

NURSE PRACTITIONERS WITH INDEPENDENT PRACTICE CAN HELP
IMPROVE EMERGENCY DEPARTMENT QUALITY MEASURES

by

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ABSTRACT

Problem Statement: Emergency Departments (ED) across the United States continued to have an increase in patient visits, new interventions have been implemented to combat overcrowding. An Inland Northwest hospital continued to see an increase in low acuity patients and a decrease in the quality measure for timely and effective care. Therefore, ED management decided it was time to try to change its ED Nurse Practitioner (NP) policy to allow NPs independent practice in the ED triage for patients with low acuity complaints.

Methods: A completed business plan was proposed to the ED provider (EDP) group to gain their support for NP independent practice for low acuity patients in the ED. The business plan proposed a 30-day Just-Do-It pilot project for a NP in triage during times of high patient census to evaluate, treat, and discharge the low acuity patients. Evaluation of the pilot project was completed by a before-and-after time series design using run charts to validate the changes in the quality measures left with being seen (LWBS), time to provider, and length of stay (LOS). Upon adoption of the business plan, the EDPs took their recommendation to the hospital's Medical Executive Committee and from there, to the hospital Credentialing Committee to request an official change in hospital policy.

Results: Unfortunately, this ED went through a redesign and eliminated the traditional lobby triage before the proposal took place. Therefore, the project was revamped and only tried to get NP independent practice rights for NPs treating low acuity patients. However, due to the recent ED changes, and the increase in quality measures for timely and effective care related to the redesign, the ED providers and Credentialing did not accept NP independent practice.

Conclusion: Though the literature and professional organizations supported independent practice for NPs in the ED for low acuity patients, the ED providers and the hospital Credentialing Committee did not see the need once the redesign showed an improvement in the quality measure of timely and effective ED care.

CHAPTER ONE

PROBLEM SUMMARY

Introduction

In 2006, the Tax Relief and Health Care Act started the Hospital Outpatient Quality Reporting Program. This program, along with a new mandate from the Centers for Medicare & Medicaid Services (CMS) required hospital outpatient settings to submit specific outcome data to CMS or receive a 2% point reduction in their annual payment update (APU) (CMS.gov, 2013). One quality of care measure for the ED was timely and effective care. Timely and effective care was designed to ensure quality patient outcomes by evaluating the timeliness of ED patient visits (Medicare.gov, n.d.a). Three timely and effective quality measures for the emergency department (ED) were: rates of patients who have left without being seen (LWBS), length of stay (LOS), and time to provider (Quality Net, n.d.). These three specific quality measures were essential for good patient outcomes because delays represent a reduction in the quality of patient care and increased the risks and discomforts for patients with serious illnesses or injuries (Medicare.gov, n.d.a).

Four years after CMS began tracking and reimbursing for quality care measures, President Obama enacted the Patient Protection and Affordable Health Care Act, or the Affordable Care Act (ACA) (Henry Kaiser, 2013). The ACA extended healthcare coverage to millions of Americans who did not have previous access (Henry Kaiser,

2013). Brooks (2012) stated now more Americans had health coverage, but the number of providers had not changed. The shortage of primary care physicians meant the patients were presenting to EDs for care (Brooks, 2012). According to the National Center for Health Statistics (2015), there were 96.5 million visits to the ED in 1995. By the year 2000, the number had grown to 108 million. In 2010, the number jumped to 129.8 million. One year later, 2011, the first full year after the ACA, ED visits further increased to 136.3 million (National Center for Health Statistics, 2015). Under present conditions, the limited ED resources were continuously challenged, and there were no expectations the rising number of ED patient visits would slow down (Brooks, 2012). The increase in patients to EDs across the country placed a greater strain on an already stressed healthcare system (Brooks, 2012).

Background of Project

Semi and non-urgent patients created a substantial burden within EDs. The 2012 Emergency Department Summary from the Center for Disease Control and Prevention (CDC) used the Emergency Severity Index (ESI) five-point scale of acuity (See Appendix A for ESI Algorithm) to describe the characteristics of U.S. EDs. An ESI 1 was considered most urgent and ESI 5 being non-urgent. ESI 4 and 5 were considered low acuity, and conditions that could be treated in a primary care setting. According to the summary, 26.6% of all patient visits were graded as semi-urgent (ESI 4) and 4.7% were graded as non-urgent (ESI 5) (Center for Disease Control and Prevention [CDC],

2016). Excluding patients with private insurance, the semi and non-urgent patient numbers were further broken down in the ED Summary (2016) by payer type. Medicare accounted for 18.3% of all ED patient visits. Of the Medicare percent, 17.5% were considered an ESI 4 and 2.3% were an ESI 5. Medicaid/CHIP patients accounted for 29.5% of all ED visits. This was broken down to determine 31.3% of all Medicaid/CHIP patients were an ESI 4 and 5.5% were an ESI 5. Patients with no insurance accounted for 14.1% of all patient visits and 30.2% of these patients were an ESI 4 and 5.8% were an ESI 5. Patients presenting to the ED with low acuity complaints were expected to rise with the continued requirement of ACA (Brooks, 2012).

In a traditional ED, patients were seen by a provider based on their acuity, which was assigned by a triage nurse. The most severe patients were immediately taken to a provider and those with semi-urgent to non-urgent needs (or low acuity) waited in the lobby until all higher-acuity patients were seen. The wait to see a provider may range from minutes to days, depending on the business of the ED (CDC, 2016).

According to the 2012 Emergency Department Summary, of all patients presenting to the ED, only 30% saw a provider in less than 15 minutes while 33.6% of the patient's waited 15-59 minutes (CDC, 2016). Patients were seen 10.8% of time between 1-2 hours, and 3.5% were seen in two to three hours. Only 1.4% of all ED patients waited 3-4 hours to see a provider. However, 1.5% of all ED patients waited greater than four hours to be seen. During an ED wait, some patients left before triage and this accounted for 4.7% of all patients. Other patients left without treatment but after

the triage process. These patients were considered left without being seen (LWBS) and account for 2% of all patients who presented to the ED (CDC, 2016).

According to CEP America (2011), not only do high LWBS rates indicate low patient satisfaction scores but also a significant loss of revenue. The CEP (2011) estimated the revenue for every one ED outpatient visit at \$500. Therefore, a hospital with an average annual patient volume of 50,000 and a LWBS rate of 4% or 5.5 people per day equals a loss of \$1,000,000. By decreasing the LWBS rate to 2% or 2.7 patients daily, the loss was decreased to one-half million dollars. Revenue and return on investment would increase even more if any of these LWBS patients needed to be admitted (CEP, 2011).

It was critical for EDs to find a quick way treat the increased number of patients. According to the 2012 Emergency Department Summary, the LOS for 68.4% of ED patients was under 4 hours (CDC, 2016). Of the patients who were in the ED for less than four hours, 11.8% were discharged within one hour. Only 22.8 % of all ED patients spent less than two hours in the department. The longest LOS for ED patients was found to be between two to four hours and this accounted for 33.6% of all ED visits (CDC, 2016). Without a change in flow, EDs were expected to continue to have high rates of LWBS, LOS and time to provider. This represented a restriction of patient access to emergency services, and compromised patient care (Vieth & Rhodes, 2006).

Significance of Project

A local Inland Northwest Trauma Level III emergency department (ED) had over 50,000 ED patient visits last year (Kootenai Health, 2017a). The ED had 36 beds and was part of a 299-bed community owned hospital (Kootenai Health, 2017b). This Inland Northwest hospital resided in an area recognized by the Health Resources and Services Administration (HRSA) as being a Health Professional Shortage Area (HPSA) and a Medically Underserved Areas/Population (MUA/P) (Health Resource, 2016). The ED reported the outcomes for the quality measure of timely and effective care to Medicare each quarter with the goal to meet the national benchmark in order to receive the full APU from Medicare (T. Putren, personal communication, September 22, 2015).

Every year since 2012, the Inland Northwest ED continued to have an increase in patient visits (Kootenai Health, 2017a). The ED was undergoing a 45.2 million dollar expansion to be able to see the continued increase in patients (Kootenai Health, 2017a). Hospital administration believed this increase in patient numbers was partially responsible for why the ED has not been able to meet the national quality measure benchmarks for similar sized hospitals set by Medicaid (Table 1) (Kootenai Health, 2017a). The most recent statistics from Medicare.gov (n.d.b) reported the outcome measure of LWBS for the Inland Northwest ED was 1% greater than the national benchmark. LOS was equal to the national benchmark. However, time to provider was eight minutes slower than the national benchmark of 26 minutes (Medicare.gov, n.d.b). The decrease in the quality outcomes represented a reduction in the quality of care and

increased risks and discomforts for patients with serious illnesses presenting to this Inland Northwest hospital (Medicare.gov, n.d.a).

Table 1. How the local hospital compares to other hospitals of similar size around the state and nation (Medicare.gov, n.a.b).

Quality measure outcome	Inland Northwest hospital	Same state average	National average
Percent of patients LWBS (average median: for reporting period 1/1/15 to 12/31/15)	3%	1%	2%
LOS (reporting period 4/1/15 to 3/31/16)	148 minutes	138 minutes	161 minutes
Time to provider (reporting period 4/1/15 to 3/31/16)	34 minutes	65 minutes	27 minutes

Hospital administration wanted to increase the ED quality measure to meet and exceed the Medicare benchmarks because the mission of the hospital was to improve the health of one patient at a time in a friendly and professional culture committed to superior quality and safety (Kootenai Health, 2017b). Thus, helping to meet the 2020 hospital vision to be a comprehensive regional medical center delivering superior, patient-focused care, and to be recognized among the premier healthcare organizations in the United States (Kootenai Health, 2017b). Therefore, the hospital administration had been talking with the ED administration, ED physicians (EDP), nurse practitioners (NP), and physician assistants (PA) to find a new way to increase the number of patients seen in the ED while still providing high quality care.

The student investigator who worked in this ED, was aware of the hospital administration's desire to change its ED flow, and began a literature review on how to increase the ED quality measure of timely and effective care. One method to decrease the LWBS rate, LOS, and time to provider that continued to be cited in the literature was to place a nurse practitioner (NP) in triage. The NP in triage assessed and treated the semi and non-urgent patients who presented with primary care concerns entirely from the ED triage area. This process helped to reduce the strain of the lower acuity patients in the main part of the ED and allowed these patients to receive timely and effective high quality healthcare.

The student investigator approached the ED Director in May of 2016 to see if there would be support for an NP in triage to help increase the quality measure of timely and effective care. The ED Director felt that due to the continued pressure and conversations from hospital administrator about the EDs low timely and effective care outcome measures a NP in triage would be supported not only the ED Director, but by the ED physicians, and hospital administration.

Nurse Practitioner Scope of Practice

The first item that needed to be addressed before placing a NP in triage was to modify the Inland Northwest hospital advance practice provider policy. The policy currently stated NPs were not to provide independent care within the hospital (Kootenai Health, 2012). However, the ED Director felt a change in this policy would be accepted because though NPs were not considered eligible for independent practice, Certified

Nurse Midwives, psychiatric NPs, and Certified Nurse Anesthetist were allowed to practice independently within the hospital (Kootenai Health, 2012).

Independent practice for NPs within the hospital did not match the recommendations from the Institute of Medicine (IOM), the state's current NP standards set by the Board of Nursing, or the American College of Emergency Physicians (ACEP). In 2010, the IOM released the *Report on the Future of Nursing* which stated its first recommendation for advancing nursing practice was to remove the scope of practice barriers placed on advance practice registered nurses (APRN) by allowing APRNs to practice to the full extent of their education and training (Institute of Medicine, 2010). The state Board of Nursing (2016) scope of practice for a certified and licensed NP stated NPs were independent practitioners who can provide

initial and ongoing comprehensive primary care services to clients including, but not limited to, diagnosis and management of acute and chronic disease, and health promotion, disease prevention, health education counseling, and identification and management of the effects of illness on clients and their families (p. 31).

The 2013 American College of Emergency Physicians (ACEP) guideline for NPs in the ED supported the use of NPs in the ED and ED triage. The ACEP (2013) guideline suggested NPs should not provide independent, unsupervised emergency care. Overall, the IOM, state Board of Nursing, and ACEP supported the use of NPs with independent practice in the ED, and therefore, the proposal to update the Inland Northwest hospital policy for advance practice providers in the ED providing care to semi and non-urgent patient complaints.

Purpose Statement and Goal

The continued need to increase ED quality measures and the support from the IOM, state Board of Nursing, and the ACEP to update the hospitals advance practice policy led to the quality improvement clinical question: Will an Inland Northwest ED with a NP triage, decrease LWBS for semi and non-urgent patients? The project's main goal is to update the current hospital policy to allow ED NPs to provide independent care to semi and non-urgent patients to help decrease the LWBS rate to less than 2%. Two secondary goals were also established. These secondary goals included decreasing the LOS and door to provider time.

CHAPTER TWO

REVIEW OF THE LITERATURE

Criteria for Review of the Literature

The goal of the review of the literature was to determine if a NP in triage decreased the number of patients who LWBS and subsequently a decreased the LOS and time to provider in the ED. A review of primary research was obtained from peer-review journals and grey literature on the topic of ED patients who were seen and treated in triage by a NP (see Appendix D for an Evidence Table on all articles used). Articles needed to be in English and published from 2006 through 2016 due to the limited availability of information on this topic. For this review, the patients were any age, but needed to have been treated in triage by a NP or Physician Assistant (PA), or a small team of staff led by a NP or PA. The results had to include how an NP in triage affected the LWBS, LOS, or cost to the ED. There were no limitations set by the size of the ED; number of annual ED patient visits; number of inpatient hospital beds; location of ED such as rural, urban, or country; or the acuity of the patient seen by the NP/PA in triage. The databases used to gather articles included CINAHL, PubMed, Cochrane Library, Joanna Briggs Institute EBP Database, Web of Science, and Google Scholar. Keywords used were: provider in triage or PIT, nurse practitioner in triage, emergency department or emergency room, left without being seen, quality of care, cost, length of stay, throughput, and patient flow. A study was not included if the triage team or provider did

not include a NP or PA, or if the provider in triage consisted of a team approach resulting in a Fast Track area. The limits and requirements were set in place to allow for adequate number of relevant studies to be found on the topic of NPs in triage.

Left Without Being Seen

A 2008 literature review was conducted by Kennedy, MacBean, Brand, Sundararajan, and McD Taylor to try to determine if there were common features to the patients who chose to leave the ED without being seen. The three questions the authors set out to answer were:

1. Why did people choose to leave the ED before being seen?
2. Were there adverse health outcomes associated with people who LWBS?
3. What had been done by the hospitals to attempt to decrease the number of people who LWBS?

Though there was insufficient evidence to make any definitive conclusions, the authors noted LWBS patients tended to be young males, patients with low acuity conditions, have low rates of subsequent admissions. The available reports found low rates of adverse events from those who leave before being seen (Guttmann, Schull, Stukel, & Fung, 2009; and Kennedy, MacBean, Brand, Sundararajan, & McD Taylor, 2008).

In a study conducted over the course of one-year at all high volume Ontario Canadian EDs on all patients who LWBS, found no increased risk for hospitalization or

death in the seven days post LWBS when compared to patients who were seen and discharged from the ED (Guttmann, Schull, Stukel, & Fung, 2009). This may be in part due to the patients who LWBS tended to find alternative medical care (Kennedy, MacBean, Brand, Sundararajan, and McD Taylor, 2008).

Nurse Practitioner in Triage

According to a meta-synthesis by Welch (2012) as long as EDs optimized their front-end functions, timely care to high acuity patients was provided without delaying the care of low acuity patients. To optimize ED throughput, operations combined efficient processes and design (Welch, 2012). A source of front-end bottleneck was the traditional nurse led triage model, which can take as long as 12 to 20 minutes per patient to complete (Shea & Hoyt, 2012; Weber, McAlpine, & Grimes, 2011; and Welch & Davidson, 2010). A new triage model benefited patients presenting to the ED as an alternative to primary care. Placing an NP in triage had been shown to allow quicker and timelier care, thus decreasing the stress these patients place on the main ED (Shea & Hoyt, 2012).

Bahena and Andreoni (2013) reviewed 11 U.S. studies placing a provider in triage. The review found the use of an experienced NP in triage had a positive effect on patient throughput. In the 11 studies, varieties of models for placing a NP in triage were used, and each model had a decrease in LWBS and LOS. An NP in triage allowed the front-end ED staff to quickly get the patient to a NP therefore, avoiding the bottleneck observed with a traditional ED triage. An additional benefit of a NP in triage was the

increase in patient satisfaction found in several of the 11 studies. Overall, the Bahena and Andreoni (2013) review found that a NP with adequate ED training increased ED throughput while maintaining high quality emergency department care.

Hayden, Burlingame, Thompson, and Sabol (2014) placed a Family Nurse Practitioner (FNP) in an ED triage. This ED saw an average of 63,000 patients per year with a 5% LWBS rate. The LWBS rate was found to be related to unacceptable wait times. Therefore, the goal of the project was to determine if a FNP performed a Medical Screening Exam (MSE) in the triage area would increase patient safety, quality, and satisfaction while decreasing the number of patients who LWBS. The study focused on having the NP evaluate all adult and pediatric patients with an ESI of 3 during the EDs busiest hours of 10 am to 10 pm. ESI was determined by the lobby pivot nurse after collecting a brief triage from every patient entering the ED. If the patient was determined to be an ESI of 3, an MSE was performed and orders were initiated. After analysis of data from pre and post project implementation, time to provider was significantly decreased, while patient satisfaction, financial recoup, and LWBS did not have a statistically significant difference. This project concluded patient satisfaction and financial metrics did not change because LWBS and LOS values were not significant ($p = .38$ and $p = .07$, respectively). There was an increase in elopement rates from the lobby. It was thought the elopement increase may have been a factor in the non-changing patient satisfaction scores. The patients were now receiving quicker MSEs and treatments were initiated sooner, but there was no decrease in LOS. Therefore, the patient was now choosing to

leave with partial visits and being billed for this care. Hayden, Burlingame, Thompson, and Sabol (2014) hypothesized if the issues with bed utilization, the pivot nurse, and NP charting time were addressed, the program would experience more success and the patient's level of satisfaction would increase and elopement rates would decrease.

A small private hospital with 47,147 ED patients per year wanted to improve patient satisfaction, increase efficiency and timeliness of ED throughput, and to eliminate LWBS rates (Love, Murphy, Lietz, and Jordan, 2012). To do this, the hospital placed a highly skilled NP or PA in triage for the 12 hours a day when the ED census was the highest (Love, Murphy, Lietz, and Jordan, 2012). In this study, all ambulatory patients presenting to the ED received a MSE by the triage NP or PA. Lower acuity patients would then have diagnostic tests completed and be escorted back to the waiting room until the patient was either discharged from the lobby or from a bed in the ED. The provider in triage focused on a brief assessment and initiation of orders rather than on evaluation, treatment, and disposition of the patient from the triage area. A new issue developed because now patients could elope from the lobby. It was determined the NP or PA in triage was responsible to follow-up with these patients. After implementation of a NP/PA in triage, this hospital found the new process was more efficient, patient centered, and significantly decreased the time to provider and rate of LWBS.

An urban Louisiana ED clinical case study by Tucker and Bernard (2015) found supporting evidence for placing a NP in triage. In this ED not only was there an NP run fast track but an additional nurse practitioner in triage was added to help care for ESI 4

and 5 patients. Data was compared before and after the implementation of the NP in triage. Tucker and Bernard found after the intervention, the percent of patients who left without treatment decreased by 3.77% and the ED was now able to treat more patients per day. The number of daily visits increased by 2.25 patients, which was an increase in 51.4 patients per month. As a result of a NP in triage, patients who left the department against medical advice did increase. This increase was believed to be due to the number of patients who qualified for either a more extensive ED evaluation or required admission but refused this care. The study did not find any change in the CMS or Physician Quality Reporting System quality measures. Tucker & Bernard (2015) discovered the majority of emergency NPs are trained as FNP or Acute Care NPs. FNPs were found to be the most common in the ED, due to their ability to care for patients across the lifespan. Thus, making NPs an integral part of the ED team (Tucker & Bernard, 2015).

Lastly, Nestler et al (2012) set out to determine whether a PA in triage could shorten LWBS and LOS of patients with ESI acuity levels of 3, 4, and 5. Regardless of the triage level, pediatric and behavioral health patients were excluded from the physician assistants (PAs) care, however the LWBS rate still significantly decreased from 9.7% to 1.4%, ($p < 0.001$) and the LOS median was decreased by 41 minutes ($p < 0.001$). This study is relevant because a NP is able to provide care to all patients across the lifespan.

Cost

A 2009 study by Gerton, Pimentel, Ercolano, Browne, and Barruetto found an increase in patient billing of \$118,000 per week when a provider was in triage. Love, Murphy, Lietz, and Jordan's (2012) article noted an additional cost for NPs in triage, for the additional lab staff, and EKG technicians. However, all patients who received a MSE now had a billable charge and were billed for their ED use. Since the revenue from these charges was not enough to cover the salary of an ED physician, the hospital felt a more cost effective approach was placing a NP in triage (Love, Murphy, Lietz, and Jordan, 2012). Tucker and Bernard (2015) and Carter and Chochinov (2007) further supported the idea of a NP being more cost effective than a physician to treat semi and non-urgent ED patient. Though Carter and Chochinove (2007) stated more research is necessary to determine the exact cost effectiveness of NPs, their research found NPs were especially beneficial in overextended rural EDs due to their ability to increase patient centered care and improve quality measures.

CMS reimbursed independent practicing NPs at 85% of the Medicare physician fee schedule (CMS.gov, 2016). The patient visit was only billable at 100% of the Medicare physician fee schedule if the independent NP and the ED physician are in the same group practice, and the physician actually documents their face-to-face encounter with the patient (ACEP, 2016). A NP discussing a patient's case with an ED physician or the ED physician reviewing the patient's medical record was not billable at more than the 85% rate (ACEP, 2016).

Summary of the Review of Literature

The evidence does not support one definitive way to implement an NP into triage. The one commonality found among the literature was to place an NP in triage during predetermined times of high ED census, leaving the traditional nurse-led triage to remain the standard of practice during times of low patient visits. Shea & Hoyt (2012) suggested standardized order sets in place to decrease variability and promote consistency among all providers. Overall, NPs were able to decrease LWBS, LOS, time to provider, and improve patient satisfaction with little to no impact on quality of care for patients who previously had long ED waits.

Nursing Theory

The scholarly project was designed to increase timely and effective quality patient-centered care in the ED by adding a NP to triage. However, to do this, there had to be support from the ED physicians and the hospital administration. Marilyn Ray's mid-range theory of bureaucratic caring incorporated the "practice significance of spiritual and ethical care in relation to the political, economic, technological, educational, physical, and social-cultural dimensions of (a) complex healthcare organization" (Turkel, 2007). Ray's theory took into account the healthcare provider and organizations struggle of balancing care for the patient while also serving the healthcare bureaucracy (Turkel, 2007). Patient centered care was viewed differently by administration than the direct healthcare providers. The administration viewed the relationship as a means to secure the

economic well-being of the establishment while a healthcare provider was focused on caring relationships and patient education. Ray's bureaucratic caring theory's main concept of spiritual-ethical caring was a place to start communication between providers and the organization. This was pivotal to this project because success only occurred with ED provider and hospital board buy-in.

Bureaucratic caring guided the project by focusing not only on the patient benefits but also on the advantages for the healthcare organization. The providers were focused on patient quality measures to ensure the patients received high quality and accessible care. While the hospital board understood the importance of high quality and accessible ED care, they were also focused on affordability and reimbursement. According to Turkel (2007), hospital administrators saw financial benefits when patients were satisfied with their care and quality measures were met.

The healthcare system structure influenced the view of nursing and how decisions for nurses were made within the organization (Masters, 2015). For several years, the Inland Northwest hospital had employed NPs throughout all departments. The NPs were not eligible for independent practice, however, Certified Nurse Midwives, psychiatric NPs, and Certified Nurse Anesthetist all had independent practice (Kootenai Health, 2012). The value of the NPs in the ED needed to be accepted and changed by ED providers before a structural change in the hospital took place. With the ED providers on board the proposed project of NPs in triage was to be taken before the hospital

administration where the ok to change the policy would be granted. Understanding the structure of decision making at the hospital was imperative to the success of this project.

The second guiding factor from Ray's theory was first proving to the ED providers and second to the hospital board that NPs were able to provide responsible care and practice defensive nursing (Masters, 2015). NP education provided these practitioners with critical decision-making skills necessary to apply rules and principles to guide their practice (Masters, 2015). Both stakeholders needed to accept and trust the recommendations and guidelines set out by the IOM, the state Board of Nursing, and the ACEP. An independent practice NP could competently evaluate and treat patients to help alleviate the demands of increased patient visits to the ED, thus increase the quality measures for the ED.

The final step of the project was guided by Ray's theory to help support the allocation of resources as necessary to maintain the economic viability of the ED (Masters, 2015). An independent practicing NP was placed in the ED triage during times of high ED census to decrease LWBS, LOS, and time to provider. Though this resulted in a decrease in reimbursement, research suggested increasing the quality measures would increase patient centered care and revenue. This was important because in the healthcare environment the organization was focused on the bottom line (Masters, 2015). Therefore, to help maintain a balance of patient care and revenue it was proposed the currently staffed NP would only be reallocated to the ED triage at times of high patient census.

The three factors of Ray's theory of bureaucratic caring acted as a basic framework to guide the scholarly project and supported how "...nursing and caring are experiential and contextual and are influenced by the social structure or the culture in the organization" (Masters, 2015, p. 363). Each factor of Ray's theory built upon the other to support the changes proposed by this project. The culture, beliefs, and practices of the ED physicians were considered when making suggestions to process changes and work flow. Sufficient relevant evidence was presented to the ED physicians. The current research demonstrated NPs were able to provide competent independent care to patients in the ED triage area. However, ED physicians would only support the NP in triage if it were also a value added cost. ED physician buy-in had to occur before the hospital administration listened and supported the idea of updating the hospital policy for NPs. Ultimately; the administration made the decision whether or not to change the hospitals advanced practice policy.

CHAPTER THREE

METHODS

The student investigator was aware of the Inland Northwest hospital's need and desire to change its ED flow to increase the ED quality measure for timely and effective care. After a thorough literature review, the student investigator spoke with the ED Director, a member of hospital administration, to see if there was support for placing a NP in triage during times of high ED census. Due to the ED's continued inability to meet the quality measures for timely and effective care, the ED Director felt the rest of hospital administration and the ED physicians would support the implementation of a NP in triage, once the ED remodel was completed in 2018.

Intervention

The ED Director thought the best method to accomplish a NP in triage was for the student investigator to develop a business plan outlining the NP in triage (see Appendix B for the complete business plan). A business plan was completed to ensure a NP with independent practice in the ED triage was safe, effective, sustainable, and increased the ED quality measure for timely and effective care. The business plan included a one page executive summary; an introduction and overview of the project; background information from the literature review; a mission statement; and a market analysis with the following components: demand factors, competition factors and market share, SWOT analysis, and

the potential change in the market. Lastly, the business plan included the market strategy, which was made up of: promotion, management/professional team, business time line, rough financial plan, and the rough operations plan which included the plan for staff education, standardization requirements, and a pilot project using the Just-Do-It approach. The ED Director and student investigator thought it important to provide the ED physicians and hospital administration a completed and well thought out plan for a NP in triage.

Once the business plan was completed, the student investigator was to propose the NP in triage business plan to the ED providers at one of their summer 2017 monthly ED provider meetings. The goal was to obtain their support for a NP in triage to see and treat patients with low acuity. This meeting consisted of all ED physicians, PAs, NPs, and the ED manager and director. At the meetings the providers and hospital administration worked together to talk about issues regarding the ED. Decisions were made by member voting with the final decision coming from the four physicians who head the ED provider group.

From informal conversations with the ED physicians by the student investigator and the ED Director, it was felt that more than half of the ED physicians supported NP independent practice. Many of these providers were younger, and had previously worked in departments where NPs had independent practice for low acuity patients. The ED Director felt the older and more resistant physicians would accept the business plan

proposal due to the continued push from hospital administration to increase the quality measures, and from the acceptance from the younger physicians.

Upon acceptance of the proposal for the NP in triage by the ED provider group, the provider group then took the proposal for the NP in triage to the hospital Medical Executive committee. This group was hospital administration and members of the hospital board. After acceptance of a NP in triage from the Medical Executive committee, the proposal was taken to the hospital Credentialing committee. Credentialing was the last place the proposal for ED NP independent practice to be accepted. Once accepted by Credentialing, the hospital policy for advance practice providers was updated.

After the policy change for ED NPs was updated, the student investigator put together a NP in triage project team. This NP in triage team consisted of the nurses, certified nursing assistants, at least one NP and one physician, and ED administration of either the ED Director or the ED manager. Together, this team officially designed and planned for the NP in triage. However, implementation of the NP in triage would not occur until after the ED remodel was finished, and was therefore, not within the scope of this project.

Project Cost

The cost of the NP in triage was discussed in the Rough Financial Plan within the business plan for a NP in triage. Cost was evaluated in a cost-benefit analysis. The cost-benefit analysis used the ED billing standard of Current Procedural Terminology (CPT) to determine the reimbursement for low acuity patients and the difference in NP

reimbursement compared to physicians for services rendered. The financial plan included a discussion of the advantage of reallocating the current NP from the main ED to the triage area rather than hiring another full time equivalent and the cost to the hospital for a NP in triage versus an ED physician. The goal was to provide enough data to show NPs in triage were able to increase the outcomes of the quality measure of timely and effective care at a relatively low cost to the hospital.

Analysis

Approval from the Institutional Review Board (IRB) was obtained to use the already collected and analyzed data from the Inland Northwest hospital. The hospital's Clinical Decision Support Department (CDS) and Quality Improvement Department (QI) had previously designed a report to monitor the timely and effective care outcomes of the ED. Midas Version 2012.1.5 pulled daily data from the clinical documentation program Meditech 6.x, thus, ensuring a systematic and rigorous data collection. The data collected was then analyzed by the CDS into a daily ED Patient Flow Report. Each month the QI used the ED Patient Flow Report to make a monthly ED Scorecard.

The student investigator used the most recent Inland Northwest ED specific statistics from the ED Scorecard for the dates of January 1, 2016 00:00:00 to December 31, 2016 23:59:59 for the compare analysis. The ED Director chose these dates because they represented six months before and six months after the implementation of an ED first nurse in triage. The 2016 Inland Northwest ED statistics for timely and effective care

were compared to the most up-to-date CMS National ED Benchmarks for similar sized EDs. The specific ED numbers evaluated and compared to other EDs of similar size included: LOS, LWBS, and time to provider. The information from this compare analysis was the foundation of why a NP in triage was both supported and necessary to help increase the ED quality measure of timely and effective care.

ED Patient Flow

Each day an ED Patient Flow report was sent from the CDS Department to the Executive Director of Emergency and Critical Care Services. The ED Patient Flow report ran daily at 0400 and collected data from the previous 12:00:00 to 11:59:59. The ED Patient Flow report contained 24 hours of patient information. Information on the report reflected patients who were still in the department at midnight thus registered the day before. The report also contained information for patients departing after 23:59:59 who would then be included as departed on the next day's report. However, it is the best indicator of patient information available. The data obtained from the daily report included:

- New patient registrations by ESI triage level and/or no triage level
- Patients leaving the ED
 - Total number of patients seen
 - Discharged
 - Left against medical advice (AMA)
 - LWBS

- Average LOS and median LOS (in minutes)
 - Total leaving ED
 - Total discharged

Definitions of each: Discharged patients excluded AMA and LWBS. LWBS and AMA were calculated by percent of all patients leaving the ED. Lastly, average LOS was calculated by finding the total time in the ED; this was the total time between ED registration and the documented time the patient left the department. If a patient LWBS or AMA, they were excluded from the average LOS data.



ED Patient Flow

New Registrations by Triage Level						
T1	T2	T3	T4	T5	Blanks	Total New Registrations
1	28	55	63	4	5	156
0.6%	17.9%	35.3%	40.4%	2.6%	3.2%	100.0%

Patients Leaving the ED						
Total Leaving ED	Admit to Obs	Admit to IN	Discharged	AMA	LWBS	
147	7	10	127	0	3	
100.0%	4.8%	6.8%	86.4%	0.0%	2.0%	

Average Length of Stay in Minutes			
Total Leaving ED - ALOS	Admit to Obs ALOS	Admit to IN ALOS	Discharged ALOS
170	259	348	151

Median Length of Stay in Minutes			
Total Leaving ED - Median	Admit to Obs Median	Admit to IN Median	Discharged Median
135.5	258	317	132

Figure 1. ED patient flow. Example of daily report from the CDS and QI departments. Kootenai Health. (2017a). ED Patient Flow. Unpublished data, Kootenai Health, Coeur d’Alene, Idaho

ED Scorecard

A monthly ED Scorecard was designed by the hospital Quality Department from the CDS data. The scorecard graphically depicted 12 months of ED quality measure statistics related to timely and effective care for all patient visits. The design separated behavioral health patients from all other medical patients. Behavioral health patients were defined as patients with a qualifying ED encounter with a principal diagnosis code meeting the ED-1c measure as determined by the National Hospital Inpatient Quality Measures and CMS. Therefore, the medical patient population was defined as all patients who did not meet the behavioral health definition and could be evaluated separately for this project.

The scorecard presented the following data for medical patients:

- Monthly actual and average number of patient visits
- Total patient visits for the 12 month period
- Total monthly median LOS and average LOS for all patients.
- LOS greater than 12 hours
- LWBS count and rate
- Time of day in relation to percent of patients LWBS

Further information was provided by the scorecard regarding patients who LWBS included gender, age, and wait in ED before departure. LWBS was defined as a patient with a discharge disposition of "Left Without Being Seen". Due to concerns the LWBS information was not correct, a sample population was audited (15% of the total LWBS

patient population) and 97% of the accounts reviewed accurately reflected the correct patient discharge disposition.

The monthly ED Scorecard report represented the performance for all patients with a qualifying ED encounter. A qualified ED encounter required a patient to have a corresponding ED cost center charge. If an encounter had an elapsed time of equal to or greater than 00:00 it was included. Encounters with elapsed times less than 00:00 were excluded. Patient volume included all encounters with a start (registration) time regardless of lapsed time or whether or not a discharge time was recorded. Upon review of a sample of accounts, it was determined for all time related statistics, patients with no discharge times were excluded from the report.

**Emergency Department Statistics
January 2017 Update**

	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Average	Total	Performance ● HIGH ● LOW
Patient Volumes	4,258	4,052	4,539	4,408	4,516	4,375	4,817	4,654	4,304	4,297	4,256	4,308	4,399	52,784	
Medical Volumes	4,010	3,824	4,274	4,166	4,255	4,137	4,568	4,400	4,066	4,058	4,056	4,065	4,157	49,879	
Behavioral Health Volumes	248	228	265	242	261	238	249	253	238	239	200	243	242	2,904	
Following Values Expressed in Hours (#/min)															
Median Length of Stay - All Patients	2:36	2:37	2:42	2:36	2:40	2:30	2:40	2:40	2:43	2:30	2:39	2:36	-	2:36:36	
Average Length of Stay - All Patients	3:06	2:58	3:06	2:51	3:03	2:49	3:02	3:05	3:05	3:00	3:17	3:08	3:02	-	
Median Length of Stay - Behavioral Health	3:33	3:36	3:48	3:36	3:52	2:57	3:36	3:19	4:02	3:41	4:14	3:55	-	3:42	
Average Length of Stay - Behavioral Health	6:29	5:53	7:05	5:01	6:43	4:23	5:40	6:49	7:57	7:18	8:20	9:27	6:47	-	
Following Values Expressed as Counts and Rates															
Behavioral Health Patients w/ LOS > 12 Hours	37	29	41	20	42	13	33	42	41	42	61	38	37	476	
Proportion of Total BH Population	16.30%	10.94%	16.94%	7.69%	21.32%	5.46%	13.25%	16.60%	17.23%	17.57%	30.50%	15.64%	-	16.38%	
Medical Patients w/ LOS > 12 Hours	19	10	9	4	13	16	9	14	13	13	15	21	13	156	
Proportion of Total Medical Population	0.50%	0.23%	0.22%	0.09%	0.31%	0.35%	0.20%	0.32%	0.32%	0.32%	0.37%	0.52%	-	0.31%	
Left Without Being Seen (LWBS) Count	97	119	150	151	175	114	171	166	119	83	111	93	129	1549	
LWBS Rate (%)	2.28%	2.94%	3.30%	3.43%	3.88%	2.61%	3.55%	3.57%	2.76%	1.93%	2.61%	2.16%	2.92%	2.93%	

Notes:

The statistics contained in this report represent performance for all patients that had a qualifying Emergency Department encounter. To be considered a quality Emergency Department encounter a patient must have had a corresponding Emergency Room cost center charge. Encounters with elapsed times of equal to or greater than 00:00 were included. Encounters with elapsed times less than 00:00 were excluded. Encounters with a start time (registration time) but no discharge time, or a discharge time of 00:00 were included for patient volumes. Upon review of a sample of these accounts, it was determined that discharge dates were entered correctly, but an associated discharge time was missing. For time related statistics these encounters were excluded. Additional patient population definitions are as follows:

1. Behavioral Health Patient Population is defined as a qualifying Emergency Department encounter with a principal diagnosis code that meets the ED-1c measure definition as determined by the National Hospital Inpatient Quality Measures and the Centers for Medicare and Medicaid Services. ICD-9 codes were used prior to October 1, 2015 and ICD-10 codes were used October 1st, 2015 and beyond.
2. Medical Patient Population is defined as all patients that did not meet the behavioral health definition
3. Left Without Being Seen (LWBS) is defined as a patient with a discharge disposition of "Left Without Being Seen". There were concerns that this information may not be accurate so a sample population was audited (15% of the total LWBS patient population) and 97% of the accounts reviewed accurately reflected the correct patient discharge disposition.

Figure 2. ED patient scorecard. Example of the monthly report from the CDS and QI departments. Kootenai Health. (2017b). Emergency Department Scorecard. Unpublished data, Kootenai Health, Coeur d'Alene, Idaho.

Figure 2 Continued

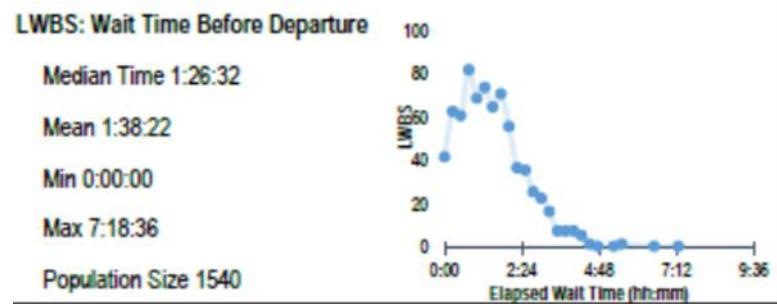
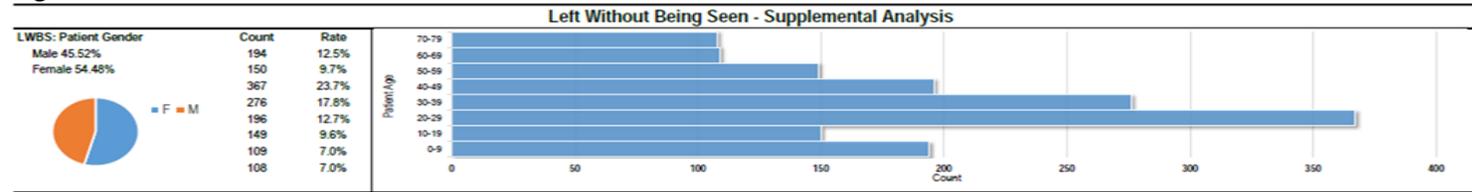
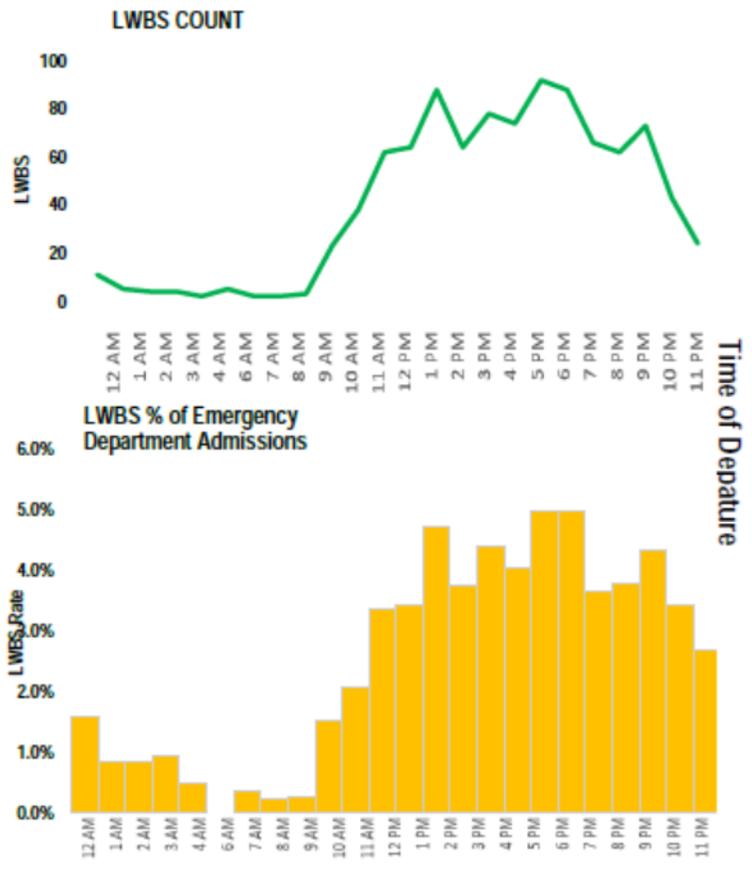


Figure 2 Continued



CHAPTER FOUR

RESULTS

Compare Analysis

For the compare analysis, the student investigator used the most recent data from the Hospital Compare website (Table 2), and the ED Scorecard (Table 3).

Table 2. How the local hospital compares to other hospitals of similar size around the state and nation (Medicare.gov, n.d.c).

Quality measure outcome	Inland Northwest hospital	Same state average	National average
Percent of patients LWBS (average median: for reporting period 1/1/15 to 12/31/15)	3%	1%	2%
LOS (reporting period 10/1/15 to 9/30/16)	159 minutes	159 minutes	141.5 minutes
Time to provider (reporting period 10/1/15 to 9/30/16)	33 minutes	22.5 minutes	26 minutes

Table 3. Inland Northwest ED Scorecard: 1/1/ 2016 00:00:00 to 12/31/16 23:59:59

Quality measure outcome	Result
Percent of patients LWBS (Average)	2.92%
LOS	156 minutes
Time to provider	56

For the 2016 calendar year, the actual LWBS rate was 2.92%. This was 0.9% higher than the CDC goal of 2%. The LOS in the ED for all discharged patients was 156 minutes. This was 14.5 minutes higher than other similar sized national hospitals, and only 3 minutes faster than similarly sized state hospitals. Time to provider for the 2016 year was 56 minutes for the Inland Northwest hospital. This was 30-minute slower than similar sized hospitals in the nation, and was 33.5 minutes slower than other state hospitals of similar size. Therefore, without a change in triage flow, the ED continued to have high rates of LWBS, LOS and time-to-provider.

Rough Operations Plan

Overview

Before the NP in triage was implemented, a NP was staffed in the main ED from 1000-0200, as this was the time of high ED patient census. The NP in the main ED assisted the ED physician in caring for ESI 3, 4, and 5 patients, as the NP did not have independent practice. Once the hospital policy for ED NPs was changed and allowed independent practice, the NP from the main ED was moved to the triage area. The NP in the main ED was not replaced because the low acuity patients were no longer treated in the main ED. This freed up the ED physicians to care for the higher acuity patients.

No additional nursing or support staff was necessary. Before a NP in triage, the triage area had a First Nurse, a triage nurse, and a lobby nurse. The First Nurse and triage nurse roles did not change. The lobby nurse used to implement standing orders in the

lobby, such as x-rays and lab work. With the NP in triage, the lobby nurse was reallocated to work with the NP in triage. The lobby certified nurse's assistant (CNA) role did not change. Lab and radiology processes in the lobby also did not change. Registration was effected, but only because now they could complete registration on patients in the lobby who were being seen by the NP in triage. However, no extra registration staff was necessary to complete this process.

Design

Between 1000-0200, the NP in triage sat with the First Nurse and registration. The First Nurse evaluated all arriving patients as high or low acuity. High acuity was determined based on the First Nurse's experience, judgment of the patients complaint's, and the use of Appendix C. Appendix C was previously designed by the ED providers to help the First Nurse know what patients were automatically considered high acuity, and therefore, not appropriate for NP care in triage.

Between 1000 and 0200, the First Nurse would place all low acuity patients in the NP que to be seen. The NP or lobby nurse would take one low acuity patient at a time to the exam room located directly off the lobby. This room was outfitted with all supplies necessary for a MSE and basic procedures. (The limited availability of supplies in triage forced the NP to send the more acutely ill patients back to the main ED, ensuring they received more advanced care). The lobby float nurse and the NP completed the triage, MSE, and any necessary procedures before the patient was placed back in the waiting room to wait for results and/or imaging. If at any time during the patient stay, the

patient's condition became more acute, the patient would be taken to the main ED. This did not change from prior to a NP in triage; however, report was now given to and from the respective providers.

During the lobby wait, but after seeing the NP, the registration staff completed patient registration and collected the patient's co-pay. As imaging was ready for the patients, the lobby float nurse, or lobby CNA took the patient to imaging, as done prior to the NP in triage. Since radiology was accustomed to having patients from the lobby receive tests, how the lobby patients were flagged did not change.

If a patient required an intravenous (IV) medication or other procedure such as splinting, which was not appropriate for the waiting room or required too much time in the NPs evaluation room, the "Quiet Room" was used for this procedure. The "Quiet Room" was large enough to seat several patients, so no patient specific information was discussed in this room if there were more than one patient present. Upon completion of all exams and treatments, the low acuity patient was brought back to the NP's room to receive their discharge instructions and packet.

Low Census. If there were more than three beds available in the main ED during the hours of 1000-0200, due to low patient census, the NP in triage would float back to the main ED once their charting was completed. The NP would assist in patient care as done prior to a NP in triage, i.e. no independent practice in the main ED regardless of patient acuity level. If a sudden influx of patients occurred, the NP would report off to the ED physician and go back to the triage area.

ED Communication. It is important to note the ED, like the rest of the hospital, already uses the Jabber communication system to send and receive messages. Jabber worked like any other instant messaging or texting system, but was secure so basic patient information can be sent. Staff and providers used it to quickly discuss and relay their needs to other members of the team. It continued to be an expectation of the First Nurse, lobby nurse, lobby CNA, and registration to use this to communicate their needs to one another and other staff as necessary. In addition to Jabber, all ED employees had two-way radios to communicate urgent information.

Training and Standardization. Educational emails and presentations at ED staff and provider meetings explained the new process. To start a NP in triage, a Just-Do-It 30-pilot project was implemented to work out kinks of the process. Additional hands-on training for the staff occurred during the first two weeks of the pilot project.

During the 30-day pilot project, the initial NP in triage and front-end staff were members of the NP in triage project team. A nurse facilitator, a member of the design team, was present in triage for the first two weeks of the pilot project to answer questions, ensure standardization of the process, and help the front-end of the ED continue to flow. If, after the first day of a NP in triage, there were no barriers, members of the design team began to train the general ED.

All ED CNAs and the ED nurses, previously allowed to be first and lobby nurse, were trained during their usual shifts. A float nurse or another member of the main ED nursing staff covered this nurse's patients in the main ED. The nurse proceeded to the

triage area and was oriented to the first nurse and lobby nurse roles. This generally took about two hours. After their orientation, they would go back to the main ED and care for their patients. As many staff nurses as possible were trained this way during the first two weeks. This method ensured a nurse facilitator was there to answer questions and maintain standardization of the process.

The NPs cycled through after each eight-hour shift. The first three shifts were all covered by a NP from the NP in triage project team. This ensured the process worked for the NP on the project team prior to training the other ED NPs.

Pilot Project Design

A 30-day pilot project was implemented using the Just-Do-It approach. This timeframe ensured a sufficient amount of time occurred to determine if there were moderate to large patterns of improvement after the implementation of the NP in triage (Langley et al., 2009). The pilot project's 30-day period was evaluated using a before-and-after time series design. Run charts were used to validate the changes in the quality outcome measures of LWBS, time to provider, and LOS. The goal of the pilot project was to hard-wire the process because there were no changes during the 30-day test period. Only if there had been major patient care concerns during the pilot process would modification have occurred prior to the end of the initial 30 days.

Staff Input. All staff and provider complaints and suggestions were made in the ED SharePoint site. At the end of the 30-day pilot period, the NP in triage project team

sat down and discussed the new process including staff and provider comments, suggestions, and concerns from SharePoint. This input helped make changes and improvements following the 30-day pilot project. Follow-up from the NP in triage project team related to the SharePoint items was available in SharePoint for all staff and providers to see.

Pilot Project Evaluation. During the pilot project, daily ED Patient Flow reports were sent to the NP in triage project team for evaluation. Each week the CDS and QI sent weekly summaries of the ED Patient Flow report with time series results for LWBS rates, LOS average and median, and the number of patients who presented to the ED as low acuity. To ensure everyone saw the immediate effects of the NP in triage on patient care these weekly reports were sent out to the staff via email, and posted on the staff educational boards in the breakroom and at the time clock.

Upon completion of the 30-day pilot project, the results from the ED Patient Flow reports were compared to the 30 days prior to implementation (baseline). The data was plotted over time on run charts for the outcome measures of LWBS and LOS average and LOS median. The time series design helped decrease the chance of the Hawthorne effect and misinterpretation of external events while increasing the rigor to the test design (Langley et al., 2009).

Rough Financial Plan

The overall implementation cost of this project was considered minor. Staff and providers were trained by email, at previously scheduled meetings, or when on shift. The NP in triage and lobby nurse were already on shift from 1000-0200, and just reallocated to the NP in triage process. The only additional cost was paying a nurse facilitator during the two weeks of Go-Live. This cost was approximately \$40/h for 14 hours a day for two weeks resulting in about \$9,000. ED supply costs were relatively similar because the same number of patients were seen, just in a quicker manner.

According to the Revenue Integrity Manager at the Inland Northwest hospital (D. Cockerill, March 16 2017, personal communication), NPs were only reimbursed at 84% of the Medicare physician fee schedule. Therefore, the 16% reduction in reimbursement from CMS and insurance companies made up the largest ongoing cost to the Inland Northwest hospital with a NP in triage. However, if the NP in triage increased the timely and effective care quality measures to meet or exceed the national benchmark, the hospital would obtain a variable rate of increased reimbursement from CMS, which would help to offset the cost. However, part (would depend on the provider contract) of the CMS reimbursement would go back to the ED physicians as a bonus for meeting the quality measure for timely and effective care (D. Cockerill, March 16th 2017, personal communication).

Approximate Reimbursement

In the ED, providers were paid based on the Current Procedural Terminology (CPT) for their Professional Charge. NPs were reimbursed at 84% of the physician's fee schedule. Each ESI level had a Professional Charge reimbursement rate (Table 4).

Table 4. Physician (MD) and NP reimbursement based on CPT codes

Current procedural terminology	MD reimbursement	NP reimbursement
99281 (ESI 5)	\$20.44	\$17.17
99282 (ESI 4)	\$39.83	\$33.46

Therefore, if there had been a NP in triage for 2016, the following reimbursement would have occurred.

Total ED patients in 2016 = 52,784

Low acuity patients = 15,833

- CPT 99281 = 1,267
- CPT 99282 = 3,483

Table 5. Reimbursement for MDs and NPs

	CPT 99281		CPT 99282		Total low acuity patients (\$)
	MD	NP	MD	NP	
Number of patients	1267	1267	3483	3483	
Professional Charge (\$)	20.44	17.17	39.83	33.46	
Reimbursement (\$)	25,897	21,754	138,728	116,541	
Difference in reimbursement between MDs and NPs	4,143.09		22,187		
Total difference in reimbursement between MDs and NPs (\$)					26,330

The calculated decrease in reimbursement for a NP in triage for 2016 was \$26,330.

However, \$26,330 was the worst-case scenario. Limitations to this calculation method are discussed below.

The goal of the NP in triage was to decrease the number of LWBS patients to less than 2%, and the total number of patients who LWBS in 2016 was 1,549. Therefore, had a NP been able to decrease the LWBS rate by 1%, 52 more patients would have been seen in 2016. The additional reimbursement from these 52 patients would have increased the reimbursement deficit for a NP in triage (Table 6).

Table 6. Additional Reimbursement for NPs Treating LWBS

	LWBS
Number of patients	52
Professional Charge (\$)	17.17
Reimbursement (\$)	893

The LWBS patients did not have a specific CPT code applied to their account because a provider did not see them. Therefore, the exact breakdown of ESI 4 and 5 was unknown, and Table 6 was based on the lowest reimbursement, CPT 99281, the hospital would have received.

Combining the calculations from Table 5 and 6, the Inland Northwest hospital would have had a total loss of Professional Charge reimbursement of \$25,437 for the 2016 calendar year. However, there were many limitations to the calculations performed on the 2016 data. Therefore, the reimbursement from CMS would actually be greater, thus decreasing the total NP in triage reimbursement deficit.

Calculation Limitations

Tables 5 and 6 were calculated on the Professional Charge alone. Had the following variables been known, the reimbursement deficit for 2016 between NPs and ED physicians would have been less.

- The actual number of patients a NP would have seen between 1000-0200
- The actual number of low acuity patients that presented between the hours of 0200-1000 when an ED physician would see them
- The number of low acuity patients that would arrive between 1000 and 0200 when the ED was not busy, therefore, seen in the main ED by a physician.
- Additional reimbursement for meeting the less than 2% nation benchmark for LWBS
- Difference in NP verses ED physician wages

- Increase in total patients seen (all ESI levels)

Overall, many variables and factors were unaccounted for; most importantly the difference in pay between ED physicians and NPs. It was believed by the ED Director and the student investigator the decreased cost of the NP, the increased CMS reimbursement for meeting the timely and effective care quality measure benchmark, and total increase in number of patients seen, more than offset the decrease in Professional Charge reimbursement from CMS.

CHAPTER FIVE

DISCUSSION

Immediate Complications

In mid-February 2017, the Inland Northwest's CNO notified the ED Director an outside company, Insight, was coming to the ED. Insight was going to work on an ED redesign to help increase the quality measures for timely and effective care. The CNO told the ED Director Insight had successfully redesigned the ED at her previous hospital and she wanted to use them again. The company came in during the last two weeks of February 2017 and created an ED Redesign Team. This team consisted of employees from Insight, ED bedside staff, other hospital department bedside staff, and staff from ancillary departments. The goal of the ED Redesign Team was to evaluate ED processes and ED flow through the department and to the inpatient units. After one week, the ED Redesign Team developed a new ED flow process for patients in the ED, and for the patients admitted from the ED to the hospital. During the second week, the ED redesign plan was implemented using the Just-Do-It 30-day Pilot Project format.

ED Redesign: Rapid Care

The ED redesign was called Rapid Care. Rapid Care split the ED into two separate pods, Horizontal and Vertical. The First Nurse used ESI, chief complaint, Appendix C, and their nursing judgement to immediately place a patient either in

Horizontal or Vertical. Therefore, Rapid Care eliminated lobby triage because the First Nurse now placed all patients directly in a room. Each shift, nursing staff and providers were assigned to either pod. Once the staff and providers arrived for their shift they did not leave there pod to assist the other, except in trauma situations.

Horizontal was designed to care for high acuity ED patients who met any of the criteria in Appendix C or was an ESI 1 or 2. There were 17 Horizontal rooms each with a bed and telemetry monitor. There were three physicians, seven nurses, and two CNAs staffed in Horizontal. No NPs or PAs were assigned to work in Horizontal due to the acuity of the patients.

Vertical, however, was designed for all other patients presenting to the ED who had lower acuity. Vertical had 12 patient areas (that could treat up to 23 patients at one time), two ED providers which included at least one physician and either another physician or a PA or NP, five nurses, and two CNAs. In the case of the ED physician and a PA or NP, the NP or PA did not have independent practice so the ED physician was required to document face-to-face assessments for all NP or PA patients. This arrangement meant the Vertical ED physician working with a PA or NP was actually responsible for as many as 23 patients at one time.

Vertical Process. A patient was assigned to Vertical by the First Nurse. At that time, the lobby CNA took the patient to a Vertical Intake room. The patient was placed in a single occupancy room with a procedure chair. Within minutes of arrival to the Vertical Intake room, the patient was met by an ED physician, NP, or PA and a Vertical nurse

who would perform the MSE, patient triage, and assign the ESI level. Upon completion of the MSE, the ED provider entered orders and the nursing staff initiated them. Once initial orders were completed, the patient was registered and co-payments were received. At this time, the patient was moved from the Vertical Intake room. The patient was placed either in a procedure room for further work-up or into the Vertical Results Waiting Room (Results Waiting). Results Waiting was a large room with chairs set up along the walls to accommodate as many as 13 patients. In this room patients waited for results, IV fluid administration to complete, further radiology studies, a face-to-face with the ED Vertical physician, admission to the hospital or surgery, or their discharge. All Vertical patients eventually spent time in Results Waiting. When a Vertical patient was ready for discharge or further consultation with hospital staff, they were taken out of Results Waiting and placed in the Disposition Room. The Disposition Room was a place where a confidential discussion about the plan of care occurred. Vertical patients were taken in and out of the Results Waiting room as many times as necessary to complete their care in a timely and confidential manner.

It was important to note, Vertical patient could be upgraded to Horizontal at any time. If this occurred, the charge nurse assigned the patient a Horizontal bed and report was given from the Vertical provider to the Horizontal provider. However, a patient was never downgraded from Horizontal to Vertical.

New Direction of Project

Rapid Care changed the flow of the ED and eliminated the need for lobby triage. However, due to the flow and provider staffing of Vertical, the ED Director and the student investigator decided to change the focus of this project to try for NP independent practice for the low acuity patients in Vertical. If the NP in Vertical had independent practice, patients would not have to wait to see the ED Vertical physician, and the ED Vertical physician would have a reduction in the number of patients they had to assess.

New Proposal

The new proposal for the EDP group included the business plan (Appendix B) with the latest research and support from the literature, ACEP, BON, and IOM. However, instead of placing a NP in triage, the proposal focused on allowing the NP in Vertical to have independent practice when caring for patients with an ESI of 4 or 5. If at any time the ESI 4 or 5 patient was found to qualify for an increase in their ESI, the current EDP oversight process would be required.

Rapid Care had its own timeline, and because of that, altered when the business plan to the ED providers was presented. Originally, the business plan was to be presented to the ED providers in a summer 2017 provider meeting. However, to fit the Rapid Care timeline, the ED Director felt the business plan needed to be presented to the ED provider group at their April 2017 meeting. The proposal focused on the results from the compare

analysis and the latest guideline information from the ACEP, BON, and IOM supporting independent practice for NPs treating low acuity patients.

Provider Response

The providers were open to listening to the proposal from the student investigator. After listening to the student investigators proposal, the ED providers presented the results of LWBS, LOS, and time to provider from the first 30 days after implementation of Rapid Care. In the first 30 days of Rapid Care, LWBS rate dropped to 0.8%, compared to the previous year's 2.9%; average LOS decreased from 156 to 143 minutes; and the time to provider was down from 56 to 15.5 minutes. Thus, due to the increase in LWBS, LOS, and time to provider, the ED provider group did not choose to support NP independent practice for low acuity patients in Vertical.

Credentialing Committee and Outcome

After the unsuccessful buy-in from the ED physicians, the ED Director took the student investigators proposal for NP independent practice in Vertical for low acuity patients to the May Credentialing committee. The ED Director felt the members of Credentialing would see the potential increase in reimbursement and insist on independent practice for NP in the ED. Unfortunately, at the May Credentialing committee the ED Director was told this hospital "did not want to be the first hospital in (this state) to allow NPs independent practice in the ED" (T. Putren, May 24, 2017,

personal communication.) It was at this time the proposal for a NP in triage (Vertical) and the policy change for NPs to have independent practice for low acuity patients in the ED was deemed unsuccessful.

Strengths

This project began because there was a need to increase the Inland Northwest EDs timely and effective care quality measure. A plan was formed with the ED Director based on the needs of the department, and the most up-to-date information available from the literature and professional organizations. Unfortunately, Insight was hired by the CNO to combat the same issue. Sadly, the two projects were competitive, and the project with the most stakeholders won. However, the student investigator's project was modifiable, which was important in the unstable hospital environment. The ED Director and the student investigator were able to change their projects focus to attempt to obtain independent NP practice in Vertical.

Project Outcomes verses the Literature

ED NP independent practice for low acuity patients was supported in the literature and by the professional organizations. However, though this state was rural and all literature supported the need for advancing NP care, especially in rural states, this state has chosen not to follow the recommendations (Carter & Chochinove, 2007). This was

proven when the Credentialing committee stated the Inland Northwest hospital did not want to be the first hospital in the state to allow NPs in the ED with independent practice.

Limitations

There were several limitations to this project prohibiting its success. In hindsight, having the ED Director on board and as a stakeholder for this project was not enough. The ED Director stated he spoke to the CNO about the project and she knew it was in the works. However, informal communication did not prove to be enough. It is unknown if her involvement would have changed the outcome, but perhaps she would have allowed an initial attempt of this project had she been better informed. The inability of obtaining the average hourly wages of NPs and ED physicians prohibited a full cost-benefit analysis. For future projects to attempt to justify NP independent practice, a cost analysis with the break-even point would be invaluable. Lastly, due to the quick implementation of Rapid Care, information from the four other hospital EDs located within 40 mile was not obtained. These EDs were in the neighboring state, but see residents from this state. It would have been beneficial to gather how many of this state's residents were treated yearly for low acuity complaints, the patients payer type, and primary diagnosis at discharge for these patients.

CHAPTER SIX

CONCLUSION

Practical Application

Two important conclusions came from this project. First, it was imperative to maintain stakeholder buy-in from all parties throughout the project. Initially, the younger ED physicians were on board with allowing NPs independent practice. However, once the results from the first 30 days of Rapid Care were presented, these physicians no longer thought independent practice for NPs was necessary. Not being able to maintain buy-in from the physicians influenced the outcome of this project. Secondly, when making changes in a healthcare system, it was important to understand the culture and organizational struggle of balancing care for the patient while also serving the healthcare bureaucracy. It was unknown if there were bureaucratic factors the student investigator was not privy too that influenced the outcome of this project.

Future of Project

The first future project idea was in one year to survey the ED physicians, nurses, and patients to gain their perspective of the new Vertical process. Questions of interest:

- Do the providers feel overworked?
- Do the providers think a NP with independent practice would help decrease their stress?

- Do the patients notice they are being billed for a physician visit though primarily seen by a PA or NP?
- Do patients and providers think waiting to see the physician slows down the ED process?

Depending on the results of the survey, a new project attempting to obtain independent practice for NPs in Vertical may be warranted. This project would need stakeholder buy-in, above the ED Director level, survey results, new calculations on cost and reimbursement, along with the information from the other EDs (as discussed in Limitations).

Another project idea would be to find out how physicians and NPs were paid at hospitals with NP independent practice to determine if the payment structure influenced the acceptance of NP independent practice. Perhaps the Inland Northwest's current payment structure plays a part of why the ED physicians did not want to allow NP independent practice. If there was a different payment structure at other hospitals, a project could compare and contrast which structure was best for the Inland Northwest hospital, its patients, and its providers.

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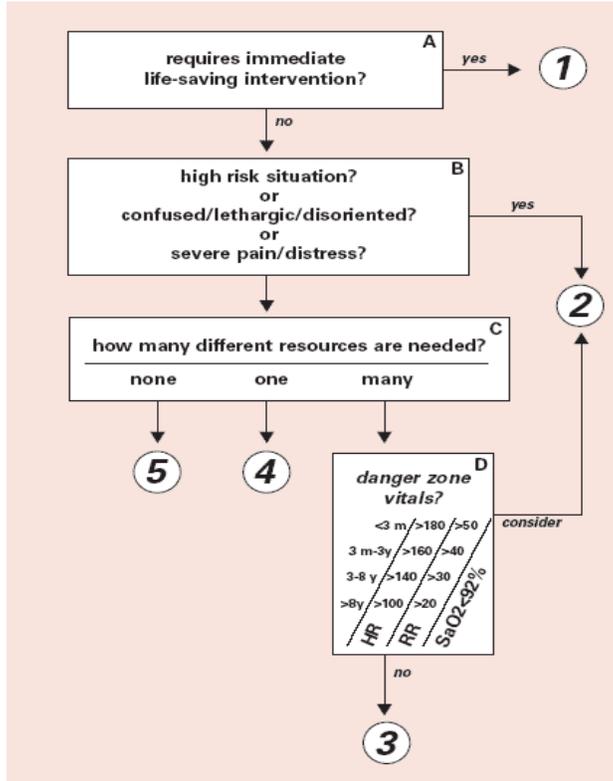
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APPENDICES

APPENDIX A

ESI ALGORITHM (ESI, 2017)



Notes:

A. Immediate life-saving intervention required: airway, emergency medications, or other hemodynamic interventions (IV, supplemental O₂, monitor, ECG or labs DO NOT count); and/or any of the following clinical conditions: intubated, apneic, pulseless, severe respiratory distress, SPO₂<90, acute mental status changes, or unresponsive.

Unresponsiveness is defined as a patient that is either:

- (1) nonverbal and not following commands (acutely); or
- (2) requires noxious stimulus (P or U on AVPU) scale.

B. High risk situation is a patient you would put in your last open bed.

Severe pain/distress is determined by clinical observation and/or patient rating of greater than or equal to 7 on 0-10 pain scale.

C. Resources: Count the number of different types of resources, not the individual tests or x-rays (examples: CBC, electrolytes and coags equals one resource; CBC plus chest x-ray equals two resources).

<u>Resources</u>	<u>Not Resources</u>
<ul style="list-style-type: none"> • Labs (blood, urine) • ECG, X-rays • CT-MRI-ultrasound-angiography 	<ul style="list-style-type: none"> • History & physical (including pelvic) • Point-of-care testing
<ul style="list-style-type: none"> • IV fluids (hydration) 	<ul style="list-style-type: none"> • Saline or heplock
<ul style="list-style-type: none"> • IV or IM or nebulized medications 	<ul style="list-style-type: none"> • PO medications • Tetanus immunization • Prescription refills
<ul style="list-style-type: none"> • Specialty consultation 	<ul style="list-style-type: none"> • Phone call to PCP
<ul style="list-style-type: none"> • Simple procedure =1 (Iac repair, foley cath) • Complex procedure =2 (conscious sedation) 	<ul style="list-style-type: none"> • Simple wound care (dressings, recheck) • Crutches, splints, slings

D. Danger Zone Vital Signs

Consider uptriage to ESI 2 if any vital sign criterion is exceeded.

Pediatric Fever Considerations

1 to 28 days of age: assign at least ESI 2 if temp >38.0 C (100.4F)

1-3 months of age: consider assigning ESI 2 if temp >38.0 C (100.4F)

3 months to 3 yrs of age: consider assigning ESI 3 if: temp >39.0 C (102.2 F), or incomplete immunizations, or no obvious source of fever

APPENDIX B

BUSINESS PLAN: NP IN TRIAGE WITH INDEPENDENT PRACTICE FOR LOW
ACTIVITY PATIENTS

Executive Summary: Nurse Practitioner in Triage

Purpose:

A NP in triage is proposed to help increase the quality measure of timely and effective care at an Inland Northwest ED. The Inland Northwest ED is the only ED in the county, the busiest ED in the state, and is consistently plagued with low marks for timely and effective care. The continued low ratings are evidence of restricted patient access to emergency services, which compromises patient care in the county.

Services Offered:

A NP in triage will quickly treat low acuity patients entirely in the triage area, therefore, decreasing the current stress these patients place in the main ED. This is a unique service to patients in the community because many of the patients with low acuity complaints do not have primary care physicians (PCP), the wait to see the PCP is too long, or the patients do not have health insurance or funds to afford Urgent Care.

Location:

NP in triage would be available in the Inland Northwest ED triage area from 1000 to 0200 seven days a week.

Market:

Placing a NP in triage will ensure patients with low acuity complaints presenting to the ED will receive the high quality, and timely care they deserve. It will also ensure fewer LWBS who seek healthcare elsewhere. From 2100-0200 the NP in triage has a 100% market share for low acuity patients.

Key Investors and Revenue Sources:

The provider group and the administration at Inland Northwest will be the key investors. Revenue will come from self-pay patients, private insurance, Medicare, and Medicaid.

Financial Summary:

There is a one-time startup cost of approximately \$9,000 for education and training. The largest cost of a NP in triage will come from the 16% reduction in reimbursement from CMS and insurance companies for treatment by a NP rather than a physician. It is estimated for the 2016 calendar year, it would have cost the hospital, at most, \$17,874 to support a NP in triage. However, there are several factors that were not able to be calculated to help off-set this decrease in reimbursement. These factors include increased reimbursement from CMS for improved quality measures; a decrease in the number of patients who LWBS; an expected increase in the number of patients seen daily; and continued 100% reimbursement for patients with low acuity who arrive between 0200-1000. Regardless of the loss of revenue, the ED management feels it is in the best interest for the community to potentially lose money to increase the quality of ED care.

The Future of the Business:

The goal of the NP in triage is not to become a place for patients to receive primary care, or to increase the number of patients arriving to the ED for low acuity complaints. Therefore, the NP in triage could be eliminated, or the hours modified to meet any demand changes.

Proposed Business: Nurse Practitioner in triage**Introduction & Overview**

A NP in triage is proposed to help increase the quality measure of timely and effective care at an Inland Northwest ED. As the busiest ED in the state and the only ED in the county, low marks for timely and effective care continue to plague this hospital. The continued low ratings are evidence there is a restriction of patient access to emergency services and compromised patient care in the county (Vieth & Rhodes, 2006). Unfortunately, these results do not uphold the Inland Northwest hospitals mission to provide superior quality and safe patient care (Kootenai Health, 2016). Without a change in triage flow the ED can expect to continue to have less than adequate measures for timely and effective care and will fail to achieve the hospital's mission and promise to the community. Increasing timely and effective care can be accomplished by adding a NP to triage during times of high ED census to evaluate and treat low acuity patients presenting to the ED with primary care concerns. By adding a NP in triage, a pull environment is created which increases patient throughput and decreases the bottlenecks found in the current ED triage model.

Placing a NP to quickly treat low acuity patients in triage offers a unique service

to this Inland Northwest hospital. Many of the patients presenting to the ED with low acuity complaints do not have primary care physicians (PCP) or the wait to see the PCP is too long. The freestanding Urgent Cares in the area could see the patients on the same day. However, many of the low acuity patients do not have health insurance or the funds to afford Urgent Care. This means ED care is the only available option for these patients. A NP in triage to quickly treat low acuity patients will provide a unique service to the community and help fulfill the mission of the Inland Northwest hospital. The NP in triage is a progressive change to the current model of healthcare in response to the needs of the community.

Background

Since the induction of the Outpatient Prospective Payment System (OPPS) the ED has been required to submit specific data related to quality of care or receive a 2% point reduction in their annual payment update (CMS.gov, 2013). One quality of care measure for the ED is timely and effective care. Timely and effective care is designed to ensure quality patient outcomes by evaluating how often or how quickly an ED can treat patients thus offering best results (Medicare.gov, n.d.). The three outcomes measured to evaluate timely and effective care for the ED are: rates of patients who have left without being seen (LWBS), length of stay (LOS), and time to provider (Quality Net, n.d.). These three specific quality measures are essential for good patient outcomes because delays represent a reduction in the quality of care while increasing the risks and discomforts for patients with serious illnesses or injuries (Medicare.gov, n.d.).

In 2010 the Patient Protection and Affordable Health Care Act (PPACA) extended healthcare coverage to millions of Americans who did not have previous access to healthcare. In 2010 the number of ED visits was 129.8 million. One year later, 2011, the first full year after the PPACA, ED visits increased to 136.3 million (National Center for Health Statistics, 2015). Therefore, it is believed the PPACA has created a greater strain on an already stressed healthcare system (Brooks, 2012). Under pressure from the current increase in patient visits the limited ED resources are continuously challenged with no expectations that the rising number of ED patient visits will slow down (Brooks, 2012).

Experts agree the shortage of primary care physicians will increase ED volumes in many communities (Brooks, 2012). This is especially true for the Inland Northwest hospital as it resides in an area recognized by the Health Resources and Services Administration as a Health Professional Shortage Area and a Medically Underserved Areas/Population (Health Resource, 2016). At this time the ED management is concerned about its continued ability to adequately care for the increase of ED patients. The management team at this hospital is looking for a new approach to provide high quality timely and effective care for patients who present to the ED with low acuity complaints.

Patients presenting to the ED with low acuity complaints are expected to continue to rise with the continued requirement of PPACA (Brooks, 2012). The low acuity patients have created a substantial burden within EDs across the nation. ED patients are seen by a provider based on their acuity which is traditionally assigned by a triage nurse. The most

severe patients are immediately taken back to the main ED to see a provider, and those with low acuity complaints wait in the lobby until all higher-acuity patients have been seen.

The benefits of adding the NP in triage is evident when the main ED is full and only high acuity patients are taken back to the main ED. All other patients wait in the lobby until a bed becomes available. A NP in triage can perform the medical screening exam (MSE), start treatments, and in some cases discharge the low acuity patients from the lobby rather than requiring the low acuity patient to wait to be seen in the main ED. This process will help to reduce the strain of the lower acuity patients in the main part of the ED while allowing these patients to receive the timely and effective high quality healthcare they desire and deserve.

Mission Statement

With the continued relationship between the Inland Northwest hospital and the ED provider group is proud to assist in improving the quality of health for every patient presenting to the Inland Northwest ED. Each provider challenges themselves to provide the most compassionate patient-focused care while maintaining superior quality and safety in a friendly and professional manner. A NP in triage, a service of the provider group, aligns with this Inland Northwest hospital's mission to become a premier healthcare organization in the United States (Kootenai Health, 2016). The NP in triage will strive to uphold the mission and values of both the Inland Northwest hospital and the provider group by offering unbiased and efficient evidence-based high quality healthcare

to all patients presenting to the Inland Northwest hospitals ED with low acuity complaints.

Market Analysis

The following includes the market analysis for a NP in triage. Demand and completion factors, the potential market share, and potential change in the market are included. A SWOT analysis is included to support a NP in triage.

Demand Factors

The potential customers for the NP in triage are any of the patients who have low acuity complaints during times of high ED census when the NP in triage is present. The hours of high census when the NP in triage would be available to see patients in the ED triage area would be 1000 to 0200. The NP in triage would perform MSE and initiate orders on all patients waiting in the lobby to see a provider with an Emergency Severity Index (ESI) score of 4 or 5.

According to the 2012 Emergency Department Summary (CDC, 2016) 31.3% of all ED patient visits were low acuity. Wait times in the ED can be substantial, in 2012 only 30% of all ED patients saw a provider in less than 15 minutes (Center for Disease Control and Prevention [CDC], 2016). Most patients, 33.6%, waited 15-59 minutes to see a provider and 15.8% of patients waited anywhere from one to four hours to be seen (CDC, 2016). During an ED wait some patients leave before triage and this accounted for 4.7% of all patients. Other patients leave without treatment but after the triage process. These patients are considered left without being seen (LWBS) and account for 2% of all

patients presenting to the ED (CDC, 2016). Sadly, these numbers represent a breakdown in the ED's ability to adequately care for its community. Timely and effective care is important to an ED because it is designed to ensure quality patient outcomes by evaluating how often or how quickly patients can be treated, thus offering best patient results.

Many of the patients arriving to the ED with low acuity complaints are self-pay or do not have insurance which covers Urgent Care visits. Actual payer breakdown for 2012 found Medicare accounted for 18.3% of all ED patient visits (CDC, 2016). For all of the Medicare patients 19.8% were considered low acuity (CDC, 2016). Medicaid/CHIP patients account for 29.5% of all ED visits and 36.8% these were low acuity (CDC, 2016). Patients with no insurance accounted for 14.1% of all patient visits and 36% of these patients had low acuity complaints. These numbers represent a large portion of patients who present to ED because they have nowhere else to go to receive healthcare.

The LOS for most ED patients, 68.4%, was under 4 hours (CDC, 2016). Of the patients who were in the ED for less than four hours 11.8% were discharged within one hour. Only 22.8 % of all ED patients spend less than two hours in the department. The longest LOS for ED patients was found to be between two to four hours and this accounted for 33.6% of all ED visits (CDC, 2016).

The Inland Northwest Hospital data compares to the information from the CDC. For the 2016 calendar year the actual LWBS rate was 2.92%. This is 0.9% higher than the goal rate of 2%. The LOS in the ED for all discharged patients was 156 minutes. This

is 14.5 minutes higher than other similar sized national hospitals, and only 3 minutes faster than similarly sized state hospitals. The time to provider for the 2016 year was not calculated but for the reporting time of 10/1/15 to 9/30/2016 the Inland Northwest hospital was seven minutes slower than the national hospitals and 10.5 minutes slower than other state hospitals of similar size. After a correction in data collection, the time to provider for the 2016 year was 56 minutes for the Inland Northwest hospital (T. Putren, personal communication, April 10, 2017). This represented a 30-minute deficit from similar sized hospitals in the nation, and was 33.5 minutes slower than other state hospitals of similar size. Therefore, without a change in triage flow an ED can expect to continue to have high rates of LWBS, LOS and time-to-provider.

Competition Factors and Market Share

Four years after CMS began tracking and reimbursing for quality care measures President Obama enacted the 2010 Health Care Reform. This reform allowed more people than ever before to access healthcare. Specifically, the PPACA extended healthcare coverage to millions of Americans who did not have previous access. However, the number of providers has not changed, so it was believed the PPACA has created a greater strain on an already stressed healthcare system (Brooks, 2012).

Experts agree the shortage of primary care physicians will increase ED volume in many communities (Brooks, 2012). This is especially true for this Inland Northwest hospital for it resides in an area recognized by the Health Resources and Services Administration (HRSA) as being a Health Professional Shortage Area (HPSA) and a

Medically Underserved Areas/Population (MUA/P) (Health Resource, 2016). Though the Inland Northwest hospital has partnered with a Family Medicine Residency program to help fill the void of primary providers in the area (Kootenai Health, 2016), there continues to be gap in lack of primary providers. Due to the lack of other options to receive healthcare the people in the area use the ED for their primary care and urgent care needs.

Inland Northwest hospital is the only hospital in northern the state and is the regional referral center for the 5 county area. The ED is a level 3 Trauma Center and for the year 2016 saw 52,784 patients (Hadley, 2017). At this time it is unknown if the low acuity patients presenting to the ED list a primary care provider. With a list of primary care providers, data could be gathered on whether or not these providers offer same-day or walk-in services for their patients. This would help to determine the number, reason, and type of patients the NP in triage may see.

Other relevant and helpful information to determine more specifics for market share and competition would come from the neighboring hospitals and the federally qualified health center. This information would include how many appointments the local federally qualified health center can see a day, and if they keep a record of the number of walk-ins they are able to fit in and how many they turn away each day. There are four other hospitals located within 40 miles. However they are in the neighboring state, but may see this state residents. It would be beneficial to gather how many of this state's residents are treated a year for low acuity complaints, these patients' payer type, and the

primary diagnosis for these patients.

The goal of the NP in triage is not to become a place for patients to receive primary care or to increase the number of patients arriving to the ED for low acuity complaints. Instead the NP in triage will ensure patients arriving for low acuity complaints, receive the high quality and timely care they deserve without placing additional stress on the main ED. A NP in triage would provide a unique and necessary service to the area by allowing the main ED to function at a higher caliber for all patient types.

SWOT analysis

Strengths:

- Quick access to a qualified healthcare provider for a medical screening exam, evaluation, treatment, results, and recommended follow-ups
- Services provided regardless of ability to pay
- Bills insurance for motor vehicle collisions in addition to all other complaints
- Decreases ED crowding for low acuity complaints
- Decrease the number of patients in the department at 0200: assisting the night physician is who is the only provider in the ED
- Increase access to care for patients who cannot see or do not have a PCP)
 - Not adding a NP position but reallocating the current position to triage
- Decrease LWBS, LOS and time to provider for patients with low acuity
- Eliminates front-end bottlenecks with pull environment

- Increase billing from patients who previously LWBS
- More affordable compared to ED physician
- Hospital administration is looking at increasing ED throughput
- Design works in neighboring EDs
- NPs are educated to care for patients across the lifespan with primary care concerns
- Support from the state BON, IOM, and the ACEP
- Have established times of ED high census
- NPs already work in the ED
- 100% market share after 2100

Weakness:

- If complaint is determined to now be low acuity will have to see ED physician in the main ED in addition to NP in triage
- Limited area to evaluate and treat patients
- Increase in elopement from lobby
- Billable at 85% of physician fee schedule established by CMS
- Fluctuating demand
- Decrease continuity of care if patient only seeks care in ED
- Need ED physicians by-in to help convince hospital board to change NP practice policy

Opportunities:

- Offer same day care for patients with low acuity complaints

- Offer PCP or urgent care services in area designated by the HRSA as being a HPSA for the MUA/P
- Potential to see and treat more patients per day in the ED
- Increase patient satisfaction and ED throughput
- Low numbers for quality measure of timely and effective care

Threats:

- NPs do not have independent practice at the hospital
- Must have ED physician and hospital board support to change NP credentials to allow independent practice
- May have to change plan for NPs to only provide Medical Screening Exam (MSE) in triage and start treatments but have ED physicians see patient in main ED once these are completed
- May be difficult to change culture of older and more resistant to change physicians
- Hospital board may not want to only have 84% reimbursement for any service

Potential Change in the Market

The change in the market could occur if more primary care providers moved to the area or if the established clinics were able to offer more daily appointments or walk-in hours. If this occurred the NP in triage position could be eliminated or the hours could be changed to meet the change in demand.

Another change affecting the NP in triage would be healthcare reform. At this

time the PPACA is not a certainty past 2017. There is no way of knowing what the future of healthcare may become. Changes will occur but what those are at this time is difficult to predict.

Lastly, reimbursement for NP services is always questionable. If the reimbursement rate was reduced the position could be eliminated or modified to find maximum reimbursement. There is always the chance the hospital could have an increase in low acuity patients attempting to receive care in the ED. If this occurred perhaps a fast track or more of an urgent care setting not requiring payment after receiving services could be established.

Market Strategy

Promotion

A NP in triage will be an offered service within the ED due to the increase in patients with low acuity complaints. Since the ED is offering this service as response to the communities need, and not as a service EDs usually provide, it will not be promoted in the community. Ideally the ED would not need to offer this service. It is hoped in the future there will be enough primary care providers in the area and the NP in triage will not be a needed service. However, until this time, patients who present to the ED during the hours of 1000-0200 with low acuity complaints will automatically qualify for the service as long as there is a wait in the lobby. For example, if a low acuity patient arrives at 1115 and there is no wait to see an ED provider they will not utilize the NP in triage and would not necessarily know the position or service exists (see Rough Operations Plan

for more specifics). However, if the patient arrived at 1115 and there is a wait to see an ED physician in the main ED then they would automatically be placed in the NP in triage's que. There may be times there is no wait to see a ED provider during the hours of 10-0200 and the NP in triage will not be available because they will be in the main ED (see Rough Operations Plan for more specifics) advertisement is not indicated. It will only be a service when indicated by actual patient visit numbers being greater than the number of available ED patient rooms.

Urgent Care is designed as a place for patients with low acuity complaints and therefore advertises. However, the ED must evaluate all patients who choose to use the facility though not actually designed for low acuity complaints. Therefore, the advertisement for low acuity services can continue to remain in the hands of the Urgent Cares and primary care offices. The goal of the NP in triage is not to increase the market share presenting to the ED for patients with low acuity. It is only to provide timely and effective care to those with low acuity complaints who present to the ED instead of Urgent Care or to a primary care providers office. In addition, a NP in triage is a successful process in other EDs of close proximity without advertisement.

Management/Professional Team

The NP in triage will remain a service offered by Inland Northwest hospital as long as the ED patient numbers and ED provider group agree it is a necessary position. The NP is employed by the ED provider group which in turned is employed by Inland Northwest hospital.

The ED provider group is employee-owned and governed by four providers. These four providers are the head of ED provider group. However, all providers have a say in the process, decisions, and practices concerning the group. The three board members work in cooperation with Inland Northwest hospital to provide care for the community.

The ED at Inland Northwest hospital has a Director of Emergency Services who answers to the Chief Nursing Officer (CNO) of the hospital. There is one ED manager who has three Clinical Coordinators (charge nurses with extra nursing staff and department responsibilities) who report to the manager as they help manage the ED staff, and a nursing Shared Governance which all work together to make decisions and changes in the ED. The NP in triage position will be a shared entity owned and managed by the ED provider group. However, the ED provider board will work side-by-side with the ED Director to determine the best process, changes, and application of the NP in triage. The nursing staff affected by the change will answer to the ED Director, manager, and Clinical Coordinators. While the Shared Governance team helps to work on process flow and nursing policies regarding the NP in triage. Policies related to nursing will be owned by the hospital and policies related to the NP in the triage area will be managed and owned by the ED provider group.

Business Time Line

It is estimated the NP in triage could be implemented within six to eight weeks pending acceptance from all governing boards at the Inland Northwest hospital. The ED

management fully supports changing the NP practice policy to allow independent practice for ED NPs for patients with low acuity complaints. Patients with low acuity are already defined in the policy and procedure guidelines for nursing triage and patient placement within the ED. However, the ED provider group needs the support of the hospital and credentialing boards to implement the NP in triage. The ED provider group could then attend the next board meetings for both the hospital and credentialing to provide the research and numbers supporting independent practice for NPs in the ED and for a NP in triage. Once the bylaws for NPs practice are changed it is a matter of educating the staff and providers on the new process.

Education is expected to take no more than two weeks after the bylaws have been changed allowing NPs independent practice. During the education process the NP in triage evaluation room will be evaluated to ensure all necessary supplies are available as to not cause a delay in the timeline for implementation. The staffing matrix for nursing and the ED providers will not need to be modified so there will be no scheduling conflicts to implement a NP in triage once the education is complete.

NP in triage will begin with a 30 day test cycle using the Just-Do-It approach. The test period will be evaluated using a before-and-after time series design on the quality measure outcomes of left without being seen, length of stay, and time to provider. After the 30 day cycle is over the team will meet and evaluate the process making changes as necessary to hardwire the process.

Rough Financial Plan

The implementation cost of this project is relatively minor since the NPs, nursing, and support staff are already employed during the proposed times of a NP in triage. Training and education will occur during times the staff and providers are already being paid. The only additional cost will be paying the nurse facilitator nurse during the two weeks of Go-Live. This cost will be approximately \$40/h for 14 hours a day for 2 weeks resulting in about \$9,000 for implementation. ED supply costs are expected to remain similar because the same number of patients are still being seen, but in a quicker manner.

The largest cost to Inland Northwest hospital will be the 16% reduction in reimbursement from CMS and insurance companies for the low acuity patients. According to the Revenue Integrity Manager at Inland Northwest hospital NPs are only reimbursed at 84% of the Medicare physician fee schedule. However, there are several factors to help off-set this decrease in reimbursement. The largest being the unknown of the variable rate of increased reimbursement the hospital would receive from CMS for improving the quality measure of timely and effective care. Though the total reimbursement Inland Northwest hospital gets to keep from CMS would depend on the provider contract between the ED provider group and the Inland Northwest hospital. This is especially important as part of the reimbursement is expected to be paid out to the ED providers in the form of bonuses for increasing the ED quality measures.

At this time the average rate of low acuity patients for this Inland Northwest ED is 30% of all visits. A rough breakdown (only using CMS reimbursement numbers, not private insurance or self-pay) of the difference in reimbursement that can be expected

with NPs treating low acuity patients compared to ED physicians is as follows:

Low acuity can be broken down into two Current Procedural Terminology (CPT) codes 99281 and 99283.

	MD reimbursement	NP reimbursement
99281	\$20.44	\$17.17
99282	\$39.83	\$33.46

An ED physician makes an average of \$160 per hour while a NP makes an average of \$70 per hour, so there is a contribution margin of \$90 to help cover the fixed costs when a NP is evaluating the low acuity patients. In addition, most LWBS patients are low acuity and at this time account for 2.9% of all ED patient visits. It is unknown the actual number of these patients the NP will be able to see and treat. However, the goal is to decrease this number to less than 2%. Which is roughly 52 more patients treated during the year. The additional reimbursement from these patients would also help increase the revenue of the NP in triage.

If there had been a NP in triage for the 2016 year here is how the numbers would have worked out.

Total ED patients in 2016 = 52,784

Low acuity patients = 15,833

CPT 99281 = 1,267

CPT 99282 = 3,483

	CPT 99281	CPT 99282	Total low acuity patients (\$)

	MD	NP	MD	NP	
Number of patients	1267	1267	3483	3483	
Professional Charge (\$)	20.44	17.17	39.83	33.46	
Reimbursement (\$)	25,897	21,754	138,728	116,541	
Difference in reimbursement between MDs and NPs	4,143.09		22,187		
Total difference in reimbursement between MDs and NPs (\$)					26,330

The decrease in reimbursement when a NP in triage is \$26,330. However, this number shows worst case scenario because it does not include the number of low acuity patients presenting between the hours of 0200-1000 when an ED physician would see them. If an NP was in triage from 1000-0200 they would see most low acuity patients. However, it is expected some low acuity patients will make it to the main ED due to the instability of the ED environment. When a patient is seen in the main ED they will be evaluated (and charged) by an ED provider.

This deficit does not include the additional reimbursement previously discussed that would now be brought in by the LWBS rate that will now be seen because there is a NP in triage. A representation of worst case reimbursement for LWBS patients for the year of 2016 follows and is based on 52 more patients or 1% of the LWBS that would now be seen in the ED by the NP in triage. The total number of patients who LWBS in 2016 was 1,549 and do not have a specific CPT code applied because they were not seen

by a provider. It is unknown the exact breakdown of low acuity versus high acuity of the LWBS so the calculations were performed based on the lowest reimbursement CPT of a 99281 that the hospital could receive. Therefore, we assume the reimbursement would actually be greater.

	LWBS	
	MD	NP
Number of patients	52	52
Professional Charge (\$)	20.44	17.17
Reimbursement (\$)	1063	893
Difference in reimbursement between MDs and NPs (\$)	170	

Overall the total loss of revenue to Inland Northwest hospital with a NP in triage would have been \$17,874. However, this does not account for all the above mentioned variables. Additionally, the potential increase in number of patients treated each day cannot be projected at this time. The reimbursement for the increase in patient volume would also help cover the cost of the NP in triage.

Overall there are many variables and factors unaccounted for. However, ED management feels it is in the best interest for the community to potentially lose \$17,874 per year to increase the quality of care the ED patients receive.

Rough Operations Plan

The main ED is already staffed from 1000-0200 with a NP who is assigned to an ED physician who must have a face-to-face with all patients treated by the NP. Therefore, it is proposed to move this NP from the main portion of the ED to the triage area. Thus, allowing the NP independent practice for those patients who qualify as low

acuity. Since the NP in triage is a new concept to ED's, a test phase would help prevent the need of allocating resources for the additional full time equivalents (FTEs) until there is proof the process increases the financial revenue of the department and the patient quality measures. Additionally, if the NPs were able to see and treat low acuity patients in triage there would be less patients in the main ED for the ED physicians to care for. Thus it is believed the ED physicians should be able to keep up with patient demands in the main ED if there is a NP in triage to see the patients with low acuity complaints. Lastly, due to the limited number of resources available in triage the NP would be forced to send the more acutely ill patients back to the main ED, ensuring they received the more advanced care they deserved.

Between 1000-0200 the NP in triage would sit with the 1st Nurse and registration, if the arriving patient was considered low acuity the NP would walk with the patient to their exam room located directly off the lobby. This room had previously been the nurses triage room and should already be outfitted with all supplies necessary for an evaluation. The lobby float nurse and the NP would complete the triage and MSE. At this time if minor procedures were required they would occur at this time by the lobby nurse while the NP went back to the 1st Nurse desk or completed their charting.

Upon completion of the MSE and procedures the patient would be placed back in the waiting room to wait for results and/or imaging. During the lobby wait but after seeing the NP the main registration staff would complete the patient registration process and collect the patient's co-pay. As imaging is ready for the patients, the lobby float

nurse, patient advocate, or lobby certified nurse's assistant (CNA) will take the patient to imaging, as done prior to NP in triage. Radiology is accustomed to having patients from the lobby receive tests, so how the patients are flagged as lobby patients will not change. However, radiology may find there is an increase in the number of patients from the lobby receive tests because a NP rather than the lobby float nurse will have seen and evaluated the patients.

It is important to note at any time during the patient stay the patient may be considered higher acuity than appropriate for the NP in triage and at that time be taken back to the main ED (with the charge nurse designating a room assignment) with report given to and from the respective providers.

If a patient required an intravenous (IV) medication or other procedure such as splinting which is not appropriate for the waiting room or required too much time in the NPs evaluation room the "Quiet Room" could be used for this procedure. However, no patient specific information would be discussed in this room if there was more than the one patient present. Upon completion of all exams and treatments the low acuity patient would be brought back to the NPs room to receive their discharge instructions and packet.

It is important to note the ED, like the rest of the hospital, already uses the Jabber communication system to send and receive messages. Jabber works like any other instant messaging or texting system but is secure so basic patient information can be sent. Staff and providers use it to quickly discuss and relay their needs to other members of the

team. It will continue to be an expectation of the 1st nurse, lobby nurse, lobby CNA, and registration to use this to communicate their needs to one another, along with other staff as necessary. In addition to Jabber, all ED employees have two-way radios to communicate more quickly and urgently with one another if necessary.

Training and standardization.

Prior to implementation of a NP in triage emails explaining the new process and education during the ED staff and provider meetings would occur. At the time of implementing the test the initial providers and front-end staff would be the members of the design team. A facilitator, member of the design team, would also be present for the first two weeks of the test to help answer questions, ensure standardization of the process, and help the front end of the ED continue to flow. If, after the first day there were no unforeseen barriers the members of the design team would began to switch out with the general staff after a brief hands on orientation. The goal would be to cycle through as many staff members as reasonably possible through the new triage design in the first two weeks while a facilitator in triage was there to help answer questions and ensure standardization of the process occurred. The NPs would also cycle through shift by shift and would not change as the nursing and CNA staff do. This process of training during the rollout had previously been successful in the ED, and therefore, was used again for this project.

The NP would use the following guidelines developed by the physicians to help guide their care of appropriate patients for NPs to independently treat in the ED triage

area. These guidelines are as follows:

Patients excluded from NP independent practice in included:

- Any patient that may require cardiac monitoring
- Altered level of consciousness
- Non-traumatic chest pain > 50 years old
- Non-traumatic chest pain any age with cardiac history
- Respiratory distress
- Reported fever < 3 months old, >70 years old, or current or recent chemo
- Level 1 and 2 Traumas
- Active seizures
- Severe Allergic Reaction
- Obvious long bone fracture or deformity
- Stroke Alert
- Gastrointestinal and vaginal bleeding
- Abdominal pain > 70 years old
- Psychiatric patients requesting evaluations, volatile, or police escorted
- Patients needing intravenous narcotics

Test design.

The design of this project is similar to a recent successful design flow change affecting the ED. A test cycle of 30 days would be implemented using the Just-Do-It approach (Langley et al., 2009). This test period would be evaluated using a before-and-

after time series design for when a NP was in triage by using run charts to validate the changes in the quality measures of LWBS, time to provider, and LOS. The 30 day time frame was used to ensure a sufficient amount of time occurred helping to determine if there were moderate to large patterns of improvement after the implementation of the NP in triage (Langley et al, 2009). This test would be implemented during the times of high census, 1000-0200, using staff familiar to the change and involved in the planning of this quality improvement project. 1000-0200 is the time when the department was previously staffed with a NP due to high census therefore this was not changed. The goal and standard set was for there to be no changes during the 30 day test period. If there had been major patient care concern it would have been addressed prior to the end of the test. During the test (and after) all staff and provider complaints and suggestions were made in the ED SharePoint site. The comments in SharePoint were then used to help make changes and improvements to the process. There was be no formal survey presented to staff.

Staff and community input.

Evaluation of the staff and provider opinions would be taken into consideration along the way. However, no actual changes would be made for 30 days. At the end of the 30 days the redesign team would sit down and discuss the outcomes along with the staff and provider comments, suggestions, and concerns placed in SharePoint. Follow-up related to the SharePoint items would be available via SharePoint and email for people to see what was changed and why.

There would be no formal patient survey done regarding this project. However, the support from the community is expected to be heard informally, in emails or letters to the hospital, and in the patient survey distributed by the hospital.

Test evaluation.

During the testing period the daily ED Patient Flow report would be sent to the design team for evaluation. Each week the Clinical Decisions Support Department and Quality Improvement Department (QI) will send a weekly summaries of the ED Patient Flow report including time series results of LWBS rates, LOS average and median, and the number of patients who presented to the ED as low acuity. These weekly reports would then be sent out to the staff after evaluation from the design team to ensure everyone could see the immediate effects of the quality improvement project on patient care.

Upon completion of the 30 day test the results from the ED Patient Flow reports would be compared to the 30 days prior to implementation which would be used as baseline data. The data would be plotted over time on run charts for the outcome measures of LWBS and LOS average and LOS median. The time series design would help decrease the chance of the Hawthorne effect and misinterpretation of external events while increasing the rigor to the test design (Langley et al., 2009).

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APPENDIX C

HIGH ACUITY PATIENT GUIDELINES AND PATIENTS EXCLUDED FROM NP
INDEPENDENT PRACTICE

- Any patient that may require cardiac monitoring
- Altered level of consciousness
- Non-traumatic chest pain > 50 years old
- Non-traumatic chest pain any age with cardiac history
- Respiratory distress
- Reported fever < 3 months old, >70 years old, or current or recent chemo
- Level 1 and 2 Traumas
- Active seizures
- Severe Allergic Reaction
- Obvious long bone fracture or deformity
- Stroke Alert
- Gastrointestinal and vaginal bleeding
- Abdominal pain > 70 years old
- Psychiatric patients requesting evaluations, volatile, or police escorted
- Patients needing intravenous narcotics

APPENDIX D

EVIDENCE TABLE

Author/year /title	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence and Application to Practice
American College of Emergency Physicians. (2013). Guidelines regarding the role of physician assistants and advanced practice registered nurses in the emergency department.	Role of NPs in the ED	N/A	N/A	IV: NPs in ED	DNP	Guidelines from the ACEP	NPs are acceptable in the ED when certain guidelines are in place	<p>Limitations: Does not contain study or research to support or negate guidelines.</p> <p>Benefit: ACEP is used by EDPs to help guide care</p> <p>FP: NPs integral part of ED team. Supports</p> <p>LOE: VII</p> <p>USPSTF: N/A</p>

American College of Emergency Physicians. (2016). Medicare mid-level provider FAQ.	Role of NPs in the ED	N/A	CMS pts	IV: NPs in ED	DNP	N/A	N/A	<p>Rules r/t charting for NPs in the ED</p> <p>Limitations: Not contain study or research supporting why rules are in place</p> <p>Benefit: NPs can be reimbursed by CMS</p> <p>FP: Supports. Can be used with different rules than EDPs</p> <p>LOE: VII</p> <p>USPSTF: N/A</p>
Bahena, D. and Andreoni, C. (2013).	PIT to decrease	SR	11 studies implemented PIT. Does not describe	IV: PIT	DV1: qualitative DV2: %	Each study discussed separately	NPs are capable triage providers	Strengths: PIT during peak hours - increase

Provider in triage. Is this a place for nurse practitioners ?	crowding	Purpose: Review of the literature of studies that implemented PIT	search criteria	DV1: NPs capable in triage DV2: LWBS DV3: LOS DV4: pt satisfaction	DV3: min DV4: qualitative	y described but no overall statistics	Decrease LWBS Decrease LOS Several studies tracked increase pt satisfaction	throughput; NP was PIT Limitations: PIT vs treatment area; autonomy of PIT; all studies, not describe how articles/studies found; no overall statistics FP: supports LOE: Level I (low level) USPSTF: moderate
Board of Nursing. (2016). Idaho administrative code IDAPA 23.01.01:	NP independent practice	N/A	N/A	IV: NPs	N/A	NPs can have independent practice in state	State gives full independent practice to NPs from accredited schools	Strengths: State law supports NP independent practice Limitations: Doesn't have to be followed. No

Rules of the Idaho board of nursing.								research/studies to support law FP: supports LOE: VII USPSTF: N/A
Brooks, D. (2012). In the wake of the Supreme Court's ruling on healthcare reform, hospitals and EDs still grapple with uncertainty, continued stress.	Continued overcrowding stress on ED	N/A	N/A	IV: Unknown effects ACA on ED crowding DV1: state accepts CMS expansion DV2: state not accept CMS expansion	DV1: not listed DV2: not listed	DV1: not listed DV2: not listed	DV1 and DV2: Uncertainty in state to state laws makes it hard to plan. TBD	Strengths: Supports need to change how EDs see pt Limitations: Doesn't give ways to combat overcrowding FP: supports LOE: VII USPSTF: N/A
Carter, A. and Chochinov, A. (2007). A systematic review of	Are NPs in ED valuable	SR Purpose: Review of the literature	PP: adult and pediatric Total articles =	IV: NPs in ED DV1: cost DV2: QoC	DV1: CoC; salary and RC/WU	DV1: Table 4 DV2: %	DV1: NPs cost more than RP not compared to EDP	Limitations: Not all RCTs and all specific statistics not given.

<p>the impact of nurse practitioners on cost, quality of care, satisfaction and wait times in the emergency department.</p>		<p>Do NPs in the ED reduce wait times, improve patient satisfaction and provide quality and cost-effective care</p>	<p>558; 281 selected for further review 59 articles assessed for quality. Total Articles: 36</p>	<p>DV3: wait times DV4: patient satisfaction No comparison NPs vs. other provider Qualitative/cor-relational studies : methodologic quality tool by Estabrooks and colleagues RCT: Jadad score</p>	<p>DV2: ability to read XR correctly; quality of referrals DV3: arrival to ED to time to see provider DV4: QoC and explanation of procures</p>	<p>DV3: minutes DV4: %</p>	<p>DV2: Equal NP to RP; better than RP DV3: decreased with addition of NP DV4: NP > RP</p>	<p>Benefit: stated N and inclusion and exclusion with process behind search. DV1 Limitations: RP unknown training costs to program. Barrier of some insurances not covering NP care DV3: lower acuity pts wait the longest and these are the pts the NP will care for Addition of NP for minor treatment improve wait times and pt satisfaction,</p>
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								with little or no impact on QoC. FP: NPs improve access to care for ED pts LOE: I USPSTF: High
CEP America. (2011). Financial analysis: Losing just 5 patients per day can cost your hospital millions.	Cost of LWB \$	Unknown design How much revenue is lost when pt LWBS	PP: CA hospitals > 50,000 beds	IV: LWBS DV1: loss of revenue DV2: D2P	DV1: \$ DV2: time	DV1: cost of not tx pt DV2: pt satisfaction	Decrease DV1: LWBS = loss \$ both for ED and inpt DV2: Decrease	Limitations: CA hospitals >50,000 ED visits, reimbursement differs by state Benefit: EDs roughly same size; decrease FP: supports LOE: VI USPSTF: Moderate

Centers for Disease Control and Prevention, Ambulatory and Hospital Care Statistics Branch. (2016). National hospital ambulatory medical care survey: 2012 Emergency department summary tables.	US statistics for EDs	Multi-stage probability design	640 hospitals selected 535 eligible EDs Of these, 408	IV DV1: LOS, T2P, LWBS DV2: Payment DV3: ESI DV4: ESI compared to payment	DV1: hours and/or min, % DV2: private insurance, CMS, no insurance DV3: 1-5 DV4: %	DV1: # of visits in thousands DV2: % DV3: 1-5 DV4: %	DV1: mostly % decreases as time increases DV2: % depends on payment type DV3: 4>5 DV4: 4>5	Limitations: unable to determine results based on location and size of ED Benefit: US statistics for quality measures FP: supports LOE: VI USPSTF: High
CMS.gov Centers for Medicare & Medicaid. (2013). Hospital outpatient quality	CMS statistics for US EDs	EDs part of CMSs out pt quality reporting program	Doesn't mention	N/A	N/A	N/A	N/A	Limitations: US EDs Benefit: Measures QoC from out pt hospital settings FP: N/A

reporting program.								LOE: VI USPSTF: High
CMS.gov Centers for Medicare & Medicaid. (2016). Advanced practice registered nurses, anesthesiologist assistants, and physician assistants.	CMS qualifications, coverage, billing, and payment for services by an NP	N/A	N/A	IV: NPs	N/A	N/A	NPs are reimbursable at 85% of physician fee for service	Strengths: NPs are reimbursed by CMS Limitations: None FP: supports LOE: VII USPSTF: N/A
Emergency Severity Index [ESI], (2017). Areas of ESI Algorithm.	ED pt triage system	N/A	N/A	N/A	N/A	N/A	N/A	Benefits: Comparable measures; CMS uses Limitation: Only used to compare with other EDs using system

								FP: N/A LOE: VII USPSTF: N/A
Gerton, J., Schabelman, E., Pimentel, L., Ercolano, P., Browne, B., and Barraeto, B. (2009). When is a physician in triage a financially viable option?	Cost of PIT	Non-randomized control trial 1 EDP in triage for 5 days to evaluate and d/c pt. 5 Control days same period.	46-bed, 57,000 patient per year community ED	IV: PIT DV1: LOS DV2: LWBS DV3: T2P DV4: PSS	DV1: min DV2: LWBS: % DV3: % DV4: %	Does not state	DV1: Decrease DV2: Decreased DV3: Decreased DV4: Increased	Limitations: small sample size Benefits: Didn't change provider staffing matrix for trial. Increase in RVUs. FP: MD not financially feasible. NP might d/t offset cost EDP LOE: III USPSTF: Low/Moderate

<p>Guttmann, A., Schull, M. J., Stukel, T. A., and Fung, K. (2009). Leaving the ED without being seen and risk of subsequent adverse events: A population-based study.</p>	<p>LWBS risk to pt</p>	<p>Retrospective EHR analysis of LWBS vs. seen et d/c status and associated with adverse in 7 days after LWBS</p>	<p>>25th percentile for ED pt visit in Ontario, Canada, from 2006–2007</p>	<p>IV: LWBS et seen et d/c DV1: death</p>	<p>DV1: %</p>	<p>Generalized estimating equation</p>	<p>DV1: LWBS not associated with increased risk of hospitalization or death when compared to seen et d/c pts</p>	<p>Limitations: Location and time frame Benefits: Large sample FP: No adverse events for seen et d/c or LWBS LOE: IV USPSTF: Moderate</p>
<p>Hayden, C., Burlingame, P., Thompson, H., and Sabol, V. K. (2014). Improving patient flow in the emergency department by placing a</p>	<p>Improve pt flow</p>	<p>Clinical QI project (Cohort study) Purpose: Mean comparison tests to determine statistical significance</p>	<p>Small 162 bed hospital with 63,000 ED visits/year ESI</p>	<p>IV: PIT DV1: reducing LWBS DV2: D2PT DV3: LOS</p>	<p>DV1: % DV2: minutes DV3: minutes</p>	<p>DV1: Shapiro-Wilk; t-test; Mann-Whitney U-test DV2: variance DV3: variance</p>	<p>DV1: NSD DV2: decrease DV3: NSD</p>	<p>Limitations: single institution=generalization inability Benefit: Need EDP by-in; EDP and NP/PA as PIT FP: supports with caveats</p>

family nurse practitioner in triage: A quality-improvement project.		of the intervention						LOE: III USPSTF: Moderate
Health Resources & Services Administration. (2016). Data Warehouse.	HRS A's definition of HPSA, MUP/A	N/A	N/A	N/A	N/A	N/A	HRSA HPSA et MUP/A	Benefits: HRSA= HPSA et MUP/A Limitation: N/A FP: N/A LOE: VII USPSTF: N/A
Institute of Medicine. (2010). The future of nursing: Leading change, advancing health.	RWJ F et IOM. More credibility et visibility to further	N/A	N/A	N/A	N/A	N/A	N/A	Benefits: IOM supports giving NPs independent practice Limitation: No specific examples FP: N/A

	nursing							LOE: VII USPSTF: N/A
Kennedy, M., MacBean, C. E., Brand, C., Sundararajan, V., and McD Taylor, D. (2008). Review article: Leaving the emergency department without being seen.	LWS S: pt satisfaction, adverse events, which intervention works best to tackle LWS	SR Information extracted from each article in reference to: purpose of study, country, study period, chief complaint, study design, sampling procedures, response rates, IRB authorization, % LWS, LWS variables considered, main findings,	N=26 MEDLINE, CINAHL and PUBMED databases and the Cochrane Database of Systematic reviews. English articles from 1990 to 2006 with prime purpose pertained directly to patients who LWS	IV: LWS DV1: why leave DV2: adverse health events DV3: interventions to decrease LWS	DV1: % DV2: % DV2: Results from previous studies compared	Does not specify	DV1: low acuity and urgency, longer wait times, males, time of presentation to ED, DV2: seek other healthcare, low rates of subsequent admissions, rare DV3: Ombudsman increased LWS; Rapid Entry and Accelerated Care at triage	Limitations: Many low level studies. Needs further research. Benefits: Insufficient evidence but found: lower urgency/acuity, longer wait times, reports serious adverse events rare, timing of arrival to ED and overcrowding FP: Support LOE: I USPSTF: Moderate

		outcomes, details of interventions, hospital/workforce characteristic, terminology, definitions provided, analyses used and relevant study weaknesses					decreased LWBS	
Kootenai Health. (2012). Advanced practice professional clinical privileges.	NP practice policy	N/A	N/A	N/A	N/A	N/A	NPs have restricted practice at the hospital	<p>Limitations: None</p> <p>Benefits: NPs have practice privileges, not independent.</p> <p>FP: Support</p> <p>LOE: N/A</p> <p>USPSTF: N/A</p>

Kootenai Health. (2016). Family medicine Coeur d'Alene residency.	Decreased PCPs	N/A	N/A	N/A	N/A	N/A	N/A	<p>Limitations: Does not apply to NPs</p> <p>Benefits: Need more PCPs; willing to try new ideas</p> <p>FP: Support</p> <p>LOE: N/A</p> <p>USPSTF: N/A</p>
Love, R. A., Murphy, J. A., Lietz, T. E., and Jordan, K. S. (2012). The effectiveness of a provider in triage in the emergency department. A quality improvement	Improve pt flow	<p>QI (cohort)</p> <p>Purpose: QI initiative to improve pt flow in ED by redesigning the triage process</p>	<p>33 bed ED in 114 bed private hospital</p> <p>47,147 pt visits (overcapacity)</p>	<p>IV: PIT</p> <p>DV1: IPS</p> <p>DV2: Increase pt flow</p> <p>DV3: decrease LWBS</p> <p>DV4:</p>	<p>DV1: qualitative pt et staff feedback</p> <p>DV2: T2P, benchmark 30min</p> <p>DV3: %, <2%</p>	Does not describe	<p>DV1: increased</p> <p>DV2: decrease</p> <p>DV3: decrease</p>	<p>Lesson: PIT needs to be highly experienced</p> <p>Decreased time to disposition</p> <p>Overall, increased pt flow and decrease elopement</p>

t initiative to improve patient flow.								FP: similar ED to support change LOE: III USPSTF: Moderate
Medicare.gov, The Official US Government Site for Medicare: Hospital Compare. (n.d.a). Timely & effective care.	Definition of timely and effective care and outcome measures for ED	N/A	N/A	N/A	N/A	N/A	N/A	Limitations: None Benefits: Specifically defines while outcome measures are part of timely and effective ED care FP: Definitions needed LOE: N/A USPSTF: N/A
Medicare.gov, The Official US	Timely and effect	N/A	N/A	N/A	N/A	N/A	N/A	Limitations: Dates are not by calendar year;

<p>Government Site for Medicare: Hospital Compare. (n.d.b). Timely & effective care: Emergency department care – details.</p>	<p>ive care outcome measure results</p>							<p>data updates and older information is not available.</p> <p>Benefits: Older data used for comparison with more recent and hospital obtained. Retrieved Fall 2015.</p> <p>FP: Necessary for project significance</p> <p>LOE: N/A</p> <p>USPSTF: N/A</p>
<p>Medicare.gov, The Official US Government Site for Medicare: Hospital</p>	<p>Timely and effective care outcome</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>	<p>Limitations: Dates are not by calendar year; data updates and older information is not available.</p>

Compare. (n.d.c). Timely & effective care: Emergency department care – details	measure results							Benefits: Older data to use for comparison with more recent and hospital obtained. Retrieved Winter 2016. FP: Necessary for continued data for comparison. LOE: N/A USPSTF: N/A
National Center for Health Statistics. (2015). Health, United States, 2014: With special feature on	Annual overview of national trends in health	National Ambulatory Medical Care Survey	449 hospitals 23,844 pt records	IV: ED pts DV1: # of pt visits and age DV2: LOS DV3: Payment	z-tests Taylor series method in SUDAAN	DV1: % DV2: min and % for T2P, LOS DV3: %	DV1: differs per age group DV2: differs DV3: differs per type DV4: differs per level	Limitations: Data several years old; not calendar year, grouped by US region; info only from participating ambulatory hospitals

adults aged 55–64.	statistics			DV4: ESI		DV4: %		Benefits: Compare hospital with region(s) and current data. FP: Necessary for continued comparison. LOE: VII USPSTF: High
Nestler, D. M., Fratzke, A. R., Church, C. J., Scanlan-Hanson, L., Sadosty, A. T., Halasy, M. P., ... Hess, E. P. (2012). Effect of a physician assistant as triage	PA in triage	Observational cohort controlled before-and-after study design Predefined outcome measures. 8 pilot and 8 control days.	Mayo affiliates: 72,000 pt/year N= 474 ESI 3-5 Excludes pediatric and psychiatric pt	IV: PIT DV1: LWBS DV2: LOS	DV1: % DV2: min	Mann-Whitney U-test SD/IQR 2 sided; p < 0.05; >98% statistical power; significance level = 0.05	DV1: Decrease DV2: Decrease	Limitations: Short study time, single center, may not be able to generalize Benefits: Decrease in DV1 and DV2, ESI used FP: supports LOE: III

liaison provider on patient throughput in an academic emergency department.								<p>USPSTF: Moderate</p> <p>Assess with triage. No EKGs or urine. Does not d/c only receives critical labs. Sees all ESI 3,4,5</p>
Quality Net. (n.d). Outpatient quality reporting measures	Quality Measure goals for ED throughput	N/A	Hospitals participating in the Hospital Outpatient Quality Reporting Program	N/A	N/A	N/A	N/A	<p>Benefits: Why project is important</p> <p>Limitations: Does not give suggestions on how to reach</p> <p>FP: Supports</p> <p>LOE: N/A</p> <p>USPSTF: N/A</p>

Shea, S. S., Hoyt, K. S. (2012). "RAPID" team triage. One hospital's approach to patient-centered team triage.	Patient centered care	Retrospective Purpose: increase pt satisfaction with PIT to RIPID	Level II urban community hospital in Louisiana 50000 pt/year ESI	IV: RAPID DV1: LWBS DV2: LOS DV3: Pt satisfaction	DV1: % DV2: min DV3: qualitative (%)	Does not state	DV1: decrease DV2: decrease DV3: increase	Benefits: more efficiently other PIT Limitation: PIT increase work load, provider must read radiographs and do wound repair; evolved from PIT model FP: improve pt throughput with NP/PA directed RAPID LOE: III USPSTF: Low
Tucker, A. and Bernard, M. (2015). Making the case for nurse practitioners in the	Crowding	Case Study Purpose: provide in-depth look at implementation and positive out-	Large urban New Orleans, LA ED 32,000 pt/year	IV: NPs in ED DV1: NP fast track: D2P, bed to provider, LOS,	For both DV1 and DV2: D2P-min, Bed to provider-min,	DV1 and DV2 does not describe how just stated compared to prior	DV1 and DV2: D2P-decrease Bed to provider-decrease LOS-decrease,	Limitations: single facility, unknown if work in other situation; not evaluate cost

emergency department. A clinical case study.		comes of NPs in 1 ED.	ESI Acuity 21% admit vs 12% national average	LWBS, # pts seen daily DV2: PIT: bed to provider, LOS, LWBS, # pts daily	LOS- min, LWBS-%, pts seen daily-raw #	(day, month, year via EMR) before and after NPs in ED	LWBS- decrease, pts seen daily- increase	Benefit: worked in high volume high acuity; most NPs FNP; discussed need increased ED training FP: NPs integral part of ED team LOE: IV USPSTF: Low
Vieth, T. L. & Rhodes, K. V. (2006). The effect of crowding on access and quality in an academic ED.	Overcrowding leading to decreased quality and satisfaction while increasing	Descriptive analysis of administrative records, paired EDP and NP surveys, and pre- or postpatient surveys regarding expectations and experiences	11,743 pts in urban academic ED	IV: LWBS DV1: Age DV2: Payer type DV3: Perception of crowding	% et means X ² test with significance of p< 0.05 Cohen's K	DV1: age (#) DV2: type DV3: time in minutes and satisfaction	DV1: most aged <45 DV2: increased based on lack of insurance DV3: more crowded = longer wait times = greater dissatisfaction	Limitations: 1 urban ED, limited hours for survey, self-reported wait times Benefits: attempt to gather data from a 4 seasons; extended wait times = high rates LWBS

	LWBS							<p>FP: supports overcrowding</p> <p>LOE: V</p> <p>USPSTF: Low</p>
<p>Weber, E. J., McAlpine, I., & Grimes, B. (2011). Mandatory triage does not identify high-acuity patients within recommended time frames.</p>	<p>Significance of project</p> <p>T2P</p>	<p>Retrospective cross-sectional study</p> <p>Traditional triage are ESI 1 and 2 T2P within recommended guidelines. Used EHR, registration and tracking systems for pt timeline</p>	<p>US urban academic tertiary ED</p> <p>N = 39,000 adult et pediatric</p> <p>Ambulatory pts</p>	<p>IV: Timeliness</p> <p>DV1: ESI 1 T2P</p> <p>DV2: ESI 2 T2P</p>	<p>DV1 and DV2: min, %</p>	<p>5 min interval histogram: time from arrival to triage</p> <p>Median, 95th % for each ESI level, confidence Intervals</p>	<p>DV1 and DV2: <50% have triage completed within timeframe</p>	<p>Limitations: ESI 1 and 2, 1 ED</p> <p>Benefits: Used ESI, ambulatory pts only, # pts et months data gathered</p> <p>FP: Current method of triage source of front end bottleneck, ESI is not issue but how implemented</p>

								LOE: IV USPSTF: Low
Welch, S. and Davidson, S. (2010). Exploring new intake models for the emergency department.	Significance to project New triage models	Qualitative et descriptive study Collaborative e-mail survey asking for descriptions of new intake model	All EDs in the Benchmarking Alliance N= 140 with average 5 million pt visits	IV: Triage model DV1: NP/PA in triage DV2: EDP in triage DV3: Team triage DV4: No triage DV5: Abbreviated triage DV6: Triage to	DV1-DV9: N/A	DV1-DV9: N/A	DV1 et DV2: Decreased throughput, LOS, LWBS DV3: LWBS decreased, pt satisfaction increased DV4: Decreased LOS, T2P, LWBS DV5, DV6, DV7: et DV9 Does not give results DV8: Decrease D2P and LOS	Limitations: Not necessarily high level or published studies; no results for some studies or ideas Benefits: Disseminates information FP: Supports LOE: V USPSTF: Low

				diagnostic waiting room DV7: Intake Kiosks DV8: Bio Identification techniques DV9: Computerized self-triage				
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Welch, S. J. (2012). Using data to drive emergency department design: A metasynthesis.	New ED models for triage	Metasyntheses Attempt to summarize latest research et data available of ED operations et apply it conceptually to ED design	ED Benchmarking Alliance database	IV: EDs flow DV1: Intake DV2: Throughput DV3: Outflow	DV1: Where takes place et timeliness DV2: Time DV3: Time	Did not state	DV1-3: Depended on method used	Limitations: ED Benchmarking Alliance database info only; many low level or unpublished studies Benefits: Disseminate knowledge FP: Supports LOE: V USPSTF: Low
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>= Greater than; <= Less than; %= resulting measurement percent; \$= United States dollars; #= number; ACA= Accountable Care Act; ACEP= American College of Emergency Physicians; CDC= Center for Disease Control; CMS= Centers for Medicare and Medicaid Services; CoC= Cost of Care; d/c= discharge(d); d/t= due to; DV= Dependent Variable; ED= Emergency Department; et= and; EDPs= Emergency Department Physician(s); EMR= Emergency Medical Record; ESI=Emergency Severity Index; D2P or D2PT= Door to Provider Time; FP= Feasibility to Practice; f/u= follow-up; HPSA= Health professional shortage area; HRSA= Health Resources & Services Administration; inpt= in patient; IQR= Interquartile range; IOM= Institute of Medicine; IPS=increase patient satisfaction; IRB= International Review Board; IV= Independent Variable; LOE= Level of evidence; LOS= Length of stay; LWBS= Left without being seen; MUA/P= Medically underserves areas and populations; N= sample size; n/a= not applicable; NP= Nurse

Practitioner; NSD: No significant difference; PA= Physician Assistant; PCP(s)= Primary Care Provider(s); PP= Patient Population; SD= Standard deviation; PSS= Patient Satisfaction Survey; Pt(s) or pt(s) = patient; QI=quality improvement; QoC= Quality of Care; RAPID= Rapid Assessment Plan Intervention and Disposition; RC/WU= Revenue Cost per Workload Unit; RP= Resident physician; r/t= related to; RCT= Randomized Control Trial; RWJF= Robert Wood Johnson Foundation; SR= Systematic Review; TBD= To Be Determined; tx= treatment; US= United States; XR= X-ray