge experience (Eaton et al., 2021; Walter et al., 2015; Aiken et al., 2021; Noffsinger et al., 2020; Lome et al., 2010; Haan et al., 2007; Hardway et al., 2020).

Problem Statement

The goal of this improvement project was to explore improved throughput for trauma patients with TNP-developed patient-centered discharge plans. The results of the project would

contribute to the creation of a policy in support of the creation of a trauma nurse practitioner position. The design would assess how the TNP role can impact the patient length of stay (LOS), and ensure discharge needs are solidified leading to increased collaboration and satisfaction.

Intervention

The Iowa Model of Evidence-Based Practice provided the theoretical framework for the project. This model is initiated when there is a trigger for change. Early on in the development of the proposal, a discussion was held between the Director of Quality and the Director of Critical Care, Emergency, and Trauma Services after an application for a change in trauma attestation from a Level II to a Level I facility was made. This is the first step in the process and helps formulate a plan for the next steps. The discussion with leadership sparked the QI research question, design, and implementation of the intervention (Buckwalter et al., 2017; Iowa Model Collaborative, 2017).

The next step in the Iowa Model is to identify organizational priorities for the project implementation. With initial support verbalized, the project leader forged ahead with the design. A team was formed and two focus group discussions were held; one with the neurosurgery team and a second with the surgical discharge nursing group. Following the Iowa Model, a literature review was initiated and sufficient published research was available to support a QI project (Lloyd et al., 2016; Buckwalter et al., 2016; Perry et al., 2020; Lome et al., 2010).

In the algorithmic pattern of the Iowa Model, the next step was the design implementation. At this stage, the QI project began with the project leader developing the Patient-Centered Discharge Plan “DRAFT” for daily rounds on admitted trauma patients.

The draft incorporated suggestions from the focus group discussion meetings. The team members verbalized information they felt would be helpful to highlight on the form in order to meet the goal of successful transitions in care, ultimately discharging patients home safely (Buckwalter et al., 2017; Iowa Model Collaborative, 2017).

The quality improvement (QI) project began with two days of direct observation on the trauma surgical unit with the unit discharge nurse, case manager, and neurosurgery team. This opportunity provided details regarding current discharge planning processes, the timing of transitions in care, delay issues, and areas for improvement. An underlying focus was the collaborative work on patient throughput and discharge planning within interdisciplinary teams (Eaton et al., 2021; Akuamoah-Boateng et al., 2019; Holliday et al., 2017).

Following the observational experience, the first of two focus group discussions were held. The focus group discussion introduced the TNP concept and highlighted how a patient-centered discharge form could be useful as an organizational tool, enhancing collaborative communication between multidisciplinary teams. The draft was shared and explanations about the benefits of the discharge form were explained, including efficiencies in care, decreases in redundancy, coordination of multidisciplinary recommendations, and outlining patient and family needs. All of these items help create a path for a successful discharge process (Akuamoah-Boateng et al., 2019; Noffsinger et al., 2020; Sammann et al., 2019).

The project enlisted four trauma patients followed by the neurosurgery service into the initial TNP rounding collection. The TNP completed rounds with the neurosurgery team for the first week. The morning rounding process provided an opportunity to compile updates on patient status and identify unmet needs arising from the previous shift as well as address any issues that

required attention early in the day (Sammann et al., 2020; McNicholas et al., 2017; Bethea et al., 2019; Lu et al., 2021).

The patient-centered discharge form was used to collect data detailing daily patient needs. The collection of this specific information identified the coordination of patient care and diagnostic results, addressing daily changes in patient needs. This also ensured that nursing staff understood the most current plan of care, and multidisciplinary team recommendations were available to meet the patient's needs (Hardway et al., 2020; Bethea et al., 2019; Collins et al., 2014). The patient-centered discharge plan was updated daily in written form, as it did not become a part of the permanent medical record in this trial.

During the second week of the intervention, the patient-centered discharge form was shared with the discharge nurses. The discharge nurses were able to use the form and collect data related to patient needs and multidisciplinary updates. This information was written on the patient-centered discharge form by accessing the electronic medical record (EMR) and attendance at the afternoon collaborative rounding meeting. This is a daily afternoon rounding meeting that includes charge nurses from all nursing units, therapy services, case managers, and social workers. Physicians update the entire group regarding patient status and expectations for patients ready for or nearing discharge.

At the completion of the intervention, a second focus group discussion was held with the same team as described above. In the second discussion group, recommendations and clarifications were reviewed. An anonymous survey was provided electronically through Survey Planet for those members interested in recording their thoughts regarding the discussion and

patient-centered discharge plan. The project leader meticulously reviewed the findings at the completion of the implementation phase to prepare the results for dissemination.

Methods

The first measurable data point compared the information gathered by the TNP using the patient-centered discharge plan to the discharge nurse using the same form on four different patients. The second measurable data point was feedback from the focus group discussion. The discussion was completed pre- and post-intervention with the neurosurgery and discharge nursing teams. Each group participated in the discussion and had access to the paper form of the patient-centered discharge plan. Following the final discussion group, each member was emailed a short electronic survey.

Statistical Analysis

Data from the week-long rounding component of the intervention included a comparison sample size, gender, educational level, length of stay, and discharge orders written by noon. A second data point included a post-focus group discussion survey about the TNP role electronically available to participants from Survey Planet. The survey was open for one month, responses were anonymous and voluntary.

Research Compliance Regulations

The project was reviewed and approved by the Institutional Review Board (IRB) at Montana State University and the project site IRB organizational board. Data were de-identified and kept in a locked, secured location until the completion of the project. At completion, all

associated data and collected paperwork were destroyed through the confidential shredding system at the hospital organization.

Results

This project focused on the direct impact of a TNP discharge plan for trauma patients admitted to the trauma surgical care unit. Trauma patients are initially evaluated in the emergency department where stabilization and resuscitation efforts are maximized. During the entire month of the implementation of the QI project, there were 52 trauma patients in total. Five were children and were excluded from the project. Thirty-one were discharged from the ED, while 17 were admitted. Women comprised 23.5% of admission compared to 76.4% of men admitted. The average LOS was 2.94 days with 47.1% of discharge orders written by noon.

Four adult trauma patients, admitted to the trauma surgical floor, were followed by the project leader and identified as X1–X4. All personal information was de-identified. Daily rounding was completed, and data were updated to the patient-centered discharge form from daily rounds, electronic medical record review, and attendance at the multidisciplinary afternoon rounding meeting. The admitting diagnosis was identified, along with gender, age, marital status, educational level, employment status, follow-up appointment and a phone call from the case manager 24 hours after discharge, length of stay, and discharge order written by noon.

The four project participants (TNP) were admitted following a traumatic injury. Two patients were diagnosed with spinal fractures following falls. A third patient had a compression fracture to L5 and the fourth patient suffered a gunshot wound after a hunting accident. The average LOS was 4 days. Fifty percent of the cohort had discharge orders written by noon

(DBN). These patients were followed without the subjectivity of imminent discharge, but rather the objective focus of daily progression to readiness to leave the acute care setting.

Figure 9. Information Gathered by the TNP, without Imminent Discharge

| TNP | DX | Label | gender | age | LOS | DBN |
|-----|----------------|-------|--------|-----|--------|-----|
| | GSW | X1 | male | 42 | 3 days | yes |
| | Fall | X2 | male | 83 | 6 days | no |
| | Fall | X3 | male | 76 | 3 days | no |
| | Compression FX | X4 | female | 78 | 4 days | yes |

The discharge nursing group (RN) used the patient-centered discharge form and completed it for four different patients. The patient-centered discharge form was used for these patients; however, admittedly, the nurses used it for patients who had imminent discharges. Three of the patients suffered falls and all were over the age of 76. One admitted patient was a driver in an MVC. The average LOS was 3.5 days with 75% having DBN. The discharge nursing group was aware of patients positioned for discharge and utilized the form for patients who were anticipating discharge in 24–48 hours.

Figure 10. Information Gathered by the Discharge Nursing Group, with Imminent Discharge

| RN | DX | label | gender | age | LOS | DBN |
|----|------|-------|--------|-----|--------|-----|
| | Fall | X1 | Female | 83 | 4 days | no |
| | Fall | X2 | Female | 76 | 3 days | yes |
| | MVC | X3 | Male | 63 | 2 days | yes |
| | Fall | X4 | Male | 88 | 5 days | yes |

In assessing the differences in the data collected from the TNP and discharge nursing group, there were differences in which patients had data collected on the form. While the TNP was following patients each day, the discharge nurses used the form immediately prior to discharge. The TNP utilized the form to a more granular level, optimizing each category to visualize patients' daily progression of recovery. For the discharge nurses, the form was used as a final checklist to ensure all needed equipment, medications, and follow-up appointments were completed.

Focus group discussions were held pre- and post-intervention. During the pre-intervention focus group, a brief explanation of what a trauma nurse practitioner can provide, as well as a preview of the patient-centered discharge plan, was presented. Feedback was received from the team members regarding recommendations of data important to capture on the form.

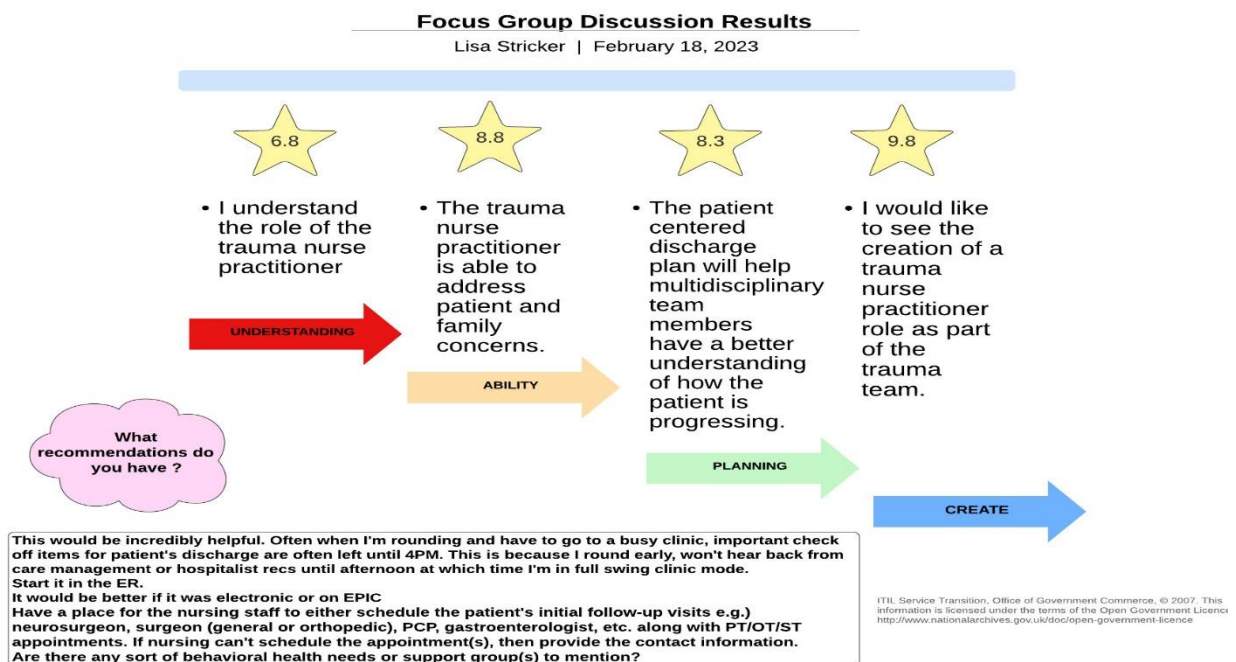
The post-intervention focus group discussion occurred 4 weeks later. This provided an opportunity to share thoughts on the TNP role and recommendations for improvements to the patient-centered discharge form. There were 13 total participants in the post-intervention focus group discussion. A survey was sent electronically to elicit anonymous responses to four

questions with a Likert scale and an accessible area for narrative text. The return rate was 46%. Six percent understood the role of the trauma nurse practitioner, 8.8% felt the trauma nurse practitioner was able to address patient and family concerns, 8.3% felt the patient-centered discharge plan would help multidisciplinary team members, and 9.8% would be in favor of a TNP role creation. Comments included, “It would be better if it was electronic or on EPIC” and “Start it in the ED,” as well as two longer comments.

This would be incredibly helpful. Often when I'm rounding and have to go to a busy clinic, important check-off items for a patient's discharge are often left until 4 PM. This is because I round early and won't hear back from care management or hospitalist recs until the afternoon at which time I'm in full-swing clinic mode.

Have a place for the nursing staff to either schedule the patient's initial follow-up visits neurosurgeon, surgeon (general or orthopedic), PCP, gastroenterologist, etc. along with PT/OT/ST appointments. If nursing can't schedule the appointment(s), then provide the contact information and are there any sort of behavioral health needs or support group(s) to mention?

Figure 11. Focus Group Discussion Results



Discussion

The comfort that TNPs have in dealing with patient and familial concerns, as well as interpersonal communication with therapy services, social workers, physicians, and nurses, can be invaluable. While the TNP remains available on the nursing units, the surgeon benefits from alleviated time pressure addressing the nonemergent needs of stabilized patients and can remain focused on their expertise in resuscitation and stabilization of acutely injured patients (Johal & Dodd, 2017; Lu et al., 2021; Collins et al., 2014; Haan et al., 2007).

Inclusion of the nursing staff into daily rounding makes for an inclusionary group with a full understanding of the daily goals, plan of care, enhancement of critical thinking skills, and an increased sense of value, which all lead to nursing retention (Jarrett et al., 2009; McNicholas et al., 2017; McFadden et al., 2022; Lu et al., 2021; Aiken et al., 2021; Cajanding, 2016; Haan et al., 2007). TNPs can help further nursing knowledge surrounding the care of trauma patients by mentoring nursing staff, encouraging engagement, and fostering collaborative communication exchanges (Woo et al., 2017; Cowan et al., 2006).

This QI project underscores the positive impact the TNP can bring to increase throughput. While nurses know that planning for discharge begins at the moment of admission, the TNP is positioned to make this a visual flow plan. With each daily recommendation and progression (or regression) available on one page, all team members can have a reference page for a quick review of the plan of the day.

The results of this QI project provide evidence that the TNP role would have a positive impact on the enhancement of collaborative communication and infusion of the collegial work of multidisciplinary teams into one easy-to-locate and interpret patient-specific discharge plan. The

role of structured rounds with the attending team provides an opportunity for the advanced practice nurse and bedside nurse to become involved in the daily goals of patients. The all-inclusive member team rounding conference solidifies this information for stakeholders representing individual hospital units (Noffsing et al., 2020; Akuamoah-Boateng et al., 2019).

This type of discharge plan works best when all members of the disciplinary team have input. At its core, collaborative communication lays the foundation for a detailed discharge summary. There were some differences in the information collected by the TNP when compared to the discharge nurse. The same patient-centered discharge form was used; however, the TNP highlighted information that was needed to show progression in the patient's status with an underlying focus on ensuring the granular physical and social needs were met for discharge.

While the discharge nurse collected more specific details, the discharge nurse utilized the form as a checklist to ensure all the final medical needs were available just prior to discharge. The TNP can lead coordination efforts between multidisciplinary teams, contributing to efficiencies in these complex patients (Walter et al., 2015).

This same result was found in several literature review studies, outlining that TNPs possess advanced skills forged into enhancing services, especially when team members understand the daily goal. This shows the benefit of one aspect of what the TNP can provide to patients as well as staff nurses. The TNP is able to be a consistent provider available on the nursing unit to address patient and nursing staff needs in real-time. In the evidence, this piece alone contributes to decreased LOS, efficiencies in care, and increased collaborative communication and satisfaction from patients and staff. The ability to provide an immediate response to requests lays the foundation for satisfaction and support (Noffsinger et al., 2020;

Holliday et al., 2017; Collins et al., 2014; Walter et al., 2015; Akuamoah-Boateng et al., 2019; Cajanding, 2016; McNicholas et al., 2017; Jeffers, 2021).

Having a TNP dedicated to assisting safe transitions in care is a hallmark role, especially for trauma patients who have many complex discharge needs. TNPs can function in a more autonomous role when compared to the discharge trauma nurse and are able to provide enhanced discharge education to patients, arrange for follow-up visits, and mentor nursing staff along the way. This QI project lays a foundation for a further pilot study that would allow the TNP a more enhanced role to assess post-discharge issues, return phone calls to the surgeon's office, or readmission rates. In this QI project, there were challenges in gaining a more autonomous role, which could have resulted in more defined benefits of the direct impact of the TNP.

The TNP illuminates the discharge plan working in collaboration with the multidisciplinary team and is a liaison between the surgeon and staff while being available for any last-minute needs the patient may have (Jarrett et al., 2009 Harway et al., 2020; Haan et al., 2007; Bardes et al., 2017). Often due to time constraints, discharge summaries may lack key details of the hospital stay or potential barriers affecting the patient after discharge (McFadden et al., 2021). This discharge plan provides principal factors that may influence post-hospital care and avoidance of readmission or failure at the desired discharge designation (Noffsinger et al., 2020; Akuamoah-Boateng et al., 2019; Walter et al., 2015).

Caring for trauma patients has complexities that may extend beyond physical injuries. Assessing social support needs, lack of resources, and monetary instability, discharge planning in trauma patients can be complex and prolonged. This requires a multifaceted approach to avoid duplication of services and medical errors, and ensure that the patient experiences a safe

discharge process while remaining efficient (Jeffers, 2021; Perry et al., 2020; Bardes et al., 2017).

TNPs have years of experience as registered nurses and are familiar with general patient care needs in the hospital as well as more advanced specialized care. This helps to solidify the TNP role as one that provides efficient quality care focusing on the needs of the patient, nursing, and multidisciplinary staff. Discharge planning with positive outcomes are best when started on the day of admission (Jeffers, 2021; Cajanding, 2016; Lu et al., 2021). This quality improvement project promotes cost-effective care, improved communication, increased throughput with a decrease in length of stay, and better patient understanding of discharge expectations and goals (Cajanding, 2016; Collins et al., 2014; McNicholas et al., 2017; Holliday et al., 2017; Jeffers, 2021).

CHAPTER FOUR

REFLECTIONS ON DNP ESSENTIALS

The American Association of Colleges of Nursing developed eight essentials for advanced nursing practice doctoral programs. These elements provide a theoretical framework for advanced nursing practice and are present throughout the DNP program at the Montana State University Mark and Robyn Jones College of Nursing. The infusion of the DNP essentials has occurred throughout my doctoral academic experience along with the final culmination of this quality improvement project. The eight essential components are listed below and further detailed in this final chapter. The components serve as the foundation for the development of the patient-centered discharge plan for trauma patients (AANC, 2006).

1. Scientific underpinnings for practice
2. Organizational and systems leadership for QI and systems thinking
3. Clinical scholarship and analytical methods for evidence-based practice
4. Informational systems/technology and patient care technology for the improvement and transformation of healthcare
5. Healthcare policy for advocacy in healthcare
6. Interprofessional collaboration for improving patient and population healthcare outcomes
7. Clinical prevention and population health for improving the nation's health
8. Advanced nursing practice

Essential I: Scientific Underpinnings for Practice

Essential I provides the outline for the scientific bedrock for practice as a doctoral-prepared nurse. The DNP student must obtain knowledge in scientific fields of study and integrate this into the practice of nursing science. This knowledge helps the DNP student in building a framework for advancing nursing practice. The coursework throughout the doctoral program builds on the experience from each subsequent classwork. As I solidified the experience from the required coursework, I was able to implement those strategies to design the quality improvement project. When focused on the care of injured patients, the trauma nurse practitioner (TNP) focuses on optimizing the health and wellbeing of the patient throughout their recovery process. By synthesizing the whole of nursing studies, the true art of healing is infused in caring for patients from admission to discharge.

Essential II: Organizational and Systems Leadership for QI and Systems Thinking

Essential II outlines the importance of organizational and systems leadership for quality improvement and system thinking. The focus of this construct requires the nurse practitioner to apply knowledge and skills of advanced care of patients with the goal of improving patient outcomes. DNP-prepared nurses are expected to practice evidence-based treatment while considering organizational policies, standards for improvement, and professional collaboration. In relation to this project, the focus was on strengthening patient outcomes by providing efficient, compassionate care while enhancing collaboration and communication with

multidisciplinary teams. The effect of providing efficient care to patients has the potential to lead to cost-saving measures for healthcare organizations.

Nursing 613, Finance and Budget in Healthcare Systems, provided a new foundation of knowledge for this learner. As a nurse who has not been involved in budgeting measures typically left to administrative leadership, I was able to design a business plan for the development of a house-call service with an advanced practice nurse making home visits for acute illnesses. By assessing current data, identifying community needs, and creating a business proposal for financing requests, this project represented this essential element by learning how to measure the cost-effectiveness of programs while balancing them with finance, health policies, and minimal risk.

The most effective course that helped me apply this component was Nursing 608, Design in Healthcare Delivery Systems. This class has been the most impactful in how I developed strategies for success in the QI project. This knowledge continues to motivate me in my current practice as an advanced practice nurse as I think about how systems in healthcare impact the delivery and optimization of throughput. Many of the maps and graphs I designed and have included in this QI project I learned from that specific class. Preparing visual representations of workflow can assist in recognizing areas for change, collaboration, and patient safety.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

Essential III focuses on clinical scholarship and analytical methods for evidence-based practice. For the DNP, this type of scholarly work expands from the roots of initial research and allows the advanced practice nurse to incorporate those results into practice. For this project, the

initial research set the foundation and provided a guide for the implementation and practice recommendations discovered. Throughout the project, the DNP candidate incurred challenges that instigated revisions and refocus. These are characteristics of leadership that set apart advanced practice knowledge from novice nursing. The Iowa Model for Evidence-Based Practice was used in the planning, development, and implementation of this project as it provides a foundational guide for evidence-based work.

In the course work covered in Evidence-Based Practice I and II, I was tasked with learning to critically review research and use those findings to create evidence tables, delineate levels of evidence of study, and evaluate the results for weaknesses and strengths. Taking the lessons learned from Nursing 604 and 605, I was able to excel in Graduate Scholarly Project Seminar coursework covered in Nursing 674. This course helped me develop synthesizing skills in writing after reading and assessing current evidence-based literature. Students were also able to evaluate fellow students' written work to provide feedback and recommendations. For this course, I wrote a final paper focused on Strategies for Treating Acute Pain Associated with Traumatic Injuries. This paper was planned as a potential submission for publication.

Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Healthcare

Essential IV outlines the component of information systems and patient care technology for the improvement and transformation of healthcare. Knowledge in data acquisition, informatic analysis, and application are underpinnings the DNP uses to incorporate these technological processes to promote patient care and organizational efficiencies. In Nursing 610, we learned how to develop a QI project. This group work was focused on utilizing data collected from an

electronic medical record and then applied to implement a planned intervention. My group focused on a family practice clinic that implemented an educational intervention providing information about the risk of diabetes. For my DNP, I was able to apply the knowledge learned from the course work as the project relied on the use of data extraction from the electronic medical record and trauma registry. This also provided data that was used in the creation of the value stream map.

Essential V: Healthcare Policy for Advocacy for Healthcare

Essential V covers the concept of healthcare policy for advocacy in healthcare. DNPs are positioned to perform as organizational leaders in the healthcare setting and also in advocacy roles in the public arena, including policy development and political action in the promotion of social justice and healthcare equity issues. In Nursing 609, Advanced Nursing Leadership and Roles, we learned about ethical and legal implications in practice and how, as nursing leaders, the advanced practice nurse is positioned to evaluate and resolve issues.

This project had a common thread from its inception that focused on improving collaborative communication in order to improve patient care while providing effective conversations with patients at discharge. The DNP-prepared trauma nurse practitioner is experienced to fit all of these roles. The DNP candidate for this project has been career-focused in promoting and advocating for nurses, as evidenced by academic endeavors, current practice in nursing education, and appointment as the APN representative on the Montana State Board of Nursing.

Essential VI: Interprofessional Collaboration for
Improving Patient and Population Healthcare Outcomes

Essential VI highlights interprofessional collaboration for improving patient and population health outcomes. Highly effective teams rely on collegial communication. With healthcare becoming more technological, multidisciplinary teams bring their expertise into the care realm. This means that each team member must be able to convey information and have that disseminated clearly to care members.

In Nursing 614, Vulnerability and Healthcare Diverse Communities, I participated in a group project focused on healthcare disparities on the Blackfeet Reservation. We were fortunate to have a tribal member on our team. This provided invaluable insights into nuances of disseminating educational strategies that would yield higher positive results. We developed an educational plan for reducing health vulnerabilities in this community.

Nursing 611, Program Planning and Evaluation further embedded the process of collegial work. This group project developed a QI project proposal Colorectal Cancer Screening Improvement Program. The culmination of this proposal design relied on a literature review, with the underlying goal of increasing colon cancer screening in patients who seek care in a primary care setting. Our group used the Plan-Do-Study-Act (PDSA) model for the proposal. We used current data to apply to the proposed design and described how data would be collected, measured, and evaluated. This required the team to develop effective communication and remain focused on a common goal.

The DNP is positioned to be a leader in ensuring collaboration in patient care, which is vital in all patient care instances, but even more in complex care delivery, to meet the patient's

needs and in the overall system delivery. This DNP project is focused on the development of a discharge plan with the patient at the center of the focus. This organizational form helps each multidisciplinary team to visualize their progress as well as other team goals.

Essential VII: Clinical Prevention and Population Healthcare for Improving the Nation's Health

Essential VII focuses on clinical prevention and population healthcare to provide improvements in health for the population as a whole. Health promotion and disease prevention are core foundations in nursing. The ability to discern data and find the applicable points that measure successes and areas for improvement in health maintenance and management in caring for people is a component of the educational competency from this essential. This QI project focused on satisfying patient discharge needs in order to help solidify a successful transition out of the acute hospital setting. In this project, this ideal is exhibited through the goal of decreasing the length of stay and decreasing readmission rates for complications. Underlying this component, the TNP can take the lead in educating the patient on safety measures to undertake daily as well as health promotion activities.

Essential VIII: Advanced Nursing Practice

Essential VIII is the culmination of advanced nursing practice and describes the professional actualization the DNP strives for throughout the academic and clinical practice experience. This essential highlights the importance of growth in knowledge and advancement in skills and critical thinking, each contributing to the art of advanced practice nursing. The nursing process remains at the center of nursing practice even at this level. Nursing is a lifelong

educational endeavor. The DNP will provide educational opportunities for colleagues as well as assume the learner role when new information is available. These ideals solidify the momentum to achieve excellence in the advanced practice of nursing. The TNP is positioned to be a great leader and mentor for nurses. In fact, several of the literature highlight that the TNP role or advanced practice role can be a catalyst for growth and development in novice nurses leading to retention.

There were many lessons learned and gained from this experience. As a nurse practitioner for 16 years, returning to graduate school brought along an inherent and logical set of challenges. Returning to the role of a student was not easily forgotten. I also found myself in a juxtaposition of the “reverse imposter” syndrome. I can recall having that experience years ago as I started as a novice NP in 2008. I had already been a nurse for 16 years when I returned to graduate school for the first time. Then, as an NP, I felt like an imposter, that I didn’t know anything.

It is funny how the mind works as, now, with 32 years of nursing practice, both as a registered nurse and advanced practice nurse, returning to school I felt like a complete novice. I spent time overthinking, filled with anxiety, or, at times, would remain silent about my personal experiences as an NP to not be seen as an over-sharing annoyance. I am thankful for the experience. This second round of graduate school afforded me the opportunity for another round of life lessons. This time about priorities, planning, rejection, revision, and perseverance.

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APPENDICES

APPENDIX A

LITERATURE REVIEW TABLE

Appendix A: Literature Review Table

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
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| Aiken (2021) | Determine whether the presence of more NPs leads to increased patient outcomes | Cross-sectional data of 579 hospitals assessing data from RN4CAST-US nurse survey, HCAHPS patient survey, surgical patient discharge summary, AHA survey | Random sampled nurses 22,273 RN's, discharge data for 1.4 million surgical patients, HCAHPS data for 86% of study hospitals | Mortality, readmissions, LOS, MSPB, patient experience, patient and nurse reported quality experience | Mailed questionnaires to RNs from randomly sampled state licensure lists. Median numbers of NP at facility reported by RN, divided by number of beds HCAHPS patient response regarding experience | Logistic regression models Odds ratio Zero-truncated negative binomial regression models | Outcomes reported from 3 hospitals with varying NP/bed ratios RN reported 37% with 3+NP/100 bed rate hospital high 27% with 1+NP/100 bed rate hospital high 51% with 3+NP/100 bed recommend 38% with <1 NP/100 bed Sig (P<0.05) MSPB mean results 3+ NP/100 bed 0.993 compared to 1.015 for hospitals with 1-2.9 NP/100 bed and 1.019 for hospital with <1 NP/100 beds Hospitals with 3+ | More favorable reporting from hospital with incorporated NPs on staff Medicare costs lower with NP on staff at hospital Reported burnout lower with hospitals employing NPs No significance if hospital had medical residents on staff Hospitals with NPs on staff had better outcomes: lower mortality, less readmissions, shorter LOS, increased patient satisfaction, lower Medicare associated costs, favorable quality indicators |

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
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| | | | | | | | NP/100 beds spend 5% less MSPB compared to <1 NP/100 beds | |
| Akuamoah -Boeteng (2019) | Assess the impact of IPC model (RAMPED- UP) on LOS in surgical trauma population | Convenience sample 100 participants targeted Pre and post RAMPED- UP group | Pre and Post RAMPED-UP group Surgical trauma patients 28 bed surgical trauma unit | 5 phase study Assessment Development Pilot Intervention Post analysis Assessment phase = retrospective chart review, demographics, and DC info Development phase = trauma task force formation, LOS, design of instrument Pilot phase= education to staff about RAMPED-UP tool Intervention = | Demographic data, ISS, DBN, RAMPED-IP LOS, CMS- LOS, average IS values, initial disposition, final disposition | SPSS t- test and chi squared measure difference of the two groups Spearman correlation to determine IS values, LOS Statistical sig $p < .05$ CI 95% Instrument complete if 80% content done | Initial disposition ED to ICU higher in RAMPED-UP CMS predetermined LOS 5 days for both groups 48 patients in the pre group CMS-LOS <5 days compared to 38 patients in the RMP-UP Median LOS pre-RMP-UP 5.0 (IQR = 8.0) compared to median overall LOS of 5.5 (IQR = 7.3) in the RMP-UP group ($p = .830$) | RMP-UP model did not decrease the overall LOS Had the most significant effect on LOS during days patient received the model process IPC model can impact DBN, multidisciplinary rounds affect collaboration and disposition Inclusion of social worker and case coordinator vital role in assisting with discharge to home with home health services |

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
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| | | | | | | | Pre-RMP-UP group LOS range 0.3- 39.3 days compared to 0.3-45.6 days in the RMP- UP group DBN 16.2% in pre-RMP and 34.4% in the RMP | |
| Allen (2020) | Evaluate healthcare practitioners’ perception of a communication tool TRANSITION to communicate with elder patients during transition of care | Exploratory descriptive qualitative design and semi- structured interviews Thematic analysis | 22 nursing and allied health providers used the tool to guide communication about transition of care | Tool developed to assess transitional care for elderly patients with chronic illness | Context inquiry with semi- structured interviews with patients and healthcare professionals Co-design adapted for focus group | Consolidated criteria for reporting qualitative studies checklist Qualitative data was thematically analyzed. Data was coded with interrogated interpretations by first author Compare and contrast codes and categories within and between interviews | Interviews were 14 minutes (SD 4.5 min, range 5-25 min) Face to face Practice in healthcare 8 years (SD 6.8, range 2 months to 23 years) Current role 3.3 years (SD 3.7 years, range 2 months to 12 years) | Effective communication is required to provide better outcomes for patient’s throughput As patients spend less time in the hospital, this tool helps staff focus on addressing complex care needs Communication tools can be helpful to direct conversations to focus on needs of patients as they transition in care areas. |

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
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| Bardes (2017) | Impact of discharge team on LOS and DBN | Retrospective review | 3053 patients DBN prior 3801 patients DBN after | DBN LOS Retrospective record review 2008-2009 prior to intervention And 2011-2012 after intervention Exclusion 2010 when intervention was developed | Inclusion patients >18 years Age Gender Discharge time Discharge disposition Insurance ISS LOS | Fisher's exact test Pearson correlation P value significance at P < 0.05 | Discharge Pre 3053 Post 3801 Age/mean Pre 43.1 Post 45.3 P < 0.001 Male Pre 2052 Post 2573 P 0.41 ISS Pre 11.4 Post 9.1 P < 0.001 ISS > 15 Pre 796 Post 520 P < 0.001 | Trauma patients use large hospital resources Complex discharge needs Rural trauma centers Increased poverty Poor insurance coverage Fewer resources Transportation 15% decrease in LOS after discharge team TNP identify discharge barriers and anticipate early discharge needs to address and create plan Increase communication between interdisciplinary teams |
| Bethea (2019) | Demonstrate the impact of TNP model, comparison of elderly patient care coordinated by TNP versus | Retrospective cohort study of patients admitted to Level I trauma center between | 1363 patients in the study n=140 to TNP service n= 1223 to non-trauma service | Patients with Injury Severity Score (ISS) of 10 or less Admission to non- critical care unit | Age, ISS, gender, LOS, injuries, incidence of unplanned ICU admission, discharge location, readmission in | IBM-SPSS 22.0. Descriptive statistics. Mean and SD Continuous variables | Demographic s and comorbidities similar for both groups TNP had less pulmonary (3.6 % vs. | Need for focused patient care to improve outcomes Improvement in decreased ED dwell time Time to surgical intervention |

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| | non-trauma NP | December 2014 and June 2017 | | | 30 days, in- hospital complications, mortality, total hospital charges | were compared using independent t or Mann- Whitney U tests Categorical variables compared chi square or Fisher's exact test | 15%), neurologic 19.3% vs. 29%), and cardiovascular (70% vs. 81.8%) diseases but higher immunologic disease states. TNP group had following results: shorter LOS and less hospital charges more patients discharged home 67% vs. 36%) less discharge to ECF (25.7% vs. 51.9%) unplanned ICU admission (1.4% vs. 2.1%) | Early risk identification critical to positive outcome Elderly patients require comprehensive management of comorbidities -may need consult with geriatrics Assess for Polypharmacy Pain management Advanced care planning Discharge disposition Recognition of delirium |

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| | | | | | | | mortality and 30-day readmission no significant difference | |
| Biffi (2021) | Implementati on of standardized patient management protocols and multidisciplin ary team involvement on trauma service led to decreased LOS | Retrospectiv e analysis of Trauma Registry data comparing LOS pre and post implementati on of standardizes process on trauma service | 1613 pre 1590 post Were compared | ISS LOS Comorbidities Unplanned ICU admission Disposition | Demographics trauma patients Mechanism of injury Admission disposition Comorbid chronic conditions | Unpaired t tests (when comparing mean values) Moods median test (comparing median values) X2 test and analysis of variance Statistical sig p<0.05 | LOS decreased by 1 day p<.0001 And for the subgroups over 65 years p<.0001 Older patients were discharged home 13% more often in POST ISS and LOS – discharged on day 1 post injury mean ISS lower than longer LOS LOS was longer if discharge was done by non- trauma service PRE 4 days vs. 3 days, p=0.0305 but | Trauma admissions varied during the week. Friday and Saturday busiest trauma days Monday slowest Sunday lowest discharges Friday and Saturday discharges increased to same levels as weekdays One day reduction in LOS Expand role of TNP to follow patient from admission to discharge Disposition plan for every patient APP better understanding of hospital patterns of care and continuity of throughput |

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| | | | | | | | not for POST 2 days vs. 2 days, p=0.3303 | |
| Choudhry (2021) | Comparison initial diagnosis and management plan for orthopedic trauma by TNP compared to British SHO (medical resident equivalent) | Retrospectiv e study, | 100 patients' cases with acute minor fractures assessed by 5 APN with 5 years of experience in ED | Of the 100 cases 50 referred to SHO 50 referred to fracture clinic Same 100 cases sent to novice SHO and senior SHO for comparison | Cases were presented with history, examination, imaging, findings, SHO had to present diagnosis and plan of care. Education cohort APNs had 2 stage education programs with 10-part lecture series | Diagnosis/ Treatment Novice SHO 72% / 73% Experienced SHO 92% / 94% APN 77% /76% After training cohort APN 83% / 89% | Experienced SHO had greater number of correct diagnosis and management After the APN completed the ortho education program diagnosis accuracy increased 77% to 83% and management from 76% to 89% | With first cohort (no specialized education for APN) APN performance similar to novice SHO After education cohort APN had increase in initial care treatment, better diagnosis, patient satisfaction, cost- effectiveness with APN group |
| Collins (2014) | Inclusion of APN decrease LOS, decrease hospital charges, improve staff satisfaction | Retrospectiv e study | 2012 results n=3053, 2012 results n= 2559 2011 results n= 2671 | ISS, LOS, Associated patient costs over 12-month pilot program, nurse and attending satisfaction survey | 3 management areas managed by trauma service T1 = ICU T2 = stepdown (pilot area) | 6-month comparison CMI, ISS, SD LOS stepdown 2010 (n=972, CMI | Addition of NP decreased LOS from 7.2 to 6.4 days Patient savings 9,111.50 on hospital | The addition of TNP to trauma service decreased LOS, savings of 9 million in hospital charges Experience in caring for trauma patients as a nurse, increased |

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| | | | | | <p>T3 = TNP service, for patients on lower acuity units</p> <p>Pilot program with TNP – morning rounds, teaching conference, first line contact with patient, families, and nurses, attend daily discharge huddle, EMR update, order initiation</p> | <p>4.03, ISS 20.1, SD 11.9) was 2.8 days</p> <p>2011 (n=999, CMI 3.69, ISS 19.7, SD 11.5) was 2.5 days</p> <p>Addition of APN, LOS decreased to 2.3 days Resulting in 0.35-day reduction (p=0.0033)</p> | <p>charges, 27.8 million reductions over 12 months</p> <p>Survey 100% physician and nursing satisfaction with TNP role on trauma service</p> | <p>patient, and nursing satisfaction as TNP</p> <p>LOS reduction 0.8 days</p> <p>Discharge instructions complex traumatic injuries by TNP better outcomes</p> <p>TNP assisted in medical resident education</p> <p>Patients and staff better informed about plan of care, workflow, and communication</p> <p>Efficient discharge</p> <p>TNP able to treat nonsurgical medical emergencies</p> |
| Cowan (2006) | Comparison APN/MD hospital care management and expedited discharge, | Comparative 2 group Quasi experimental design | 1207 general medicine patients n=581 experimental group n=626 control group | Control unit provided usual care Experimental unit APN followed patients in hospital and 30 days after discharge, hospitalist, multidisciplinary daily rounds | Measured LOS Hospital costs Mortality Readmission 4 months after discharge | LOS lower in experimental group vs. control group (5 vs. 6 days, p<.000a) Hospital savings 1591 | Group followed by APN/MD group had shorter LOS, lowered costs, no significant difference in mortality or complications when | APN comprehensive discharge plan and post discharge follow up proven reduction in hospital charges APN/MD collaboration increases expedited discharge, continuity of care, organized and creative |

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| | | | | | | per patient in experimental group | compared to usual care group MD alone | |
| Eaton (2020) | Validate the addition of advanced practice provider (APN/PA) optimized patient care delivery | Anonymous electronic survey Likert scale | Survey distributed to 274 trauma and surgical subspecialties at 9 Level I trauma centers | Detail questions/descriptio ns on participants experience on trauma or general surgery specialty that include APP | APP impact on Patient care Quality Outcomes Workload Resident education | Likert scale 5= always to 1= never Results categorized positive (always, usually), neutral (sometimes), or negative (rarely, never) | 76 attending surgeons responded= 28% response rate Patient care improvement 92% (n=69) Patient satisfaction 88% (n=67) Complex care coordination 87% (n=66) | NP enhance patient satisfaction Good patient experience equates high value target for health care system NP can provide more time with patients for discharge planning for complex situations, this increases patient and family concept of continuity |
| Haan (2007) | APNs added to trauma service to assist in patient care and direct trauma discharge team | Retrospectiv e cohort study at R. Adams Shock Trauma Center, Baltimore, Maryland Compare years – 19 98-1999 before TNP 1999-2001 residents in role | Comparison of discharge rounds of trauma patients prior to and after TNP discharge lead | Trauma Registry data Total trauma admissions Stay longer than 24 hours LOS Hours on diversion ISS | QI data Patient deaths Unexpected returns to ICU Readmissions after discharge Rates of calls to outpatient surgery department Walk in visits | Kruskal- Wallis test Wilcoxon sum statistics Jonckheere- Terpstra statistic | Discharge rounds by technique Death per 100 admissions Prior 4.6 Resident 4.7 TNP 4.2 Readmission Prior 2.6 Resident 3.2 TNP 1.1 Readmission ICU Prior 6.4 | TNP can improve continuity and bridge the gap to direct patient care Trauma surgeon can identify diagnostics or therapies to guide focused care With experience TNP can perform at a level equal to senior resident staff without decrease in efficiency of discharge rounding process |

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| | | 2001-2002 transition 2002-2005 TNP dc rounds | | | | | Resident 7.7 TNP 3.3 Clinic calls Prior 35 Resident 30 TNP 27 Walk in Prior 568 Resident 592 TNP 114 | TNP assist in decrease LOS Patients receive better organized discharge education and more detailed follow up affecting decrease in WIC and phone call to clinic |
| Hardway (2020) | Evaluate annual nonsurgical admission rates following TNP model and compare patient outcomes between TNP and hospitalist service | Retrospectiv e cohort study | 2 cohorts Trauma patients managed by TNP vs. trauma patient managed by hospitalist 749 patients TNP group 651 patients to hospitalist group | ISS Comorbidities Number of injuries Rate of surgical procedures Average number of procedures | LOS Discharge location 'In-hospital mortality' Readmission rate | IBM-SPSS 22.0. Descriptive statistics. Mean and SD Continuous variables were compared using independent t or Mann- Whitney U tests Categorical variables compared chi square or Fisher's exact test | TNP group=749 patients Hospitalist group=651 patients Nonsurgical admission 19.6% in 2017 and 13.9% in 2018 TNP group vs. hospitalist Young age 58.65 vs. 76.20, p<.001 males 40.6% vs. 32.7% p=.002 Injuries on admission | TNP provide high quality care with positive patient outcomes Expansion of TNP team revealed decrease in nonsurgical trauma admissions Discharge orders placed before noon Rapid transport to surgery Discharge locations planned early TNP provide holistic care, attention to details, flexibility Perform daily assessments, consult |

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| | | | | | | | <p>1.64 vs. 1.24, p=<.001</p> <p>LOS in TPN 4.80 vs. 5.97, p=.006</p> <p>LOS difference 1.17 days decrease hospital charges \$876,330</p> <p>DBN 68.6% vs. 36.7%, p<.001</p> <p>DC home 68.8% vs. 41.8%, p<.001</p> <p>DC ECF 23% vs. 47.6%, p<.001</p> | <p>specialists, coordinate health care member teams, talk and educate patient and family</p> <p>The study institution expanding the TNP service model Positive outcomes in favor of the TNP in LOS, time to OR, DBN, discharge locations</p> |
| Holliday (2017) | Expansion of TNP will improve outcomes in patients admitted to trauma service | Retrospectiv e review of admitted patients at Level I trauma center from 2012-2015 | 3 cohorts Prior to TNP During TNP role creation 12 months after TNP | LOS Pt characteristics ISS GCS AIS ICU LOS time for rehab referral 30-day readmission dc orders before noon | Evaluated complications Pneumonia UTI Surgical site infection ARF DVT PE sepsis | Continuous variables means and SD One way ANOVA Categorical variables Proportions | 1009 in cohort 1 1088 in cohort 2 1009 in cohort 3 Demographic s relatively same for cohorts | LOS decreased by 0.98 days from 12 months prior to 24 months post implementation Decrease 1.1 million hospital charges per year |

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| | | | 3284 total patients | complications | | Compared chi square Outcome variables ANCOVA or binary logistic regression | LOS declined over time by 0.04 days and declined further to 0.98 days in the first year 6.92 vs. 6.88 vs. 5.94, p=0.007 ICU LOS 4.64 vs. 4.27 vs. 3.56, p=0.001 | Positive impact on missed injuries with TNP Time to placement in rehab and discharge orders written before noon showed improved numbers with TNP |
| Holte (2015) | APN development of a discharge plan provides holistic, efficient, cost-effective, and safe care of hip fracture patient | Retrospective chart review over 6 years (2006-2011) | 2497 hip fracture patients' charts reviewed by orthopedic trauma NP | LOS Mortality 2 weeks Readmission 1 year mortality Overall survival | Age Gender ASA score Time from injury to surgery Type of procedure Mortality rates at 30 days, 90 days and 1 year | Compare outcomes of pt. in 2001-2005 and 2006-2010 Continuous variables compared two groups 2 sample t-tests Categorical variables compared X2 test Logistic regression for mortality | LOS mean 7.9 days Mean LOS 2001-2005 9 days and for 2006-2010 6.8 days Decrease of 2.2 days p<.0001 After adjust ASA score LOS was 2.07 days shorter for 2006-2010 p<.0001 | TNP provide safe, effective, cost-efficient care to hip fracture patients TNP increase throughput which decrease costs and LOS Addition of TNP decrease LOS for all 4 types of ISS groups TNP able to decrease time to surgery by coordinating consults for surgical clearance |

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| | | | | | | and 2-week readmission Survivorship methods 1 year mortality and overall survival | Higher ASA scores longer LOS. Positive association with time from surgery and LOS (p<.0001) after ASA adjustment for age, ASA score, gender LOS increased by 1.4 days for every increased day to surgery (P<.0001) | TNP collaborate with multiple medical specialties and develop plan of care, this improved delays time |
| Jarrett (2009) | Assess TNP role in reduction of hospital days for trauma patients with delayed discharge due to lack of coordination of care and discharge planning | Observation al method Pilot study at CAMC medical center | 2 TNP with trauma surgeon oversight expanded scope of the trauma service team Trauma patients followed by TPN from | TNP role Collaborative with other specialties to develop plan of care Determine payor source Discharge destination planned Provide education to nursing staff | Decrease LOS Maintain high quality of care Abbreviated injury score | LOS was compared to NTDB CAMC trauma LOS decreased with TNP incorporated in trauma team | ISS group 1- 9, CAMC LOS 2.3 vs. NTDB 3.5 ISS group 10- 15, CAMC 4.7 vs. 5.8 ISS group 16- 24 CAMC 7.1 vs. 8.5 | TNP drives the discharge plan in collaboration with surgeon, residents, care coordinator and therapy services TNP is consistent member of team |

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|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | admission to discharge | | | | ISS group 25- 75 CAMC 13.5 vs. 13.5 | |
| Johal (2017) | Examine the use of APP on surgical/traum a service and effects on patient outcomes and resident workload | Systematic review of literature EMBASE, Medline, CINAHL, and the Cochrane Central Register of Controlled Trials | 29 studies met inclusion criteria Excluded pediatric and nonsurgical trauma patients | LOS, readmission rate, patient satisfaction, patient perceived quality of care, resident workload, sleep, and work hours | Healthcare workers satisfaction, perceived quality of care, economic impacts | Publication dates 1990- 2014 15 case control studies, 5 retrospective reviews, 8 surveys, 1 RCT | LOS = 8 articles reviewed as outcome 88% LOS decreased after addition of APP Satisfaction =6 studies found improved or high patient satisfaction rates with APP 9 articles high satisfaction from MD, residents, and nursing | Improved patient care Continuity of care Communication with families Improved documentation Reduced workload for other healthcare workers |
| Leede (2020) | Analysis of GTS in trauma surgery team decrease mortality, LOS, increased discharge for geriatric | 2-year retrospective analysis of trauma patients >65 years Comparison patient outcomes | 908 patients 514 pre-GTS 394 post GTS Matching for age and injury 364 in each group | Demographics Mechanism of injury Prehospital physiology Injury pattern (ISS) | Mortality LOS ICU stays Discharge disposition | No difference in mortality between two matched groups 4% to 4% p=0.99 ICU days 2 vs. 3 p=0.22 | Patients in the GTS group more often discharged home, rehab, or hospice and less to extended care facility | GTS insight into patient needs Patient independence level before admission Home support Discharge needs |

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | trauma patients | before and after GTS | | | | Hospital days 6 vs. 6, p=0.97 | | Collaboration with physician and family meetings |
| McFadden (2022) | Develop better understanding challenges affecting patients and providers perceptions about hospital discharge process Level 1 trauma center | Qualitative study | Semi-structured interviews, recorded, transcribed, coded, and analyzed 10 patients and 10 clinicians | Time as inpatient Quality of care received Experience in preparation for hospital Perception of discharge instructions | Clinicians were asked about background, current role, experience in discharging patients What they thought patients want and need | Interview guide developed for qualitative results Interviews were coded using Max QDA lite Deductive codes identified; themes delineated | Theme 1: communication among clinicians Theme 2: Discharge teaching and written instructions Theme 3: Outpatient care coordination PCP Insurance limitations | Theme 1 Mixed patient review Confusion with dc instructions Unsure about follow up (who/ when) Difficulties meeting patient needs with volume of patient load Tendency of MD and NP to use nurses to communicate Clinicians worked to improve Closed loop communication Frustration with communication barriers Discharge summary lacks information Written dc instructions have medical lingo Focus on multifaceted approach for enhance communication to healthcare professionals |

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Morris (2012) | Determine difference in care provided by unit-based nurse practitioner (UBNP) and medical resident (RR) analyze patient outcomes to determine if differences exist between patients cared for by UBNP and the RR service. | Retrospective analysis | 3859 patients discharged from 2007- 2010 | Mechanism of injury ISS AIS Comorbidities Complication Discharge designation | Scheduled daily multidisciplinary rounds | χ^2 , Fisher's exact, and Student's t tests Significant factors were then tested with a multivariate linear regression analysis. $p < 0.05$ was considered significant. | Compare TNP to RR Demographic data and mean Injury Severity Score (11.6 vs. 11.1, $p = 0.24$) were similar for the two groups, more likely to be discharged to home (67% vs. 60%, $p = 0.002$). Mean (SD) length of stay for UBNP patients was 6.5 (8.8) days compared with 7 (10.8) days for RR patients, although this difference did not reach statistical significance ($p = 0.17$). The 30-day hospital readmission rates were similar for both groups | Care provided by TNP is equivalent to RR. With the restriction on resident work hours and greater reliance on nurse practitioners, patient care does not suffer. Moreover, a difference of 0.5 days in mean length of stay for the TNP patients equates with more than 1,300 fewer patient care days. |

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
|------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | | | | (4.0% vs. 4.4%, p = 0.63). | |
| Perry (2020) | Assess the addition of EMR discharge optimization tool (DOT) to achieve discharge by noon (DBN) | Quality improvement research | 4033 pediatric discharges in 13-month timeframe | Compare pre and post intervention of the DOT to achieve DBN | DBN percentage (divide total DBN by total discharge) use of AVS printed by 11:00 DOT tool use, data complied from EMR, tool utilization, readiness assessment selection electronically | Chi squared test Wilcoxon rank sum tests to assess LOS | 1 month post implementation 4849 discharges in 13 months identified. Average monthly DBN increase from 16.4% to 19.3% or an 18% relative increase (p=0.0005, odds ratio 1.213, 95% CI 1.087-1.353) Of 4849 discharges, 4229 encounters (87.2%) DOT was used at least once 2953 encounters (69.8%) used DOT more than once. Tool accuracy 75.6% (p<0.0001). | Discharge efficiency priority Increased reliance on EMR allows for standardized tools to improve discharge process Visual tool (DOT) accurate and user friendly Increased communication among team members Assists in prioritizing discharge tasks, focusing on patients ready for discharge to be addressed sooner |

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | | | | Statistical difference (p=0.0033) between baseline LOS (median 1.75 days) and post intervention LOS (median 1.68 days) | |
| Schaffer (2022) | Examine opioid requirements would differ by primary type of injury and by age, and we sought to identify factors affecting opioid prescribing at discharge (DC). | Retrospective analysis of pain management at a level II trauma center for January–November 2018 | Consecutive patients with exploratory laparotomy (LAP); 3 or more rib fractures (fxs) (RIB); or pelvic (PEL), femoral (FEM), or tibial (TIB) fxs were included, and assigned to cohorts based on the predominant injury. | 208 patients were included: 17 LAPS, 106 RIB, 31 PEL, 26 FEM, and 28 TIB. 74% were male and 8% were using opiates prior to admission. | Injury cohorts varied by age but not Injury Severity Score (ISS) or length of stay (LOS). 64% of patients received multimodal pain therapy. | Multimodal pain therapy defined as 3 or more drugs used. Categorical variables and continuous variables were analyzed with appropriate statistical analyses | There was an overall difference in OME between the five injury groups (p<0.0001) and OME72 was lower for RIB compared with all other cohorts. Compared with younger (age <65) patients, older (≥65 years) patients had similar ISS and LOS, but lower OME72 (45 vs 135*) and OME72. Median OME | There was no difference among APCs in number of pills or OMEs prescribed. 81% of patients received opioids at DC, of whom 69% were prescribed an opioid/acetaminophen combination drug; and only 13% were prescribed non-steroidal anti-inflammatory drugs, 19% acetaminophen, and 31% gabapentin. Trauma service advanced practice clinicians (APCs) almost exclusively discharged patients. |

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | | | | differed significantly between older and younger patients with PEL (p=0.02) and RIB (p=0.01) injuries. | |
| Sammann (2019) | Explore benefit of prototyping, with a quantitative evaluation approach, to improve system and stakeholder efficiency on daily trauma surgical rounds at a level 1 trauma center. | prospective interventional study using a combined quantitative and qualitative approach | Trauma Team 1 MD 2 NP 5 RR | Time inefficiency Reflection current workflow Clinicians experience in rounding | Intern work hours Discharge order times On-time OR | Descriptive statistics time observation data (median and interquartile ranges) workflow efficiency metrics (median values). The differences in medians calculated using the Mann–Whitney test. Statistical significance determined at $P < 0.05$ level | Non-value-added time as the time spent on clarifications decreased from 7.9% to 3.2%. Round duration decreased by 36 min (from 193 to 169 min) Time spent with the patient and/or family increased from 3.5% to 5.2%. Discharge order times submitted 58 min earlier | Decrease distractions by moving image, lab review and patient presentation to team to round table Move rounds to early morning Formal guide for presentation developed to assist in efficiency for rounds |

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | | | | <p>in the day (P = 0.04)</p> <p>The percentage of operative first case on-time starts increased from 40% to 63% (P = 0.01). Interns were dismissed from rounds 97 min earlier (P = 0.009).</p> | |
| Walter (2015) | Identify the scope, context, and impact on patient and health service outcomes of the specialist trauma nurse | Integrative review | 56 articles in final result publication dates ranged from 1988 to 2014 with 62% of the articles published in the last 10 years | job roles impact of practice | data converted into 3 categories: context of practice scope of practice impact | Once specialist trauma nurse identified, content of the articles reviewed, and data extracted specific job roles and impact of practice. These data were entered into a table for comparison of content and | <p>Context of practice 49 articles Theme – absorb deficits in medical staffing and work hours Manage patients across the ISS spectrum</p> <p>Scope of practice 19 articles Vague CEU Varies on experience</p> | <p>LOS commonly addressed key performance indexes assessing intervention impact, related to fiscal impact on the health system</p> <p>Discharge destination and age have significant associations with LOS, independent of injury severity.</p> <p>Specialist trauma nurse varied role that has significant impact on the care and management of the</p> |

| Citation: Author, Date of Publication | Purpose of Study | Design/ Method | Sample/ Setting | Major Variables Studied and Their Definitions | Measurement of Major Variables | Data Analysis | Findings | Worth to Practice: LOE One Strength / One Limitation Feasibility of Use Recommendation Optional Notes |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------|--------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | | | identification of commonalities | Impact 19 articles LOS improved with TNP Positive staff attitude about TNP | trauma patient throughout the entire spectrum of their hospitalization, but no consensus on orientation and educational requirements or job roles. |
| Woo (2017) | Synthesis evidence on impact APN on quality of care, clinical outcomes, patient satisfaction and cost in critical care and emergency care settings | Literature review utilizing 9 electronic databases. Search years 2006-2016. | 12,061 studies searched 15 studies met criteria | | | | Improves patient outcomes. There is a need for critical care physicians 22% by 2020 and 35% by 2030. To fill this gap, APN workforce predicted to continue to grow between 3-9 times when compared to physicians. | Critical, trauma, and ER have specific skill sets, so comparison to gen NP may not be appropriate. APN may reduce wait time while reducing cost over course of hospital admission. APN higher patient satisfaction scores when compared to physician, APN reduced time to initial treatment Physicians were freed up to concentrate on more critically ill patients allowing APN to focus on needs of patients with lowered acuity needs APN performed better in patient education, answering questions, and pain management. |

APPENDIX B

SOCIODEMOGRAPHIC CHARACTERISTICS
OF TRAUMA PATIENTS-WEEK ONE

Appendix B: Sociodemographic Characteristics of Trauma Patients-Week One

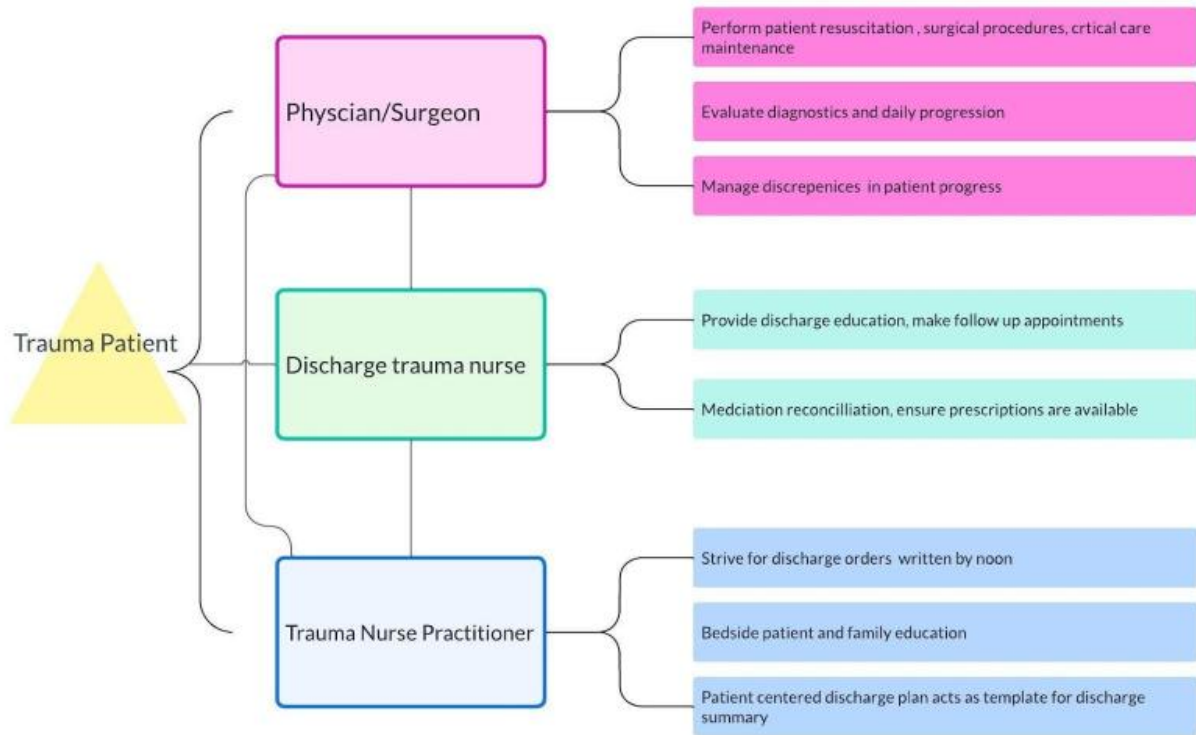
| Baseline Characteristics from initial ED presentation | Admitted n=17 | | Discharge n=31 | |
|-------------------------------------------------------|---------------|------|----------------|----|
| | n | % | n | % |
| Trauma total | 17 | | 31 | |
| Gender | | | | |
| Female | 4 | 23.5 | 20 | 64 |
| Male | 13 | 76.4 | 11 | 35 |
| Marital Status | | | | |
| Single | 3 | 17.6 | | |
| Married/partnered | 9 | 52.9 | | |
| Divorced/widowed | 5 | 29.4 | | |
| Highest educational level | | | | |
| High school/some college | 13 | 76.4 | | |
| University/post graduate degree | 4 | 23.5 | | |
| Employment | | | | |
| Unemployed | 3 | 17.6 | | |
| Student | 1 | 5.8 | | |
| Employed | 5 | 29.4 | | |
| Retired | 8 | 47.0 | | |
| Follow up | | | | |
| Follow up appointment | 17 | 100 | | |
| Follow up calls | 5 | 29.4 | | |
| Hospital specific | | | | |
| Length of stay (LOS) average days | 50/17 | 2.94 | | |
| Discharge orders by noon (DBN) | 8/17 | 47.1 | | |

APPENDIX C

TRAUMA TRIAD

Appendix C: Trauma Triad

**Trauma Triad for Successful Discharge
Surgeon-Nursing-Trauma Nurse Practitioner**



APPENDIX D

INTERMOUNTAIN HEALTH SITE REPRESENTATIVE

Appendix D: Intermountain Health Site Representative

Identification of Doctor of Nursing Practice Project Site Representative

Student Name: Lisa Stricker

Project Site: Intermountain Health, Billings, Montana

Project Site Description: This project will take place at Intermountain Healthcare, formerly known as SCL Health in Billings, Montana. This is an organization with acute and ambulatory services. The hospital currently has a 222-bed capacity.

Project Site Address: 2900 12th Ave. North, Billings, Montana, 59102

Project Site Representative: April Luft MN, RN

Proposed practice problem to be addressed: To improve continuity of care, this quality improvement project will compare a trauma nurse practitioner (TNP) coordinated patient centered discharge plan for trauma patients to the current practice of general multidisciplinary discharge planning. The goal of this improvement project is to explore improved throughput for trauma patients with TNP developed patient centered discharge plans.

Potential Intervention: In patients admitted to the hospital following a traumatic injury a TNP coordinated patient centered discharge plan will have positive impact on length of stay and staff satisfaction compared to traditional discharge planning. The intervention portion will focus on filling out the patient centered discharge plan revealing daily progression of patient's recovery while ensuring discharge needs are established.

Proposed Site/Needs assessment: A Level II trauma center in the Rocky Mountain Region has recently applied for redesignation to a Level I trauma category. With this change the trauma surgery team expects an increase in trauma patients. The trauma team has expressed interest in expanding to include a trauma nurse practitioner (TNP). TNPs are strategically positioned to focus on the forward flow of patients throughout their hospital stays and address collaborative communication approaches to keep discharge goals in focus. TNPs are uniquely qualified to lead the development of patient focused discharge plans

Print Name of Project Site Representative: April Luft MN, RN

Signature of Project Site Representative:



12/12/22

APPENDIX E

IOWA MODEL EVIDENCE-BASED
PRACTICE RESEARCH-PERMISSION

Appendix E: Iowa Model Evidence-Based Practice Research-Permission

From: Kimberly Jordan - University of Iowa Hospitals and Clinics <survey-bounce@survey.uiowa.edu>

Sent: Wednesday, February 1, 2023 4:10 PM

To: Stricker1, Lisa <lisa.stricker1@msubillings.edu>

Subject: Permission to Use and/or Reproduce The Iowa Model (1998)

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[The Iowa Model of Evidence-Based Practice to Promote Quality Care \(Revised 1998\)](#)

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Reference: Titler, M. G., Kleiber, C., Steelman, V. J., Rakel, B.A., Budreau, G., Everett, L. Q., ...Goode, C. J. (2001). The Iowa model of evidence-based practice to promote quality care. *Critical Care Nursing Clinics of North America*, 13(4), 497-509.

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APPENDIX F

IRB APPROVAL-MONTANA STATE UNIVERSITY

Appendix F: IRB Approval-Montana State University

From: NoReply@TOPAZTI.net <NoReply@TOPAZTI.net>
Sent: Friday, January 20, 2023 11:30 AM
To: Running, Alice <alice.running@montana.edu>; Stricker1, Lisa <lisa.stricker1@msubillings.edu>;
Beiswanger, Kelly <kelly.beiswanger@montana.edu>
Subject: IRB Protocol #2023-553-EXEMPT APPROVED

NOTICE: This email originated from outside of your organization. Do not click links, open attachments, or respond unless you were expecting this message and know the content is safe.

Hello Stricker, Lisa,

Your protocol was reviewed by the IRB and has been approved.

PI: Stricker, Lisa
Approval Date: 1/20/2023
Title: Effectiveness of Trauma Nurse Practitioner-Led Patient-Centered Discharge Plan for Trauma Patient Admitted to Trauma Service: Satisfaction of Trauma Surgeon and Nursing Staff

Protocol #: 2023-553-EXEMPT
Review Type: Exempt Review
Expiration Date: 1/20/2028

Work described under this protocol may now commence. The PI is responsible for ensuring that the protocol accurately describes research practices being conducted.

- > Review Category designation determined by the IRB can be found in the final section of your protocol.
- > IRB-stamped active Consent Forms are attached within your protocol where applicable.
- > Any changes must be submitted via Amendment prior to implementation.
- > Per the Common Rule, research only requires Interim (annual) Review by the IRB if 1) it was reviewed via Full Committee or 2) is regulated by the FDA.
- > All research is subject to post approval monitoring.
- > All protocol types must be renewed 5 years after approval.
- > Inform the IRB once your research is complete so that the protocol may be inactivated.

Please contact your IRB Program Manager with any questions or if you are in need of assistance. Thank you for your diligence in the care of human subjects research participants.

Institutional Review Board for the Protection of Human Subjects | Office of Research Compliance | Montana State University

APPENDIX G

IRB APPROVAL-INTERMOUNTAIN HEALTH

Appendix G: IRB Approval-Intermountain Health

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------|
| SCL Health | | collapse |
| Project: 2023-015 | Sponsor(s): | |
| Committee: IRB | Sponsor Id: | |
| Category: | Grants: | |
| Department: | Next Review: | |
| Last Review: | CRO: | |
| Agent Types: | Year: 2023 | |
| Title: Effectiveness of Trauma Nurse Practitioner Led Patient Centered Discharge Plan for Trauma Patient Admitted to Trauma Service: Satisfaction of Trauma Surgeon and Nursing Staff. | | |
| Amendment Number: | CITI Requirements: | |
| Continuing Review/Progress Report: | Device Name: | |
| FDA Regulated: | Fee Waiver: | |
| HDE #/IDE#/IND#: | Investigator Initiated: | |
| IRB Of Record: | Managing Entity: | |
| Mentor: no-one | Nursing Protocol: | |
| Protocol Risk Level: | Region(s): | |
| Reportable Event Number: | Research Activities: | |
| Service Line - Project: | Study Phase: | |
| Waiver of Consent: | Waiver of HIPAA Authorization: | |
| Project-Site | | |
| Site(s): SCLHS - SCL Health | PI: Stricker, Lisa | |
| Status: Approved for Exemption | Additional: N | |

APPENDIX H

CITI CERTIFICATE COMPLETION

Appendix H: CITI Certificate Completion

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM) COMPLETION REPORT - PART 1 OF 2 COURSEWORK REQUIREMENTS*

* NOTE: Scores on this [Requirements Report](#) reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Lisa Stricker (ID: 11917717)
- **Institution Affiliation:** Intermountain Healthcare (ID: 336)
- **Institution Email:** lisa.stricker@imail.org
- **Institution Unit:** Pain Center
- **Phone:** 406-237-8808

- **Curriculum Group:** Human Research
- **Course Learner Group:** Group 2.Social
- **Stage:** Stage 1 - Basic Course
- **Description:** Social / Behavioral Research Investigator and Key Personnel

- **Record ID:** 53866200
- **Completion Date:** 26-Jan-2023
- **Expiration Date:** 26-Jan-2026
- **Minimum Passing:** 75
- **Reported Score*:** 90

| REQUIRED AND ELECTIVE MODULES ONLY | DATE COMPLETED | SCORE |
|-------------------------------------------------------|----------------|------------|
| Belmont Report and Its Principles (ID: 1127) | 23-Jan-2023 | 3/3 (100%) |
| History and Ethical Principles - SBE (ID: 490) | 23-Jan-2023 | 4/5 (80%) |
| Defining Research with Human Subjects - SBE (ID: 491) | 24-Jan-2023 | 5/5 (100%) |
| The Federal Regulations - SBE (ID: 502) | 24-Jan-2023 | 5/5 (100%) |
| Assessing Risk - SBE (ID: 503) | 24-Jan-2023 | 4/5 (80%) |
| Informed Consent - SBE (ID: 504) | 24-Jan-2023 | 4/5 (80%) |
| Privacy and Confidentiality - SBE (ID: 505) | 24-Jan-2023 | 4/5 (80%) |
| Research with Prisoners - SBE (ID: 506) | 24-Jan-2023 | 5/5 (100%) |
| Research with Children - SBE (ID: 507) | 26-Jan-2023 | 5/5 (100%) |
| Research and HIPAA Privacy Protections (ID: 14) | 26-Jan-2023 | 4/5 (80%) |

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/?k7b770a48-413c-4904-8565-ba8d085ebba-53866200

Collaborative Institutional Training Initiative (CITI Program)

Email: support@citiprogram.org

Phone: 888-529-5929

Web: <https://www.citiprogram.org>

APPENDIX I

DNP PROJECT POSTER

Appendix I: DNP Project Poster



Effectiveness of Trauma Nurse Practitioner (TNP) Led Patient Centered Discharge Plan: A Quality Improvement Project

Lisa Stricker MSN, FNP-BC, PMGT-BC, RN

BACKGROUND

TNPs create opportunities for increased patient throughput, decreased length of hospital stay, increased staff support.

QUESTION / KNOWLEDGE GAP

The goal of this improvement project was to explore improved throughput for trauma patients with TNP-developed patient-centered discharge plans.

METHODS

The TNP can create a triad of communication with physician and nursing staff. The QI project was done with neurosurgery trauma team and discharge nurses utilizing the patient centered discharge plan.

RESULTS

Evidence supports the TNP role in developing patient focused discharged plans leading to increases in communication, increased focus on planning for unmet needs, efficiency in rounding, and decreases in length of stay.

CONCLUSIONS

TNPs can be a valuable addition to trauma services as they coordinate the development of a comprehensive, individualized plan of care for patients throughout the hospital stay allowing for a successful transition of care.

ACKNOWLEDGMENTS

Dr. Alice Running is a remarkable mentor. Thanks to the neurosurgery team and nursing staff on the trauma surgical unit at Intermountain Healthcare in Bozeman, Montana.

| Discharge Plan | Created by TNP | Created by RN | Created by NP | Created by MD |
|------------------------|----------------|---------------|---------------|---------------|
| Admission | | | | |
| Diagnosis | | | | |
| Current Problems | | | | |
| Medications | | | | |
| Discharge | | | | |
| Discharge Instructions | | | | |
| Discharge Medication | | | | |
| Discharge Location | | | | |
| Discharge Date/Time | | | | |
| Discharge Status | | | | |
| Discharge Summary | | | | |
| Discharge Plan | | | | |

Trauma Triad for Successful Discharge Surgeon-Nursing-Trauma Nurse Practitioner

