The Effect of Implementation of an Acuity Tool for Medical-Surgical Patients in an Acute Care Setting

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THE EFFECT OF IMPLEMENTATION OF AN ACUITY TOOL FOR MEDICAL-SURGICAL PATIENTS IN AN ACUTE CARE SETTING

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DEDICATION

This work is dedicated to my family:

To my husband, Mike, for his support, endless hours of listening to me talk about my project, and for being my thesaurus; to my mother, Sylvia, for her hours of proofreading endless drafts of the project; to my father, Olaf, for his encouragement, support, and feedback; to my daughter, Laura, for her feedback from a staff nurse's perspective; and to my sons, Andrew, Will, and Mike for their encouragement and for reminding me not to take myself too seriously.

ABSTRACT

Problem Statement: In an effort to decrease the number of resuscitation events on medical-surgical units, the use of an acuity tool that incorporated the American Association of Critical Care Nurses (AACN)'s Synergy Framework intervention was studied over a three-month period. This framework aligns patient clinical care needs with nursing care workload indicators. Patients on medical-surgical units are vulnerable for delayed recognition of physiological deterioration. Therefore, they are at increased risk of incurring a resuscitation event. Volume-based nurse staffing does not take into account the necessity of nursing care that is individualized to the patient needs. The American Heart Association-Get With the Guidelines ®, as part of the national Focus on Quality Program, requires hospitals to report resuscitation event occurrences.

Purpose: To implement the Chiulli, Thompson, & Reguin-Hartman Acuity Tool in order to decrease the number of resuscitation event occurrences on an Orthopedic/Neurology unit.

Method: To utilize a quasi-experimental, non-randomized, quality improvement project implemented on a 32-bed Orthopedic/Neurology Unit over a three-month period, comparing resuscitation event occurrences with the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool with the group's performance without the acuity tool.

Analysis: Data analysis utilized Chi-square test-for-independence, with a 2x2 contingency table, for variance of the number of patient resuscitation event occurrences with and without utilization of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. For the sake of analysis, data examined and combined the three months before and after the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. When compared to the three months that the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was employed, it yielded a 1% difference, with a 33% relative risk reduction.

Significance: According to the results, there appears to be no statistical significance; however there is support for clinical significance. The use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool demonstrated a significant decrease in the number of occurrences from nine to two to zero for each successive month of the project.

Conclusion: While the Chiulli, Thompson, & Reguin-Hartman Acuity Tool did not demonstrate statistical significance, there was clinical significance to support the use of an acuity tool based on objective patient clinical severity and nursing care workload indices to improve patient outcomes and reduce resuscitation event occurrences on the Orthopedic/Neurology Unit.

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List of Abbreviations

AACN	American Association of Critical Care Nurses
AHA	American Heart Association
AHRQ	Agency for Healthcare Research and Quality
ANA	American Nurses Association
APN	Advanced Practice Nurses
AR	Absolute Risk
ARC	Acute Respiratory Compromise
AR_E	Absolute Risk Exposed
AR_{NE}	Absolute Risk Non-exposed
ARR	Absolute Risk Reduction
CBL	Computer-based Learning Module
CIWA	Clinical Institute Withdrawal Assessment
CMS	Center for Medicare and Medicaid Services
CPA	Cardiopulmonary Arrest
CPM	Continuous Passive Motion
CRN	Clinical Resource Nurse
DNP	Doctor of Nursing Practice
EBP	Evidence-Based Practice
EHR	Electronic Health Record
EMC	Education and Competencies Model
EWS	Early Warning System
FTR	Failure to Rescue

HEN 2.0	Hospital Engagement Network 2.0
HIT	Health Information Technology
IOM	Institute of Medicine
IRB	Institutional Review Board
KSA	Knowledge, Skills, and Attitude
MDR	Multidisciplinary Room
MET	Medical Emergency Team
MEWS	Modified Early Warning System
MFRA	Morse Fall Risk Assessment
NLN	National League for Nursing
PCA	Patient-Controlled Analgesia
PCC	Patient Care Competency
PEG	Percutaneous Endoscopic Gastrostomy
PPACA	Patient Protection and Affordable Care Act
QSEN	Quality and Safety Education for Nurses
RN	Registered Nurse
RRR	relative risk reduction
SBAR	Situation, Background, Assessment, Response/Recommendation
TeamsSTEPPS	Team Strategies and Tools to Enhance Performance and Patient Safety
TPN	Total Parenteral Nutrition
UABPANE	Unit Assignment Based on Patient Acuity and Nurse Experience
VSA	Vital Sign Alerts

The Effect of Implementation of an Acuity Tool for Medical-Surgical Patients in an Acute Care Setting

I. Purpose of the Study

Patient care has been increasing in complexity since the advent of contemporary nursing in the days of Florence Nightingale (Selanders & Crane, 2012). Patients are sicker, with more complex, multi-system problems, and hospital stays are shorter than in the past. Healthcare is following the trend of corporations, doing more work with fewer resources. The approach to doing more with less means to become more efficient and effective at work.

Hospitals are charged with meeting or exceeding national benchmarks for the standard of care. They must comply national, state, and accreditation standards, while providing cost-effective, safe, competent care to the communities and patient populations they serve. Hospitals are now ranked based on their safety and clinical quality performance results.

The Patient Protection and Affordable Care Act (PPACA) (2010) brought an influx of patients into the healthcare systems that had previously not sought medical care due to lack of insurance coverage. The PPACA made it possible for people to access the healthcare system. However, the influx of sicker patients, many who had not received healthcare in years, an aging population, the focus on decreasing length of stay in the hospital, and changes in reimbursement have the scene set for the perfect storm. The state of healthcare in America has worse outcomes than other industrialized countries, yet spending on health care consumes more than 20% of the National Gross Domestic Product expenditures (Kavanagh, Cimiotti, Abusalem, & Coty, 2012). The Centers for Medicare and Medicaid Services have transitioned to “value-based purchasing” which places financial strain on hospital systems (Kavangh et al., 2012, para 1). Patient care is the work of nursing. Nurses primarily provide direct care to hospitalized patients. The impetus

for people to enter and stay in the nursing profession is the desire to care for patients and make a difference in the lives of others. Hospitals are the largest employer of nurses. Nurses make up the largest workforce allocation in the hospital system. Nursing salaries are a large line item in the hospital budget, in some cases being almost one half of the hospital budget (Kavanagh et al., 2012).

Kalisch, Gosselin, and Choi (2012) identified the fact that missed nursing care can be traced back to inadequate nursing resources, including inadequate staffing skill mix. Their study also surmises that sufficient staffing levels, quality teamwork, and good leadership improve patient outcomes. Hospital systems have been under increased pressure to improve patient outcomes and satisfaction while receiving fewer healthcare dollars for reimbursement of care, pay for performance, and cost-saving initiatives, such as bundled payments. Nursing is a service line on which it is difficult to place monetary value. There is no direct reimbursed payment for nursing services in the acute care setting. Therefore, the nursing staff is often one of the cost centers to be cut (O'Keeffe, 2016). However, research has demonstrated that increasing nursing staff has been an effective intervention in reducing the length of stay, healthcare costs, and improving patient outcomes (Shamliyan, Kane, Mueller, Duval, & Wilt, 2009; Twigg, Geelhoed, Bremner, & Duffield, 2013).

Problem Statement

Hospital administration was developing an initiative to examine how to reduce the number of resuscitation events that were occurring on medical/surgical units. The decision was made to review the number of resuscitation events. The hospital was looking for an initiative to decrease the number of resuscitation events and whether nurse staffing influenced these events.

During this time, there were nursing job vacancies at the facility. This study sought to find evidence that a more balanced workload impacts morale in a positive manner.

Aiken, Clarke, Sloane, Sochalski, and Silber (2002) found that nurse staffing had a noticeable effect on patient outcomes and mortality on medical/surgical units. Their research supports evidence that nurses experience a fourfold increase in job dissatisfaction compared with workers in other industries. Nursing shortages are also attributed to nurse burnout among 40% of nursing staff. Odds adjusted ratios considering emotional exhaustion and burnout of nurses demonstrated a strong correlation with failure to rescue and patient mortality.

When patient clinical severity and nurse workload indicators are misaligned, patients and nurses suffer. Patient outcomes decline through increased mortality and morbidity. Patients' satisfaction decreases when they feel their needs are not being met. Nurses also experience reduced satisfaction when they are not able to meet the needs of their patients effectively (Aiken et al., 2002). Hospital reimbursement is affected by patient satisfaction. The morale of the nurses can influence patient satisfaction and the morale of the hospital unit. These feelings can affect the retention of nursing staff.

The alignment of patient clinical severity and nurse workload indicators aids in balancing nursing assignments. Early recognition and action in physiological changes can indicate deterioration in a patient's health status (Hospital Engagement Network 2.0 [HEN 2.0], 2016). The use of an objective acuity rating system that balances the nursing assignments on medical-surgical units leads to the reduction of resuscitation event occurrences (Health Research & Educational Trust, 2016a).

Nurse staffing assignments are based on a volume-based distribution of the patient census. Nurses were assigned a group of patients based on an equitable numeric distribution.

Using volume-based census staffing does not take into account the acuity of the patient or the competency and workload demanded of the nurse. When the nurse has a high acuity patient or patients that require more care than usual, the nurse may not have the time or ability to recognize changes in the patient's condition. These changes can lead to deterioration in the physiological status leading to failure to rescue by nursing and a resuscitation event (Ashcraft, 2004).

Assignments are often based on convenience of the location of patient rooms in an area. "The new tower of the hospital was designed to reduce the amount of steps for the nurse between patient rooms" (personal communication, Shalini Randolph, March 14, 2016). Patient assignments were made by assigning blocks of rooms to nurses usually in sequential order. Through bad luck or poor planning, patients with high needs are often grouped together. High needs patients increase the acuity for some patient assignments more than others. Imbalanced workloads that do not consider the severity of the patient's illness and the required workload of the nurse can lead to less than optimal care. When the nursing staff is overburdened by the care requirements for multiple patients, the risk of failure to recognize subtle changes or meet all the needs for care is constrained by a lack of time, attention, or awareness.

Purpose Statement

The purpose of the study was to implement an acuity tool with measurable parameters that incorporate patient clinical severity and nurse workload indices to determine whether there was a difference in the number of resuscitation event occurrences. Many times there is a misalignment on medical-surgical units nursing assignments that does not provide equitable distribution of the patient needs for the unit. Many acuity tools use subjective data which is variable and not evidence-based. Chiulli, Thompson, and Reguin-Hartman (2014) designed and refined an acuity tool that takes into account the needs of individual patients and the nursing

workload competencies to provide more equitable patient care assignments, balance nursing workload, and improve patient safety. The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was not specifically used to reduce the number of resuscitation events from occurring. The knowledge gained from Chiulli, Thompson, and Reguin-Hartman's research and development of the acuity tool determined whether transferability of the acuity tool on a medical-surgical unit to balance nursing workload applied to making a difference in the number of resuscitation event occurrences.

Research Question

Would implementation of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool result in a difference in reportable resuscitation event occurrences on an orthopedic-neurology unit of a community hospital?

Hypothesis

Implementation of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool linking patient characteristics with nurse workload will result in a difference in the number of occurrences of resuscitation event occurrences in patients on the orthopedic/neurology unit.

Null Hypothesis

Implementation of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool linking patient characteristics with nurse workload will not result in a difference in the number of resuscitation event occurrences in patients on the orthopedic/neurology unit.

II. Review of the Literature

An initial review of the literature was done using the EBSCOhost health search engine, which included databases from Cumulative Index to Nursing and Allied Health Literature, otherwise known as CINAHL, Google Scholar, and ProQuest with the keywords and phrase combinations for "acuity tool and medical-surgical unit," "failure to rescue and nurse competencies," "competencies for nurses and evidence-based practice," and "synergy model."

Articles were selected based on relevance to the proposed study and applicability of the setting, staff skill mix, and patient and nurse populations. Articles about acuity tools specific to medical-surgical units were limited. Of the acuity tools found in the research, many were complex and were not aligned with the purpose of the project. Additional articles were included based on references from articles selected, journal subscription articles, recommendations from the project committee members, and position statements about patient safety, acuity tools, and safe nurse staffing.

Patients currently placed on medical-surgical units are "vulnerable-as a result of large nurse caseloads, a high percentage of new nurses on staff, and higher levels of patient acuity" (Jones, 2013, p. 38). Some of these patients need more nursing care than is currently possible with these units. Reasons for the misalignment can be due to the complexity of patient care needs, patient acuity, co-morbidities, workload and competency levels of nurses, nurse experience level, failure to identify patient decline and resuscitation events, and lack of knowing when to escalate care.

The deficiencies in not recognizing and responding to patient deterioration can have significant effects on patient outcomes. The failure to initiate an escalation of care and the resuscitation event occurrences have been demonstrated to be more likely among nurses with

less than five years of experience, an early warning score of greater than three, or a disregard for an increased early warning score. While it is difficult to discriminate all causative factors, evidence suggests that these factors lead to an increase in morbidity and mortality (Calzavacca et al., 2008; Pattison & Eastham, 2012).

Parker (2014) stressed the importance of nurses' being able to "recognize and then react to the antecedent events leading to critical illness and possible FTR [failure to rescue]" (p. 161). Nurses use initiative and analytical decision-making in prompting them to escalate care to avoid a resuscitation event. Recognizing clinical deterioration requires critical thinking by the nurse. Critical thinking is a complex process that requires time, awareness, and recognition to problem-solve and make sound clinical decisions.

Research has demonstrated that measurable physiological changes occur in patients up to 48 hours before cardiopulmonary arrest (Shiloh, Lominadze, Gong, & Savel, 2016). There are "objective parameters" that, when examined in a trending manner, can predict "physiological dysfunction" (Howard, 2016, p. 14). Failure to rescue (FTR) was a term coined by Silber, Sankey, Krakauer, and Schwartz in 1992 that has become standard terminology in research literature and is used by the Agency for Health Care Quality as a safety indicator. Failure to rescue as defined by Silber (1992) is an unintended complication that occurs in the hospital that increases the risk of death (Hravnak, Schmid, Ott, & Pinsky, 2010). With patient complexity increasing, lengths of stay shortening, and reimbursement based on quality indicators, one has to examine the cost-effectiveness of nursing hours compared to care provided to patients and health outcomes. Despite legislation mandating staffing ratios, Donaldson and Shapiro (as cited in Twigg et al., 2013) stated that studies have failed to demonstrate "any significant impact on patient safety indicators" (p. 2254).

Needleman, Buerhaus, Stewart, Zelevinsky and Mattke (2006) found that while increased registered nurse to patient staffing ratios did not result in cost savings, the benefit for improved patient outcomes was justified. Their research of 799 non-government hospitals in 11 states found that by increasing the nurse staffing ratios, there were a reduction in the lengths of stay, improved patient outcomes, decreased adverse events, and decline in the number of failures to rescue events. The value of the patient population and societal benefit justified the lack of cost-savings. The research by Needleman et al. (2006) highlights additional ways hospitals can "improve quality and patient safety…[such as] equipping hospitals with new technology, investing in training and education, imposing regulations, and increasing nursing staff" (p. 205).

While the study facility has implemented measures to improve safety, there was still the opportunity for exploring ways to improve. The study facility had incorporated advanced technology to improve communication, access to patient documentation, and vital sign alert systems. There had been discussions about the use of certification for improved outcomes, encouragement for the nursing staff to advance their degrees, and investments made in nursing staff seeking to increase their education levels by providing scholarships for degree advancement.

Early recognition of patient deterioration, accurate documentation, and action by nurses can be improved using objective data captured in the electronic health record. Most objective data such as vital signs can be captured via electronic recording. Using electronic reporting equipment such as the electronic health record and vital sign alert systems reduces errors in data reporting. These data can then be extracted to provide a tool to measure patient acuity.

Changes in patients' physiological status can lead to increased mortality. Failure to rescue requires early recognition and escalation of care. Increased surveillance, awareness, and

intervention by nursing staff can increase patient outcomes and reduce mortality (Aiken et al., 2002; Andrews & Waterman, 2005; Johnston et al., 2015; Twigg et al., 2013). The use of an acuity tool is one way to improve awareness of patient deterioration and alert staff to the need to escalate care.

Respiratory rates have been shown to be an indicator of changes in patient status and are an indicator of physiological deterioration (Andrews & Waterman, 2005). An informal audit was performed by an informatics nurse specialist at the study site. The recorded versus actual respiratory rates for patients on medical-surgical units was examined. It was discovered that most patients' respiratory rates were documented between 18-20 breaths per minute. When counted by an independent auditor, it was found that the actual respiratory rates were between 10 and 33 breaths per minute.

Other issues involving vital sign entry include delayed entry, delayed reporting, and missing data. The hospital system implemented a mandatory learning computer module with pre-test and post-test training, how to obtain vital signs, and when to report them. This module was then scored and recorded in the employee's profile. Improved training in obtaining and recording vital signs and a protocol to initiate the escalation of care improved patient safety. Improved communication among care providers to report changes in vital sign alerts (VSA) as part of the early warning system (EWS) has been demonstrated to reduce unplanned transfer to a higher level of care and "an increased risk of morbidity and mortality" (Johnston et al., 2015, p. 831; Ashcraft, 2004; Bonnici, Gerry, Wong, Knight, & Watkinson, 2016; Ghaferi & Dimick, 2015; Howard, 2016; Jones, 2013).

Early Warning Systems and Modified Early Warning Systems (MEWS) have been integrated into hospital systems over a period of years. Early Warning Systems are designed to

be a preemptive response to decreasing patient morbidity and mortality. However, as Landro (2015) pointed out, “Signs aren’t always picked upon or acted upon by staff” (para 3).

The hospital implemented a MEWS in April 2016 “to increase awareness of patient VSA score escalation indicating physiological decline” (personal communication, Stefanie Greybar, March 2, 2016). The MEWS implementation is comprised of an automated vital sign entry system that sends vital sign information to the electronic health record (EHR). At the time of this study, the parameters the facility chose to monitor are pulse oximetry, heart rate, and blood pressure. The triad of vital signs being monitored are common variables that could indicate the risk of a cardiopulmonary arrest (Andrews & Waterman, 2005).

The vital signs and VSA scores for each patient on the unit are displayed on a large screen monitor in the multi-disciplinary room, which is a common thoroughfare for staff, but not visible from common or public areas. The scores are given a green, yellow, or red color code to indicate the patient’s change in physiological status. There is also a clinical decision support system using an algorithm to escalate the care provided to the patients based on their VSA score.

Bonnici et al. (2016) evaluated the implementation of the System for Electronic Notification and Documentation protocol for an escalation of care based on the Agency for Healthcare Research and Quality (AHRQ) Health Information Technology (HIT) Evaluation Toolkit and the Delone & MeLeans’s Model of Information System Success. This study was a four-step wedge design that examined four hospital systems looking at “nursing’s recognition and response to signs of deterioration” (Bonnici et al., p. 3) and time until escalation of care or discharge. The findings for the endpoints “proved to be challenging” (p. 7) and were focused on paper versus electronic charting.

Johnston et al. (2015) discussed the progression of escalation of care using the Healthcare-Failure-Mode-Effects-Analysis to identify safety failures and develop solutions. Historically, this type of analysis has resulted in the development of safety protocols, such as situation, background, assessment, response/recommendation (SBAR) and the surgical care improvement project (SCIP), which have been shown to reduce and prevent hazardous failures in healthcare. The study identified failure to rescue rates between 29% and 41%, with "early escalation of care is critical to prevent avoidable harm and improve outcomes" (Johnson et al., 2015, p. 837).

With regards to nursing, the study identified seven failures in the escalation of care that can result in resuscitation events. Many of these were the result of communication issues between the patient and nurse, and the nurse and the medical residents and doctors, as well as vital sign documentation issues. "Participants felt that understaffing was the principle cause of all these failures" (Johnston et al., 2015, p. 834). The recommendations were to "increase nurse to patient ratios", "use electronic vital sign recording and documentation systems," "remove hierarchical barriers through the development of an improved escalation protocol," and "[increase] use of smartphone technology" (p. 834).

Andrews & Waterman (2005) used a qualitative study design based on the grounded theory design of conversational interviewing. Their findings were that nurses tended to use subjective, "intuitive knowing," and non-medical terminology that impaired their credibility and professional opinions, which led to not being taken seriously by physicians (p. 478). The recommendation based on the study was that nurses use the EWS as part of "a systematic approach to assessing patients who are vulnerable to physiological deterioration" (p. 479). The

authors also felt that the EWS improved communication and confidence since it was linked to objective data.

Triggers can be changes in vital signs, changes in neurological status, or abnormal laboratory results that have been determined to be markers in physiological deterioration. The Adverse Event Trigger Tool is a retrospective, root-cause analysis of events that had "unintended consequences of medical care …preventable or not....which caused harm" (Griffin & Resar, 2009, p. 8). The recognition of patient deterioration improves patient safety and trigger tools are used to track adverse events. Patient morbidity and mortality are indicators used as quality measures by the Center for Medicare and Medicaid Services (CMS), the AHRQ, and the Institute of Medicine (IOM). These agencies have continued the call for quality nursing practice to prevent patient harm.

Both Needleman et al. (2006) and Hravnak et al. (2010) discussed the need to identify complications which can result in adverse events. There is a multi-pronged responsibility on the part of the hospital system to have measures in place to help recognize and respond to the deterioration of the patient's physiological status. Nursing must be vigilant in identifying and intervening when physiological changes occur and implement interventions to correct the changes and prevent deterioration.

A study of critical illness events on medical-surgical units at the University of Chicago from 2009 to 2013 found that when there is a critical event (i.e. resuscitation event, ICU transfer, or death) on a medical-surgical unit, there is an increased risk of another event occurring on that same unit within the next 6 hours. This study was an observational study of a 13-unit cohort of medical-surgical units with an average patient nurse ratio of 4:1, with a charge nurse, an attending physician, and two to three residents. Each unit had approximately 20 beds. The odds

adjusted risk ratio was 1.18 for one event and 1.53 for more than one event. The absolute adjusted risk demonstrated an increase of 1.9 occurrence events (Volchenboum & Mayampurath, 2016).

The Health Information Technology for Economic and Clinical Health (HITECH) Act, which is part of the American Recovery and Reinvestment Act of 2009 was designed to "improve workflow and documentation to help make care safer and more efficient" (Weiner, Fowles, & Chan, 2012, para. 3). The use of HIT and EHR can be used to measure quality measures, known as "e-QM." Implementation of a clinical decision support system is used to support nursing surveillance and use of "actionable targets" (Lewis, 2016, para 14; McGee, 2016). CDS systems and nurse-sensitive outcomes have been used to prevent FTR events such as sepsis, septic shock, hypotension, gastrointestinal bleed, respiratory failure, and cardiac arrest (Twigg et al., 2013).

The American Heart Association (AHA) utilizes a voluntary reporting system for cardiac arrest patients. Reporting is encouraged to add to the data and development of evidence-based care. Participating hospitals report both in and out of hospital resuscitation events. The data that is collected is used to provide feedback on their resuscitation practice and patient outcomes, as well as to develop new evidence-based guidelines.

Three descriptive areas look specifically at the histogram of patients who deteriorate on medical-surgical units. These include the Medical Emergency Team (MET), Acute Respiratory Compromise (ARC), and Cardiopulmonary Arrest (CPA). These are meant to be a step-wise increase in the level of care based on the patient's physiological status and the nurse's ability to manage the changing patient hemodynamic status.

The American Nurses Association (ANA) has been working on implementing legislation that balances staffing to provide safe care to hospitalized patients. The goal is to have appropriate staffing for the level of care to improve patient outcomes and satisfaction, reduce errors, improve staff morale and retention, and make the delivery of healthcare more cost effective. There are currently 14 states that having staffing laws and regulations in place. There is variance between states regarding regulations. Since 1999, California has had a mandated nurse to patient ratio that must be maintained at all times. Other states require that the Chief Nursing Officer (CNO) use collaboration to develop staffing plans. Five states require public reporting of staffing levels (ANA, 2015). While ratios are important, the acuity level between patients on the same unit can vary tremendously.

Oh & Seo (2008) determined that numerous acuity measurement tools have been developed to help determine "disease severity and … to predict outcomes, especially mortality" (p. 50). Benner (1984) and Johnston et al. (2015) demonstrated that acuity measurement tools help with identification; they do not provide the nursing staff with support for recognizing and acting on subtle changes that indicate an escalation of care. Benner (1984) discussed the importance of vigilance in recognition of acuity in patient safety. The nurse is expected to manage patients to keep them from life-threatening situations.

Sherwood and Zomorodi (2014) discussed the implementation of Quality and Safety Education for Nurses (QSEN) core competencies in providing safe, patient-centered care. Utilizing the QSEN knowledge, skills, and attitude (KSA) competencies, they operationalized the Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) curriculum from AHRQ. The strategies are designed around improved communication to increase interdisciplinary and intradisciplinary collaboration.

The strategies in the TeamSTEPPS curriculum are

- SBAR: Situation, background, assessment, and recommendation,
- CUS "C-I am concerned, U- I am uncomfortable, S – I think this is a safety issue, if no action, next step is to go up the chain of command."
- Check back or read back, repeating important communication.
- Plan of care briefings determining the following: "What is the most important thing this patient needs? What are the safety issues? What are the benchmarks and/or evidence for the care interventions?"
- Huddles to "problem solve or clarify strategy, get everyone on the same page" by asking, "What is the priority? What else could it be? What could we do differently? What was done well?"
- Debriefing strategies such as asking, "What did not go well? What could be done differently?" (AHRQ, as cited in Sherwood & Zomorodi, 2014, p. 19, Table 1).

Many of these strategies were introduced, and efforts to implement them had occurred at the study facility. However, there was no consistency in implementation and continuation of these strategies.

Workloads that are equitable improve nursing care, which in turn, improves patient outcomes. Kidd, Grove, Kaiser, Swoboda, and Taylor, (2014) discovered that acuity tools have been shown to decrease hospital expenses and allow "high-quality nursing care" (p. 2). It was also found that nurses "add value…and should be involved in assessing their own workloads and making decisions about resources" (p. 2). "Patient characteristics drive nurse competencies" (Edwards, 1999, p. 1). Providing nurses with autonomy and professional independence improves ownership of their practice, enhances job satisfaction, and promotes advocacy for patients.

Determining nurse competencies have been a topic of discussion for decades, many using Benner's Novice to Expert theoretical framework (Wangensteen, Johansson, & Nordstrom, 2014). There have been numerous tools and methods of evaluating competency in nursing; however, "repeated use of instruments for measuring nurse competence has rarely been reported" (Meretoja and Leino-Kilpi, as cited in Wangensteen et al., 2014). The Nurse Competency Scale has been used internationally to measure new graduate competence, but there has been dissension in a common definition and in establishing validity and reliability. Corwin et al. (2008) demonstrated a relationship between competencies between the Australian National Competencies and the Nurse Competency Standards for new graduates.

Engelmann, Brady, Larson, Perkins, and Schulz (2012), working with the National League for Nursing (NLN) in response to the IOM's reports (*To Err Is Human, 2000; Crossing the Quality Chasm, 2001; The Future of Nursing: Leading Change, Advancing Health, 2010*) calling for reform of competencies in nursing and nursing education, sought to "design competencies that address the affective, cognitive, and psychomotor domains essential for nursing practice" (para. 1). The result of their work was the NLN Education and Competencies Model (EMC), which serves to guide the incorporation of implementing the NLN "core values, integrating concepts, and program outcomes" (para. 2).

Conceptually, the EMC combine to develop core competencies in nursing. The core concepts, defined by the NLN were expanded and include

- "Caring, Diversity,
- Excellence,
- Integrity,
- Ethics,

- Holism, and
- Patient Centeredness" (Engelmann et al., 2012, para. 3).

The Education and Competencies Models integrates concepts derived from the Educating Nurses: A Call for Radial Transformation, 2010, report calling for nursing education to be built on the framework of

- "Context and Environment,
- Knowledge and Science,
- Personal/Professional Development,
- Quality and Safety,
- Relationship-Centered Care, and
- Teamwork" (Engelmann, Brady, Larson, Perkins & Schulz, 2012, para. 3).

The program outcome attributes of the graduate nurse include

- "Human Flourishing,
- Nursing Judgment,
- Professional Identity, and
- Spirit of Inquiry" (Engelmann et al., 2012, para. 3).

It is more challenging to assess competencies for seasoned registered nurses. The literature for determining the competency of nursing has demonstrated that self-evaluation is a valid and reliable way to demonstrate nursing. Other ways are through "observation of practice….learning packages….continuing professional development" (Royal Children's Hospital, n.d. para. 5). The orthopedic/neurology unit utilized many of these competency measures in the annual skills required for all nurses (see Appendix A).

Hwang (2015) developed and tested a patient care competency (PCC) scale based on KSAs based on QSEN competencies. The QSEN project focuses on patient-centered care and the relationship the nurse has with the patient. The study was based on a 17-item questionnaire, with nurses (n=577) rating "their competencies on a Likert scale of 1 = minimal… [to] 5 = excellent" (p. 45). The scale was able to demonstrate "good psychometric properties to assess nurses' competency for patient-centered care" (p. 47). This scale can be used to "assess nurses' competency for patient-centered care in hospital setting…. [demonstrate] variations in total PCC scores according to individual and organizational characteristics…. Determine factors related to patient-centered care…. [and] used for evaluation of educational interventions…to improve PCC" (p. 50).

Melnyk, Gallager-Ford, Long, and Fineout-Overholt (2014) developed evidence-based practice (EBP) competencies for both registered nurses and advanced practice nurses using a Delphi consensus-building survey model for use in acute care health care settings. The findings were determining set competencies for registered and advanced practice nurses. The authors determined that the findings could be used to incorporate the results into "healthcare systems expectations, orientations, job descriptions, performance appraisals, and clinical ladder promotions…driving higher quality, reliability, and consistency of healthcare as well as reduc[ing] costs" (Abstract).

The future of nursing is moving toward staffing based on patient acuity. Retrospective studies have found a correlation between staffing levels, acuity levels, and patient mortality. When researchers looked at nursing workload indicators, they found patient care indicators for "falls incidence, catheter-associated urinary tract infections, central line-associated bloodstream infections, and pressure ulcers prevalence" all decreased when "staffing was adjusted to account

for higher-acuity patients" (O'Keeffe, 2016, pp. 31-32). Data collected by the EHR can be seamlessly adapted to determine the complexity of the patient regarding nursing workload. Researchers suggest balancing facility capabilities with patient needs, mobility, functionality, and physiological and psychosocial needs with nurses' training and skill set (O'Keeffe, 2016).

Chiulli et al. (2014) developed an acuity tool because it was discovered that there was no appropriate "assessment tool…for [the] medical-surgical patient population" (p. 10). The acuity tool "incorporates clinical severity and nurse workload indicators to determine acuity and is used to make patient assignments in alignment with appropriate skill mix and staffing ratios" (p. 12). The researchers worked with staff and managers to identify assessments that recognized that acuity levels were different for individual patients. Through trialing the acuity tool, the nurses were "able to have an objective tool to use in assessing patient acuity to provide safe care, adjust staffing ratios, and balance unit workload" (p. 12).

III. Conceptual Framework

The Synergy Model was developed by the AACN, which conveys the interaction between the patient's needs and nursing care that thrives when they work together. The models are used as a framework for critical care certification and nurses to demonstrate the contribution nursing makes in improved "quality of care, containment of costs, and patient outcomes" (Curley, 1998, Abstract). The Synergy Model places emphasis on patient care by matching patient care characteristics that are nurse dependent with nurse competencies that are significant to patient care and by using these principles to augment relational care and optimize patient outcomes.

Mainly used in critical care units, Pope (2002) was the first to offer a variety of ways the Synergy Model could be utilized to create alignment between the "institution's mission, vision, and values…[and a] healthcare system driven by patient and family needs" (p. 41). Suggested uses include implementation as an acuity tool in medical-surgical nursing units and "rating nursing hours on the level of individual patient's characteristics" (p. 39). As nursing hours required (workload indicators) decrease, the patient-to-nurse ratio increases. The Synergy Model supported the use of an acuity rating system that considers the complexity of the patient, the patient needs, and the nurse's ability to meet those needs. The premise of aligning patient needs with nurse competencies drives improved outcomes. Patients receive care by the appropriate staff with experience and skills for the needs of the patient. Nurses feel fulfilled with the care they deliver and meet the patient needs. Pope (2002) has also suggested that this model would be useful in recruitment and retention of staff by developing clinical skills through the use of a promotion and progression ladder and decreases in healthcare costs and can be instrumental in adding experiential learning for nursing staff.

Carter and Burnett (2011) demonstrated the use of the Synergy Model on a medical-surgical unit that had both adult and pediatric populations. They developed and implemented a staffing grid. The grid scored the elements of "stability, predictability, and complexity" of the patient acuity, overlaid with the competencies of the registered nursing staff (p. 250). An evaluation process determined nurse competency. The assessment of the skills process consisted of the nurse's self-evaluation on a skills survey, the evaluation of performance by a peer, and evaluation by the unit manager. The scores from these items defined the nurse as "independent, competent, or expert" (p. 250). The scores from patient acuity and the nurse competencies were then "superimposed on the Synergy Grid to determine patient assignments for each nurse" (p. 253). The outcomes were positive for patient outcomes, patient, staff, and healthcare provider satisfaction. After implementation, the unit also improved its safety benchmarks and surpassed "national comparative information for small teaching hospitals" (p. 254).

Of the tools available, no synergistic model considered the clinical indicators and complexity of the patient balanced with the competencies of the nurse and ability of the units to respond to the change in trajectory when the patient has physiological deterioration. Kidd et al.'s (2014) research demonstrated the need to incorporate the synergy framework when "creating ideal nurse-patient assignments" (p. 3).

Kidd et al.'s (2014) research on the progressive care unit found that "nurse sensitive indicators" are determined by the skill level of the nurse providing care (p. 1). They developed their own acuity tool that examined five acuity criteria categories. These included "complicated procedures, education, psychosocial or therapeutic interventions, oral medications, and complicated I.V. drugs and other medications" (p. 2).

The researchers used inter-rater reliability amongst staff members on the same patients during the same and different shifts that yielded an acceptable level of 85%. The acuity scoring system they developed was on a 1-4 scale. This study measured nurse satisfaction and was completed at months 1, 6 and 12.

They also tracked perception of workload and perceived quality of care. The final item examined was the quality indicators based on nurse workload indicators. The charge nurses developed patient assignments based on "acuity scores of 0-60 for each patient," balancing workload among the nurses according to geographical location and level of nurses' experience level and patient needs.

The study found that nurses had improved satisfaction with the quality of care they were able to provide. The nurses also reported that they felt "that completing the acuity tool was not a waste of time" (p. 3). The study did not discuss the nurse sensitive indicators (Kidd et al., 2014).

Brewer et al. (2007) tested the Synergy Model in a cross population of pediatric and adult patients using a case report form to establish reliability and validity of patient characteristics. They used a self-evaluation proficiency scale to assess nursing competencies. The findings were applicable in regards to patient characteristics and were reliable and valid regardless of the age of the population and severity of illness, and that "nurses without previous knowledge of the AACN Synergy Model were able to apply the model during routine patient care" (Brewer et al., 2007, Abstract).

Kohr, Hickey, and Curley (2012) studied the use of the Synergy Model in developing a model for nurse productivity. The study had two phases which took place in three different intensive care units. The first phase was the identification of the operational definitions of each of the eight dimensions of the patient described by the Synergy Model characteristics. The

second phase of the study was the development of a data collection system for nursing productivity. These surveys were subjective in nature, with charge nurses describing one patient cared for each day in terms of easy, usual, or hard (Kohr et al., 2012). With regards to nursing productivity, they were met with the usual challenge of quantifying the multidimensional work of nursing.

Although not stated, elements of the AACN Synergy Model (2016) were utilized conceptually to support the Chiulli, Thompson, & Reguin-Hartman Acuity Tool to ensure that the patient's clinical needs were aligned with the appropriate level of care for both the nurse and unit characteristics. The acuity rating system worked to make patient assignments more equitable and match nurse expertise and experience with appropriate levels of patient acuity (Chiulli et al., 2014; Kidd et al., 2014). As an intervention, the acuity tool provides an objective measure of clinical severity and nurse workload.

Although designed for implementation in critical care units, the Synergy Model has theoretical elements that are adaptable to medical-surgical units in the hospital (Pope, 2002). The model has seven patient characteristics and eight nurse competencies; for the purposes of this study, only some of the elements were utilized. The aspects of the Synergy Model that were focused on in relationship to the acuity tool and defined at a later time are the patient characteristics of stability, complexity, predictability, and vulnerability. The nurse competencies that were the focus of this project are advocacy/moral agency and caring practices (Curley, 1998). The characteristics are defined by the AACN Synergy Model for Patient Care (n.d.), which is discussed in detail in the Operational Definitions section.

The acuity tool assigns points based on "clinical severity and nurse workload indicators" (Chiulli et al., 2014, p. 12). The indicators were based on documented data entry points in the

EHR. Scoring was based on clinical severity and nurse intensive activities to help distribute the care provided to patients on medical-surgical units.

The patient rating from the Chiulli, Thompson, & Reguin-Hartman Acuity Tool balanced the workload on medical-surgical units, matching patient characteristics that are of interest to nursing with nurse competencies that are vital to patient care. Quantifiable measures of the complexity of the care needed for the patient supported equitable distribution of work. The synergy of matching patient characteristics with nurse competencies improved advocacy and caring practices among nurses and care team members to decrease the number of resuscitation events.

Nurses with a workload that is within their skill level are better at meeting their patients and their needs (Cathro, 2013). Based on the Synergy Model, Kohr et al. (2012) said that "when needs and characteristics of the patient and the patient's family are matched to a nurse's competence, … better outcomes for the patients can be expected" (pp. 421-422). Nurses can provide safer care within their level of competence, advocate for patients' needs, and effectively collaborate with unit staff and care providers to meet their patient needs.

There is no formal system in place to match nurse competencies with patient clinical severity indicators. This reinforces the archaic thinking of the past 60 years that consideration for nursing competencies and skill levels varies among nurses (Gelinas, 2016). Besides having a valid nursing license, holding current basic life support and advanced cardiac life support certification, and meeting the basic competencies outlined in the skills checklist (see Appendix A), there is a lack of alignment of nurses' "training, education, and skills [to match] with the needs of a particular patient" (O'Keeffe, 2016, p. 33).

The ANA currently supports legislation that requires unit specific staffing plans that are aimed at creating safe care to patients. The Registered Nurse Staffing Act is a federally mandated regulation that requires all hospitals that receive Medicare reimbursement ensure nurse staffing needs are "appropriate to patients' needs" (ANA, 2016, para 3).

The ANA is promoting the Safe Patient Care Act. This legislation is designed to set ratios for the number of patients a nurse can be assigned to care for during their shift. Hospital systems would also need to abide by limits that reduce the amount of mandatory overtime nursing staff is required to work. The final tenet requires that hospital systems report actual nurse to patient ratios (MNA, 2017).

While the ANA is seeking to improve patient safety through the use of ratios, Cathro (2013) highlighted the need to consider patient acuity as part of the equation. An acuity tool addresses these needs separate from the proposed required mandated staffing ratios or mandatory overtime to cover staffing needs.

Operational Definitions

Medical/Surgical Units: Patients admitted to the hospital for general medical issues or standard surgeries without complications were assigned a bed in the medical/surgical units. These patients were supposed to be relatively stable and did not require individualized care. The nursing staff provided standard nursing care, monitored physiological status, and assisted in preparation for and recovery from procedures in the transition to discharge from the inpatient hospital system.

Resuscitation events: The AHA utilized a voluntary reporting system with participating hospitals. The data collected was recorded in a repository that analyzes and provides feedback on resuscitation events and their adherence to evidence-based practice. The 'Get With The

Guidelines' is a clinical decision-making algorithm that was designed to improve patient outcomes. Resuscitation events encompass three different in-hospital resuscitation event measures: MET, ARC, and CPA. These three areas are reported to the American Heart Association registry to improve patient outcomes, enhance cardiac arrest performance improvement, and provide realistic standards for facility capabilities and process improvement (AHA.org, 2016). For this project, the MET, ARC, and CPA resuscitation event occurrences were examined collectively.

Medical Emergency Team is also known as a rapid response team (RRT). Medical Emergency Teams are physician-led teams that review patients who are deteriorating before they get to the point of "multiple organ failure or cardiac arrest occurs" (Jones, Bellomo, & DeVita, 2009, para. 6).

Acute respiratory compromise occurs when the patient experiences increased work in breathing that results in a decreased level of consciousness. Other signs that the patient has increased work in breathing include the use of accessory muscles to breathe, becoming breathless while trying to talk, and the inability to maintain adequate respirations, orthopnea, or diaphoresis. When the work of breathing overrides a person's internal reserves, respiratory distress and arrest are imminent without intervention (McEvoy, 2013).

Cardiopulmonary Arrest occurs when a person's heart ceases to have electrical activity that is conducive to life. The change in electrical activity can be from the heart beating too fast, too slow, or too irregularly (AHA, 2017). Without intervention, loss of life will occur.

Failure to rescue: This has been defined in the literature as the probability of death resulting from an adverse occurrence while hospitalized (Aiken, Clarke, Cheung, Sloane, & Silber, 2003; Hendren, 2010; Silber et al., 1992). Silber et al. (1992) described a difference

between adverse occurrences and failure to rescue as the difference between "patient characteristics" and "hospital characteristics" (Abstract). The difference implied that "some complications may be hospital-acquired, others are present as admission co-morbidities" (Hravnak et al., 2010, p. 141). For purposes of this project, the more generic definition encompassing both hospital and patient characteristics were used.

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool accounted for both the patient clinical severity (risk of adverse occurrences) and nurse workload indicators (which fall under hospital characteristics). McGee (2016) defined FTR as "a clinician's inability to save a hospitalized patient's life when he experiences a complication (a condition not present on admission)" (p. 1) as measured by an acuity tool developed by Chiulli et al., 2014.

Nursing staff: The registered nurse was identified as the nursing staff for this project. This hospital system was utilizing licensed practical nurses as nursing assistants or patient care assistants. The registered nurse is a licensed professional who has completed the required coursework from a school of nursing. The registered nurse title is inclusive of nurses who have graduated with either an Associate's Degree, Bachelor's Degree, or Master's Degree.

Patient assignment: The patient assignments were the combination of individual patients assigned to a nurse responsible for the coordination of their care during a scheduled shift.

Shift: A time period that nursing staff was assigned to work. The typical nursing shift is a 12-hour shift from 7 am to 7 pm, and 7 pm to 7 am. On occasion, there was a staffing adjustment made on an eight-hour schedule. An abbreviated shift is from 7 am to 3 pm, 3 pm to 7 pm, or 7 pm to 11 pm.

Acuity tool: Acuity tools are a process that evaluates the complexity of patient care and assigns a numeric value based on predetermined criteria. The premise was that the number, also

known as an acuity score, was used to make equitable work assignments for nursing staff and nursing assistants on a particular unit.

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool is a conceptual model developed and trialed at Duke Raleigh Hospital, Raleigh, North Carolina as an "objective and equitable way of defining acuity ratings to promote safer patient care" (Chiulli, Thompson, & Reguin-Reguin-Hartman, 2014, p. 9).

Stability: "The ability to maintain a steady-state equilibrium" (AACN, 1997, as cited in Edwards, 1999, Table 1). The stability of the patient is used as a baseline description to ascertain the level of care necessary to attain a patient's physiological equilibrium.

Complexity: "The intricate entanglement of two or more systems (e.g. body, family, therapies) (AACN, 1997, as cited in Edwards, 1999, Table 1). The complexity of a patient accounts for the physiological, psychosocial, emotional, and spiritual components that comprise an individual's being and needs. The complexity of an individual is related to Maslow's Hierarchy of Needs. A patient's physiological needs, breathing, heart rate and rhythm, nutrition, and fluid status must be attended to. Besides the physiological needs of differing body systems, the need to attend to the other systems that provide support for the patient must be considered. Family dynamics, stressors, safety, and security are an integral part of the patient's psychosocial and emotional needs. The more therapeutic modalities the patient requires, the more involved the patient will be. Therapeutic modalities include oxygen therapy, medication therapies, wound care, and skin protection therapies, as well as the multidisciplinary therapies required. The spiritual component is critical for the rest, healing, and restoration of health. All these systems must be in alignment for the optimal healing experience.

Vulnerability: “Susceptibility to actual or potential stressors that may adversely affect patient outcomes” (AACN, 1997, as cited in Edwards, 1999, Table 1). A deficit in any of the patient’s systems, as above in complexity, increases a patient’s vulnerability. When a system is deficient, the patient is at greater risk of deficiencies in other systems, thus increasing the risk of increased vulnerability.

Advocacy/Moral agency: “Working on another’s behalf and representing the concerns of the patient, family, and community; serving as a moral agent in identifying and helping to resolve ethical and clinical concerns within the clinical setting” (AACN, 1997, as cited in Edwards, 1999, Table 2). It is nursing’s professional, moral duty to provide competent care (Vaartio, 2008). Demonstrating competencies is required of all licensed nursing staff. Nurses are in a position to advocate for the patient’s best interests. A major part of the nurse’s responsibility is advocating for patient wellbeing, safety, and restoration to the best level of health.

Caring Practices: “Nursing activities that create a compassionate, supportive and therapeutic environment for patients and staff, with the aim of promoting comfort and healing and preventing unnecessary suffering. Includes, but is not limited to, vigilance, engagement and responsiveness of caregivers, including family and healthcare personnel” (AACN, 1997, as cited in Edwards, 1999, Table 2). The nursing profession is built on caring practices. The ability to care for one’s self, the patient, community, and society are taught in nursing school and perpetuated through the nursing profession. Improving the patient condition is based on caring practices and therapeutics to reduce harm.

The HEN 2.0 project is the continuation of the AHA/HEN 1.0 that was developed and funded through CMS as part of the Partnership for Patients campaign of the Affordable Care Act

to help hospitals improve the quality of care and patient safety (Joint Commission Incorporated, 2012). The HEN 2.0 project was in effect from September 2015 through September 2016. This project was contracted with the American Hospital Association and the Health Research & Education Trust to reduce "inpatient harm by at least 40 percent and avoidable readmissions by at least 20 percent" (Health Research & Educational Trust, 2016a, para. 2). Partnerships and Grants were provided to "34 state hospital associations and more than 1,500 hospitals" (Health Research & Educational Trust, 2016b, para. 1). Failure to rescue was regarded as a "harm" and the hospitals that partnered with this project tracked and reported the FTR rates. These data were publically reported to provide the ability for hospitals to continue process improvement and goals for patient safety (Health Research & Educational Trust, 2016a). The state and facility where this study was conducted were not among the HEN 2.0 participating systems. Therefore, this data was not extrapolated.

Research Question

Will implementation of the Chiulli, Thompson, and Reguin-Hartman (2014) Acuity Tool result in a difference in reportable resuscitation event occurrences on an orthopedic-neurology unit of a community hospital?

IV. Methodology

Project Design

Developed by nurses, the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was designed to match patient clinical severity with nurse-driven workload indices. The project coordinators were unit managers, educators, and clinical experts. The development of the acuity tool was used by the acuity tool authors as a process improvement plan to help balance the workload on the medical-surgical unit.

This project was a quality improvement project aimed at measuring the number of resuscitation event occurrences before and after the implementation of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. The study was a quasi-experimental, non-randomized, convenience sample design examining data reported to the AHA.

The independent variable was the implementation of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool on the Orthopedic/Neurology Unit. The dependent variables were the number of admissions to the Orthopedic/Neurology Unit and the number of resuscitation event occurrences as reported to the AHA.

Population/Sample: Inclusion and Exclusion Criteria

Inclusion criteria for the acuity tool were all patients admitted to the Orthopedic/Neurology Unit in an acute care facility in a mid-west rural area community teaching hospital. This project was a prospective study of all patients admitted to the Orthopedic/Neurology Unit between March 1, 2016, and November 30, 2016.

The total number of admissions on the Orthopedic/Neurology Unit during the study period in 2016 was 1,602. The admissions were grouped into the pre-tool application period, the application of the tool period, and the post-tool removal period.

During the pre-tool application, there were 544 patient admissions during the three months: in March, 190; in April, 160; and in May, 194. The admissions were grouped together for analysis purposes.

The second period was the three months during the implementation of the acuity tool. This period was from June 1, 2016, through August 31, 2016. The total number of admissions to the Orthopedic/Neurology Unit during this period was 537: in June, 181; in July, 182; and in August, 174.

The final and third period was after the Chiulli, Thompson, & Reguin-Hartman Acuity Tool had been removed. The three months of patient admissions during that time were 521: in September, 164; in October, 188; and in November, 169.

Exclusion criteria for the acuity tool would be patients on all other units such as Post-Surgical Care, Cardiac Telemetry, and the Medical/Oncology units. Patients not admitted to the medical-surgical units, including the Emergency Department, Surgery, Cardiac Catheterization Lab, Imaging Departments, and Hospice, were excluded. Patients who had a do not resuscitate (DNR) or a do not intubate (DNI) status were included in the admission counts, but were excluded in the number of resuscitation event occurrences. Patients transferred to other units from the Orthopedic/Neurology did not appear in the number of resuscitation events. Patients who transferred into the Orthopedic/Neurology Unit were not counted in the admission numbers, but had the opportunity to be included in the number of resuscitation event occurrences.

Setting

The orthopedic/neurology unit was a 32-bed unit. The unit was designed based on the Transforming Care at the Bedside Initiative that incorporated pod nursing. Pod nursing has many nurses' stations centrally located near patient rooms. This arrangement reduces the

number of steps a nurse has to travel during his/her shift and places the nurse in closer proximity to the patient rooms (Donahue, 2009).

There were 24 rooms designated as private rooms. A private room indicates that the room only has one bed and the capacity for one patient. Four rooms can be used as semi-private rooms, with two beds in each room. These four rooms have the capacity for two patients to share the room. There were electrical outlets and ancillary connections, such as oxygen and suction hookups, for both patients. Patients share a bathroom and a nurse workstation in the room. The unit is structured to allow pod-like modules that place the nursing stations near patient rooms. There were four nursing stations in the unit with between four and six patient rooms located in relatively proximity.

The hospital utilized a staffing grid to determine staffing needs and placement of nurses based on patient volume census. The house supervisors and central schedulers used the staffing grid to assign staff system-wide in an attempt to balance the number of patients hospitalized and the available staffing mix based on volume-based census and available staff. The staffing grid called for a ratio of patients to a nurse of 5:1 on days and 6:1 on nights. The staffing grid was followed as closely as possible according to the staff available. When the patient census was more than nursing staff available, the schedulers tried to distribute the available staff throughout the hospital based on census totals for each unit. Staffing, skill mix, and workplace environment have also been demonstrated to affect patient outcomes (Aiken et al., 2002; Nolan, 2016). Decreasing patient to nurse ratios have been shown to have a positive effect on patient outcomes, reduce mortality and failure to rescue, reduce hospital costs, and increase staff retention and recruitment (Aiken et al., 2003; Sherwood & Zomorodi, 2014; Twigg et al., 2013).

The current method for staffing assignments was completed by the central schedulers and house supervisor who were housed in a separate part of the hospital. The staffing formula took the hospital census, which was the volume of patients compared to the number of staff available. The census staffing grid was then examined to try to divide equitably the number of patients by the number of staff mix available based on the volume.

The unit staff assignments were then completed by the unit clerks on each medical-surgical unit. Again, assignments were determined by a census-based formula dividing the number of patients by the number of nursing staff. The unit clerks were trained as a clerical/receptionist, but do not receive any training for nursing care. The unit secretaries have not trained or completed competencies determining clinical judgment and have not been taught to consider the acuity of patients. "The charge nurses are supposed to have input into the assignments, but that isn't always the case" (personal communication, Stefanie Greybar, March 15, 2016). Historically, the unit clerks make the staffing assignments on the medical-surgical units. Many times, the charge nurse was included in staffing. Having the charge nurse in staffing with a full patient group limited the opportunity to make the assignment.

Nurses received admissions and transfers based on a rotating or sequential process that lacked consideration of the current acuity of their patient load or location of their patients. The charge nurse could choose to alter the admission assignments if he/she was aware of clinical severity situations that required more attention by the nurse with their current assignment. Unfortunately, awareness may be unintentionally overlooked, or a lack of communication could cause a nursing group to be out of balance.

Using a data-driven acuity tool opened dialogue on the unit as to the appropriateness of patient and admission assignments, similar to the VSA system. The electronic record allowed

trackable data about the workload of the patient, or the patient workload indicators, through order entry and nursing documentation. The study facility had received national recognition for maximizing the EHR and coordinating technology applications to improve patient safety outcomes through identifying vulnerable patients (Lakeland HealthCare, 2014). There was computer software available to determine acuity, but it was not available on the Orthopedic/Neurology Unit at the study facility.

Subjects

The unit had earned and received Joint Commission Stroke Certification. Most of the patients were either an orthopedic patient or patients with neurological disease or disorders. Orthopedic patients were admitted with fractures, joint replacement or repair, usually after surgery or, in special circumstances, before surgery. Neurological patients admitted to the Orthopedic/Neurology Unit were patients who had experienced neurological insults such as transient ischemic attacks, cerebral vascular accidents, changes in levels of consciousness, mental status changes, and seizures. The goal of the unit was to place the neurology patients in the front half of the unit and the orthopedic patients at the back of the unit. The placement of patients was to facilitate care by the nurses and physicians by grouping similar types of patients together. This arrangement did not always work out based on bed availability.

To maintain privacy, adhere to the Health Insurance Portability and Accountability Act, and maintain patient confidentially, the data collected for the project was not correlated with individual patients who were admitted to the Orthopedic/Neurology Unit. There were no individualized data related to the patient identification and, therefore, demographic information for patients was based on my observations and typical demographics of the unit.

The patients on the Orthopedic/Neurology Unit were adults and could be of any age over 18. The majority of the patients were between 45 and 75 years of age. Caucasians made up the largest population of patients on the Orthopedic/Neurology unit, with African Americans making up the next largest racial group. There were Latino/Hispanics, Asian, and Indian ethnicities that received care on the Orthopedic/Neurology Unit. There were slightly more males than females admitted to the unit. The demographics of admissions to the Orthopedic/Neurology Unit were similar to the demographics of the surrounding community.

The staff on the Orthopedic/Neurology Unit was comprised of a mix of registered nurses and nursing assistants. There were typically six to eight registered nurses, two to three nursing assistants, and one secretary on each shift. There was one unit manager, one full-time day clinical resource nurse, and one full-time night manager. The nursing staff was comprised of "25 Associate Degree-level nurses and 29 Bachelor's in Nursing and one staff member with a Masters in Nursing degree" (Personal Communication, Stefanie Greybar, June 16, 2017).

There are two main Associate Degree schools of nursing that provide new graduate candidates for nursing staff recruitment at the hospital system. The hospital was moving towards an initiative of 80% prepared nurses with a Bachelor's degree within the next ten years. There were financial incentives such as scholarships and tuition reduction for Associate Degree Nurses to return to school and advance their education. This initiative had increased the number of registered nurses returning to school to advance their education.

The number of years of experience also varied among the staff. There were approximately 45 registered nurses who were regular staff on the Orthopedic/Neurology Unit. One-third of them have been there for more than five years. Five of the nurses have been working on the Orthopedic/Neurology Unit for more than a decade.

The Orthopedic/Neurology Unit manager had her Bachelor's in Nursing and worked full time, Monday through Friday from 7 am until 4-5 pm, but sometimes as late at 6 pm. There was also a full-time clinical resource nurse (CRN) and a full-time night assistant manager, both of whom had an Associate Degree in Nursing. There was a mid-level supervisory person on staff all the time, except from approximately 4pm-11pm, during which time a charge nurse was the only supervisory person on the unit.

On occasion, due to staffing needs, a nurse from another unit would float to the Orthopedic/Neurology Unit. The Orthopedic/Neurology Unit also used agency travel nurses. All the nurses had met the core competencies of a general staff nurse, had telemetry training, Advanced Cardiac Life Support, and Basic Cardiac Life Support certification. The unit staff attempted to give the nurses who floated into the unit a lighter patient load. However, this did not always work out as planned due to lack of communication, changes in patient status, the ability of the nurse, or increased workload that was not recognized when the assignment was made.

Measurements/Instrumentation

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was used in this project to determine if it made a difference in the number of resuscitation events, which by the end of the project when it was utilized to its fullest extent, did demonstrate clinical significance. Measurement for the acuity tool was an interval scale of reported resuscitation event occurrences using parametric testing that tracked reported resuscitation event occurrences in the three-month periods before, during, and after implementation of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool in 2016.

Instrumentation was a paper-based acuity tool developed by Chiulli et al. (2014) and utilized on a post-surgical unit at Duke Raleigh Hospital that measured "10 categories – six related to patient clinical severity and four related to nurse workload" (p. 10). The Clinical Severity Indicators categories were "Assessment, Respiratory, Cardiac, Medications and Therapeutic Protocols, Drainage Devices, Pain Management." The Nurse Workload Indicators were "Admit/DC/Transfer, Education and/or Psychological, Wound/Ostomy/Continence, ADLs and Isolation." The scoring was a ranking from 2—a "Stable Patient Typical Workload," 3—a "Complex Patient Increased Workload," to 4—being a "High Risk Highest Workload" system (Chiulli et al., 2014, p. 10, Figure 2). The simplicity of the tool was that it required no mathematical computation. Once a parameter was met in a higher designated column, the acuity score jumped to what the highest column checked was (See Appendix B).

This tool was developed conceptually to be adapted for specific needs of acute care units. The authors of the Chiulli, Thompson, and Reguin-Hartman Acuity Tool did not copywrite the tool to allow it to be adapted to meet the needs of various acute care units. I modified the acuity tool before beginning the study to meet the needs of the Orthopedic/Neurology Unit (see Appendix C). Modifications made to the Chiulli, Thompson, & Reguin-Hartman Acuity Tool included the addition of the neurological status of the patient. The neurological status addition also included any clinical institute withdrawal assessment (CIWA) scores or delirium protocols that were instituted.

My role was to introduce, educate, remediate, collect, and analyze the data. The manager on the unit was very supportive of the research project. She assisted with remediation and reinforcement of the use of the acuity tool. The manager and I collaborated on ways to increase staff involvement. These collaborative meetings often focused on barriers to staff utilizing the

Chiulli, Thompson, & Reguin-Hartman Acuity Tool, adherence issues, resistance, and sabotage efforts by nursing staff.

I developed steps to facilitate successful implementation and translation of research in the clinical setting. These measures included educating and training staff on the use of the tool. I maintained a presence in the clinical setting to assist with the implementation of the acuity tool and analysis of correct acuity scoring. There was a need for frequent reminders for the appropriate personnel to do specific aspects of the study. Consistent monitoring of the implementation of the tool and meetings with the unit manager were held to discuss strategies to keep the project going when faced with a slump in progress. There were remediation and re-education of nursing staff on the proper use of the acuity tool, along with the motivation to continue to utilize the tool throughout the study. The utilization of research experience as a guide served to provide formative data which then led to a change in how patient-nurse assignments were formulated. I conducted focus groups with nursing staff as needed to address resistance to change brought about by the implementation of the translational research project. The application utilization of leadership skills sought to circumvent any direct sabotage of the study by resistant nursing staff on the unit.

Each nurse was to complete the acuity tool and report the acuity score for each patient before staffing assignments for the unit. Staffing adjustments occurred up to four times in a 24-hour period. The charge nurse was to collect the acuity tool from each nurse and evaluate the acuity ratings of the patient population on the unit. Assignments were to be made based on equitable acuity ratings before the change of shift.

Alignment of elements of the Synergy Model with the acuity tool followed the parameters for patient characteristics of concern to the nurse and were developed by Carter and Burnette (2011) and use the following patient characteristics:

"Stability reflected vital signs …patient condition …pulse oximetry, patient-controlled analgesia, and use of epidurals. Predictability considered fall risk, expected time of discharge, resuscitation status, orientation, and change in medical condition. Complexity scores are determined by self-care ability, required medical procedures, age… and isolation status" (p. 250).

Stability included the frequency of vital signs, and EWS scores help determine how stable, complex, or high-risk that patient was. Stability category also included the respiratory and cardiac assessment findings and interventions required, such as oxygen therapy and post-operative status.

"Fluctuation in vital signs was linked to *stability*; number and severity of diagnoses, to *complexity*;… invasiveness of procedures, to v*ulnerability*;…"(Kohr et al., 2012, Abstract).

Predictability was the type of risk the patient is susceptible to including falls, aspiration, seizures, pulling lines or drains, or elopement. Risks were assessed and recorded every eight hours in the required shift documentation on the EHR. Prophylactic embolic venous thrombosis interventions were also included in this category. Additional interventions that were required helped to determine the patient score.

Complexity incorporated the number and frequency of medications, including glucometer monitoring before meals and at bedtime, along with insulin coverage. It also included intravenous (IV) fluids, electrolyte supplements and boluses, IV medications or IV piggyback medications that were given more than every two hours, continuous bladder irrigation (CBI),

Total Parenteral Nutrition (TPN), and patient-controlled analgesia (PCA). Complexity addressed the amount of assistance the patient needed with ADLs and the involvement of interdisciplinary therapies, such as occupational, physical, and speech therapies.

Vulnerability was the number of invasive procedures or interventions the patient required. This encompassed recent surgical procedures, drains and dressings, wound vacuums, use of the turn and positioning (TAP) system, Braden Skin score, continuous passive motion (CPM) machine, and traction or head tongs.

Nurse competencies are driven by patient characteristics (Edwards, 1999). The nursing role for advocacy is introduced early in the profession. Nurses have a moral and professional code to serve as moral agents, advocating for patients placed in their care, pledging their dedication and moral obligation in the Nightingale pledge to "devote myself to the welfare of those committed to my care" (Nightingale, 1893, as cited by American Nurses Association, 2016, para 1). The International Council of Nurses Ethical Codes (2012) requires nurses to take responsibility and accountability for the protection of people under their care through the provision of safe, competent care. The innate nature of nursing is to accept professional responsibility for caring for the patients placed in their care. Choi, Cheung, and Pang (2013) identified this attribute as "guardianship…guarding patients against harm" (p. 1588).

Nurses work diligently to defend the vulnerabilities of their patients from harm resulting from institutional processes. Johnstone and Hutchinson (2015) called for "developing mechanisms for reducing the incidence and impact of 'preventable moral harms' in healthcare by fostering a 'culture of moral safety'" (p. 11). The IOM developed five core competencies that were the result of an interdisciplinary summit held in 2002. The need for "work in

interdisciplinary teams [to] cooperate, collaborate, communicate, and integrate care in teams to ensure that care is continuous and reliable" (ANA, 2003, para 10).

Collaboration was an important tenet in recognizing a need for promoting a culture of patient safety. However, there were some barriers to collaboration in the healthcare setting. These barriers include lack of experience from novice nurses, insufficient communication among care providers, delay in action when recognizing changes in a patient's status, and escalating nurse workloads (Choi, et al., 2013; Howard, 2016; Johnstone & Hutchinson, 2015). Through the use of an objective way to quantify professional advocacy for patient care and nursing practice, the Chiulli, Thompson, and Reguin-Hartman Acuity Tool provided measurable data to initiate collaboration among unit staff and interdisciplinary team members.

Procedures for Intervention and Data Collection

I completed the National Institutes of Health (NIH) web-based "Protecting Human Research Participants" training course (see Appendix D). The Doctor of Nursing Practice (DNP) Capstone Project Committee and nursing administration at the hospital were supportive of a process-improvement project that would determine if the use of an acuity tool would make a difference in the number of occurrences of resuscitation events (see Appendix E).

There were two units where I was interested in applying the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. The Post-Surgical Unit and the Orthopedic/Neurology Unit were both considered for this project. Upon the advice of the onsite project manager committee member, one unit was selected to allow for better control of the project.

The Orthopedic/Neurology Unit was selected for a number of reasons. The Orthopedic/Neurology Unit manager had been in her position for one and one-half years. The clinical resource nurse that had been part of the unit for six years and the assistant night manager

had been a nurse on the unit for more than a decade. There were mainly Orthopedic and Neurology patients on the unit and it encompassed the entire nursing floor. The Orthopedic/Neurology Unit Manager expressed concern about when the project would be implemented. There were a number of changes being implemented on the Orthopedic/Neurology Unit. Some of these changes included the addition of the VSA scoring system, wireless transmission of the vital signs into the EHR, and the introduction of radio-frequency identification monitoring of staff compliance with handwashing, the location of unit supplies, and location of patients in transit to other units in the hospital. The unit manager was concerned that introducing too many changes at once would overwhelm the staff. It was decided that the summer months of June, July, and August would be the best months to implement the Chiulli, Thompson, & Reguin-Hartman Acuity Tool project. The months decided on were after the implementation of the other projects, and as far as the Unit Manager knew, there were no changes scheduled during this time.

The other unit being considered was the Post-Surgical Unit. This unit was in a period of transition with supervisory support staff and had some supervisory staff vacancies. The unit had a greater variety of patients, some medical, but mainly. The Post-Surgical Unit shared part of the work space with a Progressive Care step-down unit. Staff members from both units shared one of the nursing stations due to the layout of the unit. The blending of workspace placed patients from both units near the common nurses' station. One-quarter of the rooms on the nursing floor were dedicated to the step-down unit, which translated into a smaller sample size for the Post-Surgical Unit.

Permission to use the acuity tool was sought from the authors. The lead author, Kathy Chiulli, had retired from Duke-Raleigh Health Systems and moved to Maine. Attempts to

contact the author were not successful. The second author, Jackie Thompson, was working for a Duke Hospital subsidiary hospital as the Stroke Program Coordinator, was able to be reached and granted permission for the use of the acuity tool. She was thrilled that someone was interested in the acuity tool project they had developed. Ms. Thompson was excited that it was being implemented on an Orthopedic/Neurology Unit, given that she was now the Stroke Program Coordinator for a hospital system. She reiterated that the tool was meant to be adapted to unit-specific needs. Ms. Thompson explained that the acuity tool was not copy-written, specifically to allow others to use and alter the acuity tool according to unit needs. The nurse scientist from Duke University Health System explained that the tool could be used by anyone (see Appendix F). The Chiulli, Thompson, & Reguin-Hartman Acuity Tool had been developed for a post-surgical unit with 36 beds. The goal was to "determine what makes up different stages of [patient] need and [nurse] workload. The tool was a guide to be used conceptually" (Personal communication, Jackie Thompson, March 23, 2106).

I completed the Institutional Review Board (IRB) application processes for both Andrews University and the study facility. The applications were submitted to both IRB committees for review. The project received an Exemption from Full Review by both facilities and approval to proceed with the project (See Appendices G and H).

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool project was introduced and discussed with staff members a week before the training began. Overall, there was positive feedback and excitement that workload would be balanced. The nursing assistants (NAs), also known as patient care attendants, asked if they could also have a way of balancing their workload through the use of an acuity tool. It was explained that this project was exploring, with

registered nurses, the effect of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool to determine if there was a difference in the number of occurrences of resuscitation events.

The Orthopedic/Neurology Unit manager was a supportive, hands-on leader. She championed for and encouraged high performance from the staff. It was not unusual for her to work part of a shift when staffing was short, and there were no other nurses available. She had the respect of the staff and followed through on rewarding and remediating staff as necessary. Her leadership style helped with the cohesiveness of the unit employees and was helpful in getting the nursing staff to follow through with the objectives of the project.

I met with the unit manager multiple times to review the Chiulli, Thompson, & Reguin-Hartman Acuity Tool and discuss how to roll out the implementation and troubleshoot potential problems. The manager asked that the acuity scoring sheets include the registered nurse's (RN) initials, date, and shift worked. The intent of adding the RN's initials, date, and shift was to collect the acuity tool worksheets and observe what nurses and shifts scores were being recorded. The IRB office was contacted by email to determine if this change warranted a new or amended review application and consideration. Jann Totzke, the Lakeland IRB chairperson, called me and said the change did not need to go before the IRB and its approval was granted for the modification. The acuity worksheet was revised to include the addition of the RN's initials, date, and shift.

The staff was informed that implementation of the acuity tool was intended for research purposes. Explanations of the clinical severity and nurse workload indicators were provided to the staff. The scoring system was explained and how the score changes based on the objective measures of any of the items changing. The majority of nurses on the Orthopedic/Neurology Unit were in agreement that there needed to be more consideration of the patients' clinical

severity and nurse workload indicators in staffing the unit. The staff was pleased that there was no mathematical computation needed to determine the score for the acuity of the patient. The staff was notified that they were to put their initials, date, and shift on the top of the forms and that there was a 9 x 12 envelope placed in the multidisciplinary room (MDR), where completed acuity tool worksheets were to be placed.

Training began one week before the scheduled start date of the application of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. The nurses and managerial support team were introduced to the acuity tool and were provided instruction for its use. Training took place in a group setting and individually. The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was introduced in safety huddles. A poster presentation for the project occurred over several days and several shifts, with the opportunity to ask questions at the end of each session. The poster used for the presentation remained on the unit in the area used for change of shift reporting and safety huddles for the entire three-month time the acuity tool project was implemented. Copies of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool were made using the Orthopedic/Neurology Unit's copy machine. Copies were placed at each nursing station in a manilla folder titled Acuity Tool Worksheets. A manilla folder with multiple copies of the Chiulli, Thompson & Reguin-Hartman Acuity Tool was also placed in the MDR, where the assignment was posted, shift safety huddles were held, and next to where the staff Voceras were kept.

Instruction on the use the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was completed through application and feedback of acuity scores before study and data collection started. Training was provided twice daily at safety huddles and through instruction with hypothetical and actual patient scenarios before the study began. The nurses were provided

specific examples of typical patients on the unit to practice using the acuity tool and encouraged to use the tool to practice assigning acuity scores to their patient groups.

I was available to answer questions, address concerns, and remediate the utilization of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. The questions asked during training were "How would you score someone that needs to be straight cathed during the shift?" "Why is there not an area for Foley catheters?" There is no specific area for straight catheterization; however, there is a nurse workload indicator for Wound/Ostomy/Continence. A patient who would need to be straight catheterized twice a shift that would score a "2." The procedure fitting the description for that category is "QD/BID Dressing by RN, Wound Vac, Ostomy, one person assist to the BR, Bedpan" (Orthopedic/Neurology Unit Acuity Tool, 2016, adapted from Chiulli et al., 2014). If a patient had a foley catheter, it would be aligned with the Patient Clinical Severity Drainage Devices Index, also a rating of "2" based on the descriptive drainage devices listed for that area.

I was present on the unit on a variety of shifts and times. This availability was to provide additional informal individual training sessions and coaching on the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool and how to analyze the scores. Education and remediation on application and timing of the use of the acuity tool was provided initially by me, then by the clinical resource nurse and unit manager; towards the end of the project, the charge nurses also provided training for nurses not familiar with the acuity tool.

When education and training on the tool was taking place, the majority of the staff was open to learning how the tool worked; comments such as, "This seems straight-forward enough" and "I can handle this" were verbalized. One of the charge nurses had been intentionally absent from the safety huddles when education on the Acuity Tool was presented. She would stand

outside the MDR at the nurse's station, just out of earshot. She was specifically invited to join the education presentation, but refused to come into the area to hear the educational piece.

Some nurses resisted having individualized assistance with using the acuity tool and determining acuity scores. There was feedback such as, "If I have any questions or get stuck, I'll let you know." During this same period of education and training, the introduction of the Unit Assignment Based on Patient Acuity and Nurse Experience (UABPANE) worksheet (Appendix I) was provided to the charge nurses. I instructed and worked with many charge nurses on both the day and night shift to demonstrate how to balance nurse workloads using an acuity-based rating system. The charge nurses were also shown how to arrange the assignments to account for nurse's experience and perceived skill level.

The day that the project was launched, I was on site and available to help. The announcement was made that this was the start of the project and that the Acuity Tool was to be used starting on the day shift. I remained available on the unit to answer questions and assist with determining acuity scores for a couple of hours after the shift began. I told the staff and charge nurse that I would return after noon to help with any questions or problems with the acuity tool and to help assist the charge nurse in making the assignment for the 1500 shift change. When I arrived back on the unit after lunch, the acuity tool had been completed by only two of the five nurses.

I went to each of the three nurses who had not completed the scoring sheet to assist them with determining the acuity and answer any questions they had. One of the nurses said it was straightforward enough and was able to complete the acuity scoring independently once prompted. Another nurse told me, "I don't need you standing over my shoulder. I will complete it and turn it in."

The third nurse was the charge nurse who was resistant to hearing the educational presentation of the Acuity Tool. She told me she did not have time to complete acuity scoring on her patient group because she had five patients, an orientee, and had to help another nurse who needed to catheterize a patient every four hours and did not know how to do that herself. I was able to look through the documentation and orders for the patients in the charge nurse's group and determine the acuity rating for each of the patients. I then transferred the scores to the Unit Acuity Scores worksheet and made the assignment for the upcoming shift change approximately 15 minutes before the change of shift.

Upon determining the acuity scores for the patient groups on that day, it was found that the charge nurse had the highest acuity group. The score for her patient assignment was 17. All the other nurses working had acuity scores of 12-14. When the difference in acuity scores were brought to the charge nurse's attention, she was reminded that the charge nurse should have a lighter load. The charge nurse was reeducated on the justification that 1) she was in charge, 2) she had an orientee she was supposed to be training, and 3) she had more responsibility. She replied that other people would be upset with her if she had a lighter [patient] load.

The next day, I arrived on the Orthopedic/Neurology Unit before 0600 to assist with any problems the night staff was encountering with the acuity tool. The assignments for the 7pm-7am shift were written on the whiteboard with the acuity scores for each group written behind the assigned bank of rooms. There were 28 patients on the unit with four nurses. Each nurse had seven patients, including the assistant manager. Two of the nurses had completed the acuity scoring worksheets. One nurse and the assistant manager had not. The nurse agreed to complete the acuity scoring and turn it in. I asked the assistant manager if she understood the tool or had any questions about how it was to be utilized. The assistant manager replied, "I don't have time

to do anything else." I offered to walk through how to score the patients in her assignment, but she adamantly refused. I again went through the orders and documentation on this assignment. It was discovered that of the four nurses on the unit, the assistant manager who was in charge had the highest acuity scores with every-hour pain medication administration, a confused patient who needed frequent reorientation, dressing changes, an admission, and a patient who was incontinent. I showed the acuity scores to the assistant manager and explained that as charge nurse, she should have a lesser acuity load. Decreasing the acuity of her assignment would allow her to manage her responsibilities as charge nurse; she responded that she "couldn't do that to my co-workers."

The next shift, I went to the various nurses working on the unit at 1300 and asked for their acuity scoring worksheets. The charge nurse, who was different from the previous day, but again had an orientee, was very vocal and stated, "I don't have time to do this [acuity scoring and making the assignment] and it isn't going to work. It sounded good in theory, but reality is different." The other nurses completed their acuity worksheets for their assigned groups. The unit manager took over charge responsibilities and worked on balancing the acuity for the unit. It was discovered that two different nurses recorded scores on the same patient, while another patient's acuity score was missed. This error created a problem when making the new assignment, as the missed patient was not assigned to a nurse. I saw this as a problem with accuracy and inattention to what they were recording on the acuity tool scoring sheet, not as a result of the use of the acuity tool.

When the acuity scores for the day shift were examined, it was found that the charge nurse had the highest acuity (15) and five patients, while other nurses on the unit had acuity scores of 9 and 10. When the next admission was called to the unit, the secretary was going to

assign it to the charge nurse and the orientee. I pointed out that there were nurses with a lower acuity load who should be assigned the admission. The secretary said the admission would be placed based on the location of the room and the number of patients. I assigned the admission to another nurse with an acuity level of 9. There was a distance between the location of the admission and the other nurse's patient group, but this was only for four hours.

I shared these issues with the unit manager and the perception of the charge nurses that if they didn't take the highest acuity and patient volume assignments, the nurses on the unit would view them as "not carrying our weight." The manager was surprised to hear that the charge nurses felt this way. She said she would speak to the charge nurses about their perceptions and the need to take a lighter patient load. She also said she would talk with the resistant individuals about "getting on board with the project and how their expression of the negativity of the project was unacceptable."

The evening assistant manager was not supportive of the project. She is an Associate Degree Nurse and expressed displeasure that she was supposed to take time from her busy night to complete the staffing assignment. She felt that I did not understand her workload and that her priority was not to help with a research project. The full-time clinical resource nurse was a helpful and willing participant in contributing to champion the implementation of the project. When I was not available on the unit, the clinical resource nurse took on the majority of the responsibility of educating the nurses who floated into the unit on the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. The education she provided was very similar to my presentations, as was relayed by a nurse who was familiar with the project and had heard the presentations previously and floated to the Orthopedic/Neurology Unit during the project.

It was discovered a week into the implementation of the project that the charge nurses and secretary were resistant to the implementation of the UABPANE worksheet. Satisfied with their current system of having the secretary make the assignment, they continued to use the previous traditional way of recording the assignment. The traditional method used was to write the nurse's name followed by listing the rooms individually or grouping the rooms they were assigned. After making the assignment, the secretary would transfer the information from the goldenrod assignment sheet to the whiteboard in the MDR where the safety huddles were held. The difference of formatting depended on the working secretary's preference. Following this was the number of patients in each group, and that was circled to indicate the number of patients assigned to each nurse and any additional unit tasks assigned to the nurse. This method is used on most of the medical/surgical units at the study facility.

The biggest difference between the traditional way of recording the assignment and the proposed way of making the assignment was a place to record the acuity scores for each patient. The traditional method of recording the assignment did not allow for acuity scores to be placed next to each patient or for a place to record the total acuity score of the assignment. The charge nurses and the unit secretary did not willingly use the UABPANE worksheet.

When instructed and re-educated on the proper use of the worksheet, the charge nurses had the secretaries copy the information from the traditional, goldenrod sheet to the UABPANE worksheet. Despite repeated attempts to re-educate charge nurses about the need to use the worksheet to align nurse experience and patient acuity, there was a lack of adherence to the proposed change. Discussion with the unit manager about the lack of adherence to using the UABPANE worksheet resulted in the determination that in the overall scheme of change, this allowance could be made without jeopardizing the study.

The unit manager requested that as a compromise, a sheet with each room number and, if more than one bed in a room, the bed number be listed so acuity scores could be recorded on these sheets to provide an overall snapshot of the acuity levels of patients on the unit. The worksheet was titled "Unit Acuity Scores" (see Appendix J). Upon completion, the sheets were to be placed in the 9 x 12 envelope in the MDR with the acuity scoring worksheets. The staff, charge nurses, and secretaries were amenable to this concession. Multiple copies of the Unit Acuity Score worksheet were made and placed on a clipboard that was kept on the whiteboard where the assignments were written.

The acuity tool was to be completed every four to eight hours by each nurse for balancing staff assignments. The acuity tool scores were collected, examined, and recorded on the Unit Acuity Scores worksheet before making the assignment for the oncoming shift. Staffing changes occur at 0700, 1500, 1900, and 2300. The ratings from the acuity tool were incorporated into the patient assignments, taking into consideration experience and the ability of the nursing staff (see Appendix L). At the start of the project, the paper-based acuity tool scoring sheets and the scores recorded on the Unit Acuity Score worksheet were collected by the unit manager. Two weeks into the project, it was discovered that the nurses were no longer placing their initials, dates, or shift on the acuity tool scoring worksheets. This revision was a request by the unit manager, and when it was discovered that this information was being omitted, she decided that it was not an issue and chose not to pursue having the staff place this information on the acuity tool scoring worksheets. The unit manager kept the acuity tool worksheets and the Unit Acuity Score worksheets. She was using the information collected to help justify the additional nursing positions on the unit to the hospital administration as she was formulating the Orthopedic/Neurology Unit's budget for the next fiscal year.

The staff had expressed the need for more nursing help. June is typically a month of staffing transition. Nursing students have completed their education and have graduated. Many have not taken their boards or are in the process of taking their National Boards to obtain their license. Dissatisfaction in staffing assignments has been identified as a contributing factor in decreased staff morale and nurse burnout (Burppert, 2017; Cathro, 2013).

The unit manager was collecting data on the average acuity score for patient assignments in an attempt to justify a request to add additional staff to the budget for the following fiscal year. When the staff expressed dissatisfaction in having “one more thing to do” during their shift, the staff was also told that the manager was collecting data to develop the budget for the next fiscal year based on the acuity and staffing ratios. Emphasis was placed on how important this information was to justify the creation of additional staffing in the future.

Staffing assignments were adjusted based on patient acuity tool scores. This adjustment resulted in some nurses having more or fewer patients than other nurses on the unit. Nurses who had assignments with higher acuity scores were to have fewer patients. This change created some resentment among the nurses. Historically, nurses compare the number of patients they have to other nurses. The mindset that all patients are not equal did not correlate into the implementation of the acuity tool. Nurses who liked the idea that the workload would be balanced were balking when the equalization of acuity translated into more patients for some nurses and fewer patients for other nurses.

The average acuity score for a daytime nursing assignment was between 16 and 19 for each nurse with an average of six to seven patients a piece. Night shift nurses had acuity scores ranging from 18-20 with up to 8 patients a piece. These numbers were consistent with the duration of the project.

Charge nurses, if included in staffing, were to take a partial load or lighter patient acuity assignment. The premise for this was to allow them to assist other nurses if a patient's acuity changed during the shift and to allow them time to plan assignments for the next shift. The responsibility of charge nurse on the unit was managed by the night assistant manager from 11 pm to 7 am and shared between the staff and the clinical resource nurse from 7 am to 3 pm, Monday through Friday. Charge duties outside these times fall to the staff and are rotated among a core of staff nurses. As previously mentioned, the unit secretary typically made the assignment, and the charge nurse was to review the assignments before posting them. The unit secretaries were told that the assignment was the responsibility of the charge nurse. However, due to the busyness of the unit, making the assignment was often delegated to the unit clerk.

Outside this facility, in the acute care setting, staffing assignments are typically completed by charge nurses. The charge nurse is often out of staffing to help other nurses on the unit when they need additional help or to help nurses who float to the unit (Burppert, 2017). The charge nurse has the responsibility of delegating and supervising the staff on the unit during that shift (Cathro, 2013). When they are occupied by having to provide care to their assigned group of patients, they are not able to exercise fully the responsibility as a charge nurse and resource person to other staff members on the unit.

Part of the education for using the acuity tool for staffing was that the charge nurses were to have a lighter load so they could complete charge duties and be available to assist staff members if they needed help. This reduction in charge nurse assignment acuity did not occur on a regular basis because the charge nurses felt "guilty" about having fewer patients and a lighter load than the other nurses on the unit. There were a couple of charge nurses who did take a

lighter load, but the unit secretaries indicated to me that the staffing assignment was still delegated to the secretary.

Each unit is responsible for keeping track of which staff members float to other units. There is a priority system that floats relief staff before regular part-time or full-time nursing staff. When nurses float to another unit, they are given an assignment which typically equals the other assignment groups on the unit. There has not been an orientation to the unit, as each medical-surgical unit is designed to mirror one another. While each unit has its individual characteristics, the expectation of providing basic nursing care is understood.

When nurses floated to the Orthopedic/Neurology Unit, the expectation was that they would be oriented to the acuity tool by the clinical resource nurses, the charge nurse, or me. When nurses floated in and were trained on the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool, they started to ask why this system couldn't be implemented on their units. They seemed satisfied with the approach for balancing nurse workload.

Cynicism about the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool came from some of the more seasoned nurses on the unit. While they liked the ideas of acuity based staffing, they were skeptical and very vocal about their doubts that this research study would change anything. One nurse made a point of verbalizing that she would not be participating in the research project and was demonstrative in her unwillingness. I met with these staff members to explore why they were so adamantly opposed to using the acuity tool. They based their response on their experience with change, that it was short-lived, and that things then went back to how they were before, so it was a "waste of time."

Another nurse stated that the "increase in patients in the assignment to balance the acuity scores made the unit unsafe for all the patients." When asked to elaborate on the details of this

and steps she took to rectify the situation, she "did not want to talk about it." The manager met with these individuals and discussed that this project was a unit-based project and they would participate while the research was being done.

A nurse floated to the Orthopedic/Neurology Unit in early July from another unit and did not receive an orientation on how to use the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. When she was asked for her acuity score, she artificially inflated the numbers, which was discovered at the change of the next shift. The oncoming nurse questioned why the acuity scores were so high, and the float nurse told the nurse what she had done. When I worked with the float nurse individually, she was able to give an accurate acuity score for the assigned group that she had. The oncoming nurse talked with the charge nurse, and the situation was brought to light an increased awareness that education of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was imperative for the correct application of the acuity tool.

One month into the study, the staff expressed that they felt some items were missing from the acuity tool. They felt the Chiulli, Thompson, & Reguin-Hartman Acuity Tool did not fully encompass the types of care for the Orthopedic/Neurology Unit that needed to be considered in the acuity score. The example they gave was the lack of a patient's fall risk on the acuity tool. They felt that there was no specific designation for patients that met the criteria for being considered a fall risk.

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was included as part of the Institutional Review Board application. I sought advice from the project committee about making changes to the acuity tool to meet the recommendations of the staff. The feeling was that this would qualify as a significant change and that the tool should be used as was originally approved. The staff was briefed that the tool had already been utilized for a month and the

project was only to have a duration of three months. They were told that their suggestions for improvement would be conveyed in the research findings. They were also informed that changing the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was not feasible at this point in the project.

The facility where this research study was conducted uses the Morse Fall Risk Assessment (MFRA) that is part of the nursing assessment in the EHR. The MFRA was part of the assessment and was to be completed at least twice a shift. Patients were considered at an increased risk for falls when they meet certain criteria. These criteria included having had a previous fall within the past three months and having more than one medical diagnosis. The fall risk assessment also evaluated whether they were in need of or used an ambulatory aid, whether they had intravenous access or are receiving intravenous therapy, their ability to get out of bed and what their level of orientation and mental status was (SAGE Publications, n.d.). While all this data was incorporated throughout the Chiulli, Thompson, & Reguin-Hartman Acuity Tool, it was not a line item with a designated score attached to it.

The staff provided feedback that they felt the tool was not broad enough to cover the patient clinical severity and the nurse workload indicators. An example of this was the patient who has multiple categories that made him a “4,” the “Highest Risk/Highest Workload.” On at least one occasion, scores for a different patient were inflated to compensate for the acuity of a patient who had multiple indicators that made him a “4.”

Some nurses verbalized frustration that patients with multiple clinical severities and nurse workload indicators that qualified them as High Risk High Workload patients received the same score as patients with a single indicator that qualified them as a “4.” An example was given of two very complex patients—one who had suffered a stroke was morbidly obese, diabetic, and

placed in contact isolation for Methicillin-resistant Staphylococcus aureus (MRSA). This patient had bolus feedings every four hours through her percutaneous endoscopic gastrostomy (PEG) tube. She was incontinent with decubiti on her coccyx and needed to be turned every four hours.

The other example was an older patient with cerebral palsy that contracted his body, making it impossible for him to move or change position. He had dementia and yelled out if someone was not present in the room. He was incontinent of urine and feces, was in contact isolation, needed to have oral medications crushed and bolus feedings, both administered through a PEG tube. After listening to the reasoning for the nurses' frustration and empathizing with the limitations of the situation, remediation on the need for consistency was reemphasized. The need was for each patient to have a score that is evidence-based and not opinion-based (O'Keeffe, 2016).

Staffing at the facility where the project was conducted was done based on a "volume-based, reimbursement-driven method to allot for staffing care" (Gelinas, 2016, p. 6). When the use of an acuity based system was explained to the schedulers and house supervisors, it was met with resistance. The charge nurses reported that they were told by the central staffing office and house supervisors that "the hospital doesn't staff for acuity, but for census." Gelinas (2016) supported the need to consider the patient needs with the best nursing talent for that patient: "Traditional staffing methods based on the midnight census are quickly becoming obsolete. Those systems falsely assume all patients are average and all nurses are similar regarding terms of competency and talent" (p. 6).

The study facility's traditional way of staffing led to staffing issues on the Orthopedic/Neurology Unit. One night, in particular, assignments based on acuity scores translated into a nurse who had eight patients, while some of the other nurses had four patients.

The acuity scores for these assignments were equivocal. However, the difference in the number or volume of patients created resentment among the staff. This happened on more than one occasion and led to a period of one week in mid-July when it was discovered that the staff was not using the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. After the discovery of the lapse, the manager and I met and discussed leadership strategies to move forward with the project. Focus groups and individual meetings with staff who were resistant to the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool were conducted.

Feedback garnered from meeting with nurses resulted in both positive and negative responses from the Orthopedic/Neurology and positive reviews from staff who floated into the unit. Some of the comments received were as follows:

Pros:

"It's a good idea."
"It's about time we do something like this."
"I think it helps prioritize my patients by allowing me to focus on the most critical ones first."
"It helps with communication between shifts."
"I know my assignment is as heavy as everyone else's."
"This data helps forecast staffing budget needs for next year."
"We used to use an acuity rating system, and I liked it."
"I wish we did this on our unit."
"Why can't NAs have an acuity tool?"

Cons:

"It will never work."
"You won't get nurses to do this."
"I think having more patients than (other nurse) isn't fair."
"I don't have time to use it."
"I don't want to do this."
"The numbers don't accurately reflect how much work the patients are."

"I don't want to have to skip rooms and go from [rooms] 28 to 46 based on acuity scores to balance the assignment."

"I'm not changing my assignment in the middle of my shift just because the numbers change."

"I don't have time between 3 pm and 5:30 to determine the acuity score."

"The tool doesn't include fall risks and other things that make the patient more work."

"No one explained it to me."

"I didn't pay attention to all the criteria and scored it based on what I felt instead of what the tool showed they should be."

Based on the staff feedback, remediation and re-education was done, as well as emphasizing the need for consistency for the duration of the project. It was decided that the total number of patients in each group would no longer be written on the board, but that just the overall acuity scores for each assigned group would be listed. The typical acuity load for nurses on nights continued to be 18-20 based on the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. The assignment scores for days were usually between 16-19 points.

Towards the end of July, the second month of the project, I noticed that the unit secretaries reverted to making the staffing assignments. When this was discussed with the unit secretaries, they acknowledged that they were making the staffing assignments, but the charge nurses were reviewing the assignments before they were finalized. The unit secretaries were also contacting the individual nursing staff to collect acuity scores one and one half hours before the next staffing change occurred. This information was conveyed to the unit manager, who followed up with the unit secretaries and the charge nurses. The response to interviewing these individuals was that "because of the business of the unit, the unit secretaries were making the assignments, but that the charge nurses were reviewing the assignments before they were finalized. The unit manager stated that this was acceptable to her. During this same time, there was a direct attempt to sabotage the project by the nursing staff. One of the more outspoken staff

members sent an email to the manager and me stating that the project was causing increased risk to patient safety. She rallied the staff and incited dissatisfaction among the nurses. She stated that she had five patients with the acuity score of 2 each, but while she was admitting a patient to the unit, one of the patients in her assigned group choked on her lunch. According to the information she provided in her email, the acuity score for her assignment was 13. There were other staff members on the unit who had three and four patients a piece, but their acuity scores were higher because of patients who had planned discharges, although she did not give information to discern the other assignment groups' acuity scores. This staff member felt the acuity tool resulted in her having more patients and therefore "she was not able to provide safe care."

I reached out to this staff member to try to determine what had happened and if it was related to the acuity tool. She was asked if the acuity scores were equivocal between the nurses. She was asked if she was aware that her patient who had choked had any aspiration precautions. I wanted to know if she utilized the charge nurse when she had an escalation of care. It was important to determine if she had followed the protocol and if the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was utilized correctly. Questions were asked to ascertain her use of nursing judgment and if she adjusted her acuity score to reflect the change in the patient assignment acuity. I acknowledged, empathized, and validated her feelings that she had had a difficult time. I also mentioned in my response that in that month, the acuity tool had been effective in reducing the number of resuscitation events that occurred.

There were numerous attempts to reach out to and meet with this staff member to garner more information and determine if the tool was used correctly and if there was a safety risk that was related to the project implementation. The staff member did not answer emails, and when

attempts were made to contact her directly, she stated that she "didn't care to discuss the incident any further." She denied the unit manager's request to set a time to discuss the situation and how to rectify any problems related to the project possibly. That same weekend, the acuity numbers were not recorded for the 1500 shift or the 1900 shift. An inquiry into why this had not occurred resulted in a response that there were too many admissions and discharges for all the nurses to complete the tool and turn in their acuity scores.

After this weekend at the end of July, there was a feeling of dissatisfaction with the project; staff who had initially been excited about the idea waned in their enthusiasm. I met with the unit manager to determine how to continue the project and increase compliance. The unit manager suggested that the staff should be notified of when the project would be completed. It was also suggested that I develop and survey the entire staffing unit on the use of the acuity tool.

An informal survey consisting of nine short-answer questions, along with an email was sent to the entire staff on the orthopedic/neurology unit. The instructions were that anonymous feedback on the Chiulli, Thompson, & Reguin-Hartman Acuity Tool, the perceived benefits and detriments to the tool, and its use on the unit were requested. The survey was sent to 78 people on the Orthopedic/Neurology Unit email list; this included all staff on the Orthopedic/Neurology Unit, managers, ancillary staff, and administrators. The email indicated that additional surveys were available in the breakroom for ease of access. The instructions were that there was a 9 x 12 envelope placed in the breakroom in my mailbox where the surveys could be returned.

In the email that contained the survey, the staff was notified that the project would end on August 31 at 2300 and that I was interested in their feedback about the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. The staff was encouraged to complete the survey

anonymously. The unit manager, CRN, and assistant manager reminded staff during the safety huddles that the surveys were available to them and that their feedback was valuable.

Of the 78 surveys sent out approximately 50 went to the nursing staff. Survey responses were from four individuals of the people who were directly affected by the implementation of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. The staff had three weeks to submit their feedback. The survey questions asked the individuals completing the form to identify what their role was on the Orthopedic/Neurology Unit.

Four RNs and one unit secretary responded. The survey also asked the individuals if they had used the acuity tool each shift they worked, and if not, why. Two RNs worked the evening/night shift, one RN worked the day shift, and one RN did not indicate what shift was worked. The unit secretary worked a variety of shifts. The RNs reported that they did use the acuity tool, but not always. The survey asked what barriers there were to using the Acuity Tool. Every survey mentioned staffing issues and time constraints. One survey also stated that there was a conflict between how the hospital staffs and acuity ratings. One respondent felt "no one should be a '2.'" The next question asked what benefits the staff have seen or may see in the future for using the Acuity Tool. The survey respondents responded that benefits for the future included "caps on the acuity scores and fairer workloads." One respondent replied that he/she saw no benefit that "the unit clerk asks for the patient information anyway before making the assignment." I asked what improvements could be made to the Acuity Tool. The responses were to make the Acuity Tool "more specific and individualized to the unit"; "there needed to be a greater spread between the numbers (i.e. 2-6)"; "there needs to be a cap on acuity." The next question asked if there should be an Acuity Score cap. All respondents replied "yes." The following question asked what level of acuity they thought was enough without jeopardizing

patient safety based on the current 2-4 score per patient. The responses were: “12, 20, 11-12, 16.” The participants were thanked for completing the survey and encouraged to email me if they had questions or would like to talk more about the Acuity Tool. My email address was included, along with a statement that I was open to hearing what the staff had to say and any other ideas they might have.

The premise of the acuity tool was to balance the workload with patient needs and nurse competencies through “appropriate staffing skill mix and staffing ratios” (Chiulli, 2014, p. 12). Empowerment of the nurses to care for patients within their competency levels through “safer nursing workload” (Chiulli et al., 2014, p. 12) led to decreased number of resuscitation event occurrences. It was also felt that the nursing staff would be more satisfied with the quality of the care they could provide to their assigned patients.

It was found through spot-checking and interviewing that the staff was compliant in the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool consistently through the month of August. On August 31, the project ended. The staff removed the poster, the acuity tool worksheets, and the Unit Acuity Score worksheet and returned to the traditional method of making assignments and writing patient totals on the whiteboard.

Reporting cardiopulmonary codes is measured in different ways. Data collection proved to be more challenging than was initially anticipated. Counting the actual number of occurrences seemed fundamental; however, it was more involved than it seemed. The hospital system reported only system-wide mortality to the CMS. The code data that was generated using the International Statistical Classification of Diseases and Related Health Problems, tenth edition (ICD-10), was reported hospital-wide, so each case needed to be examined. The ICD-10 mortality code includes both natural and unsuccessful resuscitation deaths. The new ICD-10

code changed what was defined as a successful cardiopulmonary code. This change in the ICD-10 coding was not sufficient because it did not include the escalation of care, but was inclusive of surgical procedures. This data was mainly heart ablation procedures performed in the Cardiac Catheterization Laboratory, open heart and valve replacement surgeries in the Operating Room, or patients who received cardiopulmonary resuscitation by either the Emergency Medical Service (EMS) before arrival at the Emergency Department or the Emergency Department staff in the Emergency Department.

There is no standardized method for escalating care. The hospital does have Vocera ®, a call system, in place and does track the number of times this is activated. When a "rapid response" or call for a MET is needed, this is recorded in the call system. However, nurses often collaborate with other nurses, medical residents, and physicians, and escalation of care is done without a broadcast call for assistance.

The facility reported data to the AHA was completed by examining medical records from rapid responses, cardiopulmonary arrest reports that were completed when the crash cart was opened, and reports about patient deterioration. Many people are involved in the process for data mining and reporting to the AHA. The process at the time of this study involved reading the electronic health record for each case.

Drawbacks with this process were the inability to get raw data for unit admissions and the number of resuscitation event occurrences. The original Internal Review Board application stated that no identifiable patient data would be accessed or used. Ideally, to run statistical analysis would have required that each admission matched up with whether they resulted in a resuscitation event occurrence. "Each admission needs to have its own file that includes what happened to the patient during their stay" (Personal communication, Dr. Jerome Thayer,

February 23, 2017). This would have required that each admission be identified and their deposition recorded. Therefore, the data was condensed to the number of admissions and the number or occurrences with and without the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool.

I contacted the individuals who submitted resuscitation event information to the AHA to collect the data from the three months before the project was implemented. The persons entering the data were approximately three months behind in data entry due to changes it the ICD-10 coding and reporting requirements. It took through the following January to gather all the data from the project.

I was invited to a staff meeting in September 2016 to share the results of the project and the staff survey feedback. At that time, there was limited resuscitation event occurrence data available. There was no data available for the three months after the removal of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. I shared the fact that the results were very preliminary. These results were shared with the staff, managers, and ancillary staff at three different informational staff meetings in September, 2017. Data collection was not available and statistical tests on these data had not been completed. I provided food at the staff meetings as a thank you to the unit team members for their participation in the research project. The staff expressed an interest in the results of the study.

V. Analysis and Results

Statistical Analysis

Data analysis utilizing Pearson Chi-square test-for-independence with a 2x2 contingency table for variance between two independent samples was conducted using IBM Statistical Analysis Data Software (SPSS) Version 22. Pearson Chi-square statistic is a test that is used to determine if there is a variance in distribution between the sample and population (UCDavis.edu, n.d.). The test-for-independence, also known as Pearson Chi-square, is useful to analyze "whether two categorical or nominal variables are related or associated with each other" or by chance (Wielkiewicz, 2000, para. 1). The 2x2 contingency table is useful in comparing the populations that received the intervention and those that did not.

"A Chi-square test of independence was calculated comparing the results" of patients admitted to the orthopedic/neurology unit and the number of resuscitation event occurrences with and without the Chiulli, Thompson, & Reguin-Hartman Acuity Tool intervention on workloads and staffing (Cronk, 2008, p. 90).

Data analysis showed no statistically significant relationship (χ^2 (1) = 1.250, $p > .05$). Examination of the data using purely statistical tests showed no statistical significance existed. However, there was evidence of clinical significance, which is significant when studying clinical populations.

The data examined for the statistical tests was nominal data. When the data is at a nominal level, Chi-square is an effective means of discerning observed occurrences from expected occurrences between independent groups (Tappen, 2011). Data is grouped to reflect the number of occurrences between the groups. The variance in distribution between the

"outcome variable among the comparison groups" supports the hypothesis (Sullivan, 2012, p. 156).

Table 1

Intervention * Occurrence Crosstabulation

			Occurrence		Total
			1.00 Yes	2.00 No	
Intervention	1.00 Yes	Count	11	526	537
		% within Intervention	2.0%	98.0%	100.0%
	2.00 No	Count	32	1033	1065
		% within Intervention	3.0%	97.0%	100.0%
Total		Count	43	1559	1602
		% within Intervention	2.7%	97.3%	100.0%

Two assumptions needed to be met for the Chi-square test to be used. The first assumption was that each cell of the table contains at least five occurrences. The second assumption was that the population and intervention have to be independent of one another (Krishnan, 2011; Tappen, 2011). Once these assumptions are met, the Chi-square test can be utilized effectively. The test for independence makes the assumption that the population that received care while the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was implemented is independent of the population that received care without the acuity tool.

Using the Chi-square statistical test, the decision rule, to reject or fail to reject the null hypothesis, "depends on the level of significance and the degrees of freedom, as defined as $df = k - 1$, where k is the number of response categories" (Sullivan, 2012, p. 136). In the data analyzed for this study, the level of significance was 0.05. This level of significance meant that the confidence interval of 95% had a margin of error no greater than 5%. This "allows a 5%

probability of incorrectly rejecting the null hypothesis in favor of the alternative when the null is true" (Sullivan, 2012, p. 125). The degrees of freedom is the number of rows and columns minus 1 from each, i.e., "$df = (c - 1)(r - 1)$" (Sullivan, 2012, p. 158).

Degrees of freedom allow the contingency of the data when estimating the populations. The hypothesis was whether the Chiulli, Thompson, & Reguin-Hartman Acuity Tool would make a difference in the number of occurrences in FTR on the Orthopedic/Neurology Unit. The data analysis compared the number of admissions and the number of FTR codes with the intervention of the Acuity Tool or not. Each variable was represented in a column and row, making it a 2x2 contingency table with degrees of freedom equaling one.

Analysis of the data was completed using a Chi-square test-for-independence 2x2 contingency table. The 2x2 contingency table indicates whether the association between the population that received the intervention (Chiulli, Thompson, & Reguin-Hartman Acuity Tool) and the population that did not receive the intervention is greater than it would be if by chance (Krishnan, 2011; Tappen, 2011).

The results of the analysis were Chi-square $1.250 > 0.05$, indicating that the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was not statistically significant in reducing the number of resuscitation event occurrences on the Orthopedic/Neurology Unit.

Data grouping was performed by pre- and post-implementation and the study period as with and without the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. Data collection spanned a nine-month period that was grouped in three-month increments to allow for ample sample size.

The first period of data collection was done examining the months of March, April, and May 2016, when the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was not utilized.

During these months, acuity scoring was not done. Patient characteristics and nurse workload indicators for staffing assignments were not used.

The second period of data collection occurred in June, July, and August 2016. The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was implemented and utilized during these months. Although there was an inconsistent use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool at the start of the project, compliance improved with time, with consistent use by the last month of the project implementation. The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was used to link the patient clinical severity with nurse workload indicators.

The third period of data collection were the months of September, October, and November 2016. The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was not used during this time. The staff had stopped using the tool at 2300 on August 31, 2016.

For analysis, the months that the tool was not used—March, April, May, September, October, and November—were examined individually, then combined and compared with the months the project was implemented. The periods of time the tool was not in use in the population was n=1065. The number of reported resuscitation event occurrences was 32. The population when the tool was being utilized was n=537. The number of reported resuscitation event occurrences was 11.

VI. Discussion

The term "no statistical significance" should not dismiss the importance of data analysis that is less than the alpha standard ($\alpha = 0.05$) for research. Because the levels of statistical significance are pre-established by the rules of statistical tests, the clinical relevance should also be examined (Gelman & Stern, 2012). The power of analysis for the statistical test should not be the only litmus test in considering the implications of the findings.

Statistical analysis always runs the risk of Type I and Type II errors. Type I errors are associated with errors in the confidence level. While there was discussion previously about the alpha-value and the results of the statistical test which were completed, there is some question about the comparison of independent sampling, coincidence, and observations and not examining the 'soft data' (Altman & Bland, 1995).

Statistical analysis often shadows the clinical importance when the findings or statistical tests are not significant. There are often a variety of reasons why data may not be statistically significant, but have clinical significance. Statistical significance is based on the underlying assumptions, the statistical test used to analyzed the data, the sample, and the effect size (Rethman & Nunn, 1999; Vahabi, Noormohammadi, & Rahnama, 2013). The American Statistician Association has been debating the use of null hypothesis testing, citing that it lacks scientific reliability and validity. The editorial board of the journal *Basic and Applied Social Psychology* decided to ban p-values (null hypothesis significance testing)" (Wasserstein & Lazar, 2016, para. 4). The p-value has been misunderstood and misused by those who are not "properly trained to perform data analysis" (Leek, 2014, as cited in Wasserstein & Lazar, 2016, p. 129).

The p-value metric was set in the 1920s by Ronald Fisher, a statistician, who selected the number as a value that would evaluate if data warranted additional study to prove or disprove a

correlation as significant. Unfortunately, using the p-value for the litmus test for validity is fraught with errors. The purpose of the p-value to determine statistical significance was intended to see if data observed was attributable to random chance. When using the p-values, the underlying assumptions, hypothesis testing, effect size, and sample size, experimental manipulations, as well as confidence intervals and empirical data should all be considered (Wasserstein & Lazar, 2016). Reproducibility is problematic when based on the p-value; other means need to be considered.

While the data analysis indicated there was no statistical significance, there was clinical significance that emerged in the data analysis. The term “no statistical significance” should not dismiss the importance of data analysis that is less than the standard Cronbach’s alpha ($\alpha = 0.05$ or 0.01) for scientific research. The traditional standard for scientific and discovery research has been a determination of the generalizability of studies and that the results are not by chance. Because the levels of statistical significance are pre-established by the rules of the applied statistical tests, the clinical relevance should also be examined (Gelman & Stern, 2012).

The relevance of the clinical evidence needs to be considered for application in the clinical setting and the effect it has on the patient and the patient population. The magnitude of the effect is useful in determining the clinical significance to a patient population. The clinical significance can be determined using the absolute risk reduction (ARR) and the relative risk reduction (RRR) (Polit & Beck, 2017; Tappen, 2011).

The clinical significance of the data using the magnitude of the effect analyzed the degree of benefit versus harm. Absolute risk reduction is the *percentage* in reducing harm. The absolute risk (AR) of the exposed group is determined by dividing the number of resuscitation occurrence events in the group with the Chiulli, Thompson, &Reguin-Hartman Acuity Tool (11)

by the total number of patients in the exposed group (537). The result of the absolute risk exposed (AR_E) was 0.02. The AR of the non-exposed group (AR_{NE}) was found by dividing the number of resuscitation occurrence events in the non-exposed group (32) by the total number of patients in the non-exposed group (1065). To find the ARR, the AR_{NE} was subtracted from the AR_E (0.03-0.02). The ARR for this project was 1%.

The RRR is the difference in the *rate* of harmful outcomes. The RRR was found by dividing the ARR (0.01) by the AR_{NE} (0.03) for a result of 0.33. With the application of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool, the result was a 33% reduction in the rate of resuscitation event occurrences.

The following graph demonstrates the clinical significance of the reduction of resuscitation event occurrences.

The clinical significance is demonstrated in this graph. The months of March, April, and May were before the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was applied. The months of June, July, and August were when the tool was being used. As previously mentioned, there was consistent monitoring, education, and remediation that was occurring. In June, the month the tool was first applied, there were nine occurrences of resuscitation events. July had improved adherence and applicability and a decrease to only two resuscitation events occurrences, which was a 78% reduction. In the month of August, the tool was used consistently for the entire month and no resuscitation events occurred. In the period of September, October, and November, when the tool was removed and staffing returned to the previous methods, there was an increase in the number of events that occurred and continued on an upward trajectory over each month.

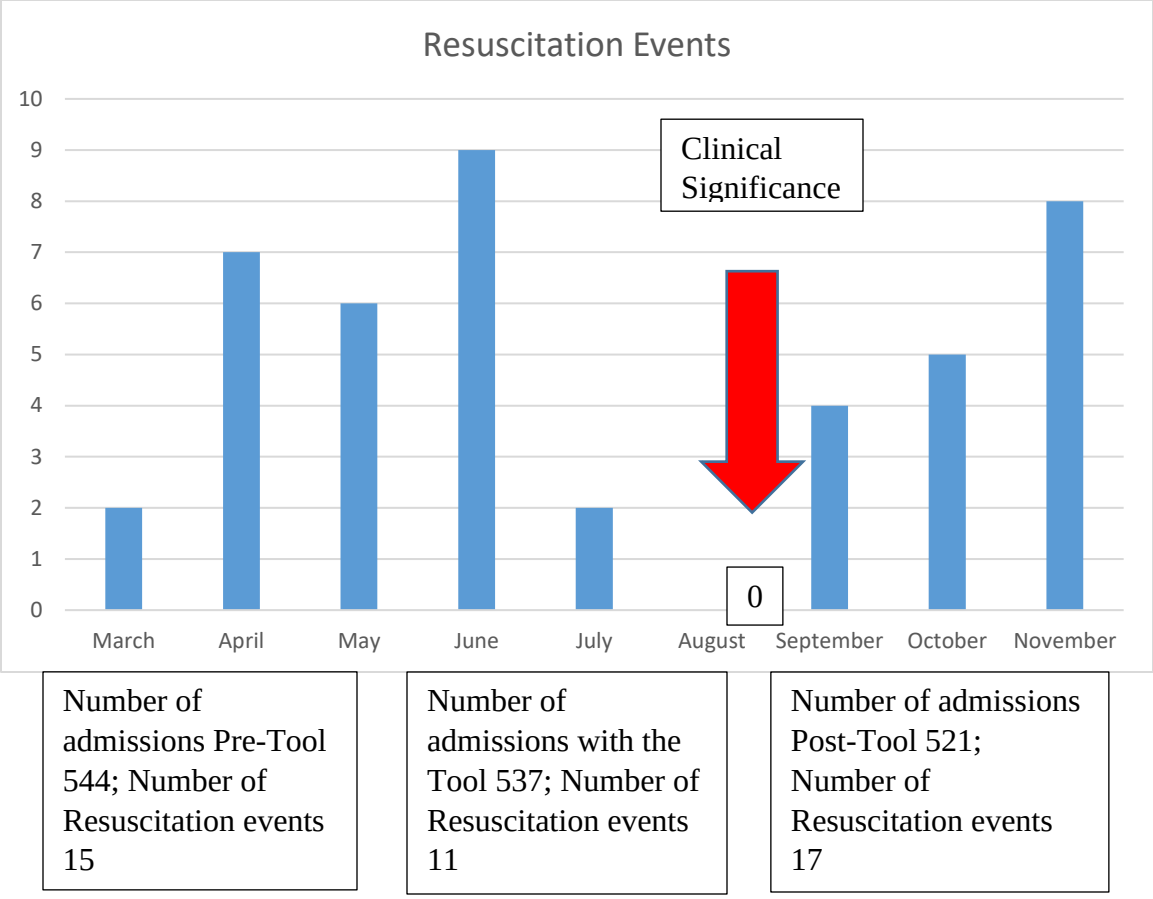

Figure 1. Resuscitation events.

The research results demonstrate the effectiveness the DNP has in improving the state of healthcare today. The DNP Essentials are competencies formulated by the American Association of Colleges of Nurses in their 2006 white paper. These competencies demonstrated the acquisition of knowledge, skill, and attitudes at the highest level of doctoral prepared educational standards. There are eight different competencies which the successful DNP candidates utilize in their practice to improve the outcomes for patients local and globally.

Essential I: Scientific Underpinnings for Practice

One way that translational research differs from discovery research is in the implementation of an intervention. Translation into practice required research and exploration

into theoretical concepts, healthcare delivery phenomena, and conceptual models related to nursing and patient care. The dissemination of knowledge by research aids the DNP in translating theory into practice. Conceptually, theories are developed to help explain an area of inquiry.

The DNP investigated the generality of the theoretical models and used a combination of educational and clinical experience, which translated theory into application. The areas of inquiry and application of theoretical models helped explain clinical phenomena. The translation of scientific discovery into application and practice helped support the conceptual, theoretical framework. The DNP, in the role of researcher, used nursing theory and practice-based experience in "critical appraisal of research literature" to guide ethical constructs, research methodology, statistical analysis, and evaluation of the process and results to bridge theory and practice (Magnan, 2016, p. 121). The dissemination of findings in the clinical setting adds to the body of knowledge and provides additional nursing knowledge to inform healthcare delivery.

Utilizing research methodology, I was able to utilize knowledge and synthesize information in developing the capstone project. The exploration of current articles related to resuscitation events, nurse staffing levels, acuity tools, and evidence-based research allow translational research from one specialty setting (an adult post-surgical unit) to another specialty setting (an Orthopedic/Neurology Unit).

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was supported by the Synergy Model (Curley, 1998) which utilized patient care needs to drive nursing care. The result was a 33% reduction in relative risk ratio or harms to patients receiving care while the tool was being used. Through the application of the tool, I was able to develop a change in clinical practice and develop strategies for future study, building the knowledge gained in the project.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

For the past two decades, there has been a call for health care reform. The need to improve access to care, increase educational levels, advance the delivery of value-based health care, and enhance the quality, safety, and efficacy of the healthcare delivery system have all been identified. The DNP developed experience and practical application in the ability to deliver evidence-based practice into the clinical setting. The DNP Scholarly Project required developing an understanding of how organizations function, identifying stakeholders and powerbrokers, recognizing work environment cultural norms, and evaluating the different systems within the organization and their ability to perform and work as a whole entity.

Each system within the organization contributes either directly or indirectly to the care delivered and the effectiveness of patient outcomes. Using systems thinking and understanding the workflow and cultural climate within the facility strengthens the ability of the DNP to improve work systems and facilitate change. Attributes such as problem identification, quality improvement processes, policies, "information literacy," and collaboration to develop "evidence-based, patient-centered" solutions are required of the DNP (NONPF, 2011, as cited in Peterson, 2014, p. 39). The DNP advocates for the patient, whether an individual, community, or society.

There is an element of risk-taking when championing for process improvement and initiation and maintaining change within an organization. It is through the scholarship of understanding organizational theory and systems frameworks that the DNP can identify strengths and weaknesses that affect the delivery of healthcare. By serving as a leader, guide, mentor, and coach, the DNP utilized a proactive approach to facilitate effective change within the

organization to improve healthcare outcomes for the patient, providers, and facility (Eldridge, 2016; Peterson, 2016).

Through the use of the Chiulli, Thompson & Reguin-Hartman Acuity Tool, the workflow was redesigned to optimize patient care and nurse competencies. With the assistance of the managerial staff, I was able to develop and monitor these changes and reinforce the use of the Acuity Tool. The results demonstrated that when there is equitable care distributed across the unit, the number of resuscitation events decline.

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

The DNP curriculum was designed to provide the integration of theory into practice. Doctors of Nursing Practice are equipped with clinical knowledge and experience in a variety of areas of nursing. The DNP, as an effective clinical nurse leader, joined the attribute of scholarship of evidence-based practice with clinical knowledge, expertise, and leadership.

Boyer's model of scholarship incorporates a synergistic approach that integrates the constructs of discovery, integration, application, and teaching (Boyer, 1990, 1997; Stull & Lanz, 2005, as cited in Tymkow, 2014). These constructs were incorporated throughout the curriculum of the DNP program and in the Scholarly Capstone Project. The DNP chose a quality improvement process that promoted patient safety through evidence-based application. It is through clinical scholarship and evidence-based practice that the DNP promoted practice change through the translation of research into practice. Facilitating practice change occurred through the utilization of conceptual frameworks that evaluated the design of systems, services, outcomes, and cost/benefit ratios.

Implementation of practice change and management included collaboration, strategies, and policies that supported the economic and ethical use of resources to ensure the best patient

outcomes. Because nursing is on the front line of the care delivery system, the DNP is positioned to evaluate the area of inquiry. Once the clinical question was determined and a systematic review of the research was completed, the DNP selected the best design to determine practice change. Evaluative strategies used clinical knowledge, research methodology, leadership, and ethical decision-making to help develop and drive practice change.

The information gained from the project study was able to be synthesized into the knowledge gained from practical application in the clinical setting. This new knowledge was translated into care that was specific to the Orthopedic/Neurology Unit with the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. The results of the project were analyzed comparing the resuscitation event occurrences with and without the use of the tool.

Essential IV: Information Systems-Technology and Patient Care Technology for the Improvement and Transformation of Health Care

The role of the DNP is to be familiar with the available technology and current on innovations to improve access and delivery of care. Through the combined use of the sciences—nursing, technology, statistical, and computers—the domains of this competency are met through the DNP curriculum. The current speed and access to information through electronic portals require the DNP to evaluate information sources critically. Through the use of technology and informatics, the DNP helps formulate policy and standards of care using best evidence-based practice and research. The use of technology is commonplace in the healthcare setting. Through the use of innovative electronic health record programs, communication strategies, and databases, the DNP can guide clinical practice based on evidence-based practice.

Informatics provides the ability to examine the latest research and extract data based on patient, provider, or facility characteristics. Best practice outcomes and adverse events can be

tracked and monitored using a combination of technology and informatics to drive quality improvement processes and change practice based on research and data. Outcomes management is an expectation of the DNP graduate. Outcomes management is a skill that "measures the impact of technology on bedside acute care and intensive care nurse's time in rendering patient care" (Burkart-Jayez, 2014, p. 147). Health information technology allows measurement, data extraction, and analysis of a variety of parameters in the health setting.

The PPACA (2010) required the use of EHR healthcare setting to receive reimbursement from government entities. The use of health information technology allows easier transfer of patient information to other providers that care for the patient, improved communication between providers and patients, and reduced waste from repeated tests that another provider may have ordered. Another advantage of technology and informatics is the increased access to care. The DNP has the clinical knowledge and skills for computer literacy to be able to provide care through the use of telehealth and teleconferencing software applications (Burkart-Jayez, 2014).

The EHR was used to data mine for the reported number of occurrences to the American Heart Association. There was a need to differentiate reported occurrences due to changes in the ICD-10 billing codes and a variety of testing that was completed using specialized computer software for statistical testing. Future applications of the acuity tool examining the use of nurse workload indicators could be pulled from the EHR to determine an objective acuity scoring system.

Essential V: Healthcare Policy for Advocacy in Health Care

Health Care policy is at the forefront of issues globally. There are problems worldwide with the provision of access, quality, and equitable distribution of healthcare. "Policy activism

translates into patient advocacy" (Mund, 2014, p. 178). The DNP is positioned to advocate for improvements in the delivery of healthcare.

The United States is facing many uncertainties and changes in the legislation of health care policy, access, affordability, and delivery. Nursing needs a voice in the discussions that shape healthcare policy. The DNP curriculum is designed to support the leadership skills necessary to advocate for fair healthcare policy.

Through collaboration, understanding of systems organization, and policy making, the DNP is challenged to be an active voice in the legislative process through educating the public and elected representatives on the topics that affect patients, providers, and delivery of care. The DNP should be connected at the local, state, and national level to be a leader and voice in the community for change (Mund, 2014).

The impetus of the project was to reduce the number of resuscitation events through advocating for equitable workloads for nurses. A variety of research tools and methods were examined to determine the most efficient and least cumbersome acuity tool to aid the nurses in objectifying patient acuity levels. I was able to provide education and advocacy for the role of the charge nurse. The transition from patient care providers as a registered nurse in the role of the charge nurse required relinquishing some of the patient care responsibilities to improve their ability to be more effective in a leadership role on the unit.

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

The stakeholders in health care have terminal degrees. Nursing is one of the few professional careers that has multiple layers of education, but is not recognized for the differentiation in education and experience. To be equal stakeholders in the health care arena,

the entry-level educational requirements for nursing need to be raised. The DNP as a terminal degree is the missing crucial piece of the patient care team of doctoral qualified members. The educational component of the DNP degree is the ability to understand, evaluate, analyze and synthesize data from professional practice. When all the team members are educated at the highest level for their discipline, then professionalism and knowledge allow for a combined voice and a decreased chance of power plays and feelings of superiority among disciplines.

Each discipline has its area of experience and body of knowledge. Collaboration is essential among members of the patient care team. When care providers among the disciplines demonstrate their expertise and evidence-based practice, then the patient benefits.

Design, implementation, evaluation, and analysis of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool project involved collaboration with multiple individuals and departments within and outside of the study facility. The ability to enhance communication and develop social capital and emotional intelligence in the undertaking of this project was an excellent learning experience. These skills enhanced the ability for the study to take place and allowed multiple perspectives in the evaluation and analysis of the results.

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

Resources are finite. Health care providers are responsible for managing resources for the good of all the population. Clinical prevention utilizes primary and secondary levels of prevention and screening to focus on preventing illness and disease before it happens or catching problems in the earliest stages before disease treatment is needed. Prevention is less burdensome on society and provides individuals with a healthier lifestyle which improves the quality of life. The U.S. Department of Health and Human Services (2000a; 2010) developed interventions to

help meet the goals of improving the "quality of health and longevity and eliminate health disparities" (as cited in Schadewald & Pfeiffer, 2014, p. 258). The DNP uses evidence-based practice guidelines to screen for disease and provide a springboard for teaching an individual's self-care. Self-care improves self-efficacy and overall wellbeing. A healthy society is a strong society. When people are healthy, they are more productive, are happier, and live longer.

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool project improved patient outcomes through the reduction in the number of resuscitation event occurrences. The improved compliance of staff with using the tool over the period of the project demonstrated a significant decrease in the number of resuscitation events. Alignment of the needs of the patient based on clinical severity indicators and the nurse competencies through equitable distribution of workload allowed for prevention of adverse outcomes.

Essential VIII: Advanced Practice Nursing

There are many different advanced practice roles in which the DNP can practice. One commonality is that the DNP is a highly functional leader in nursing. Advanced Practice Nurses (APN) have additional training and certification from national accrediting bodies. The DNP-APN is trained to provide "care for patients at the highest level possible and implies the infusion of clinical scholarship of all patients, at all times, and in all practice settings" (White, 2014, p. 355). The DNP-APN requires 1000 hours of clinical advanced practice practicum. These hours are more than is required for the Masters level-prepared APN. The additional hours allow additional training and development of clinical excellence. The curriculum and addition of the doctoral courses broaden the knowledge base and understanding of barriers and challenges that the DNP-APN may encounter in practice (White, 2014). The extra bonus of more education

better prepares the practitioner to meet the needs of the patient and provide patient-centered, evidence-based care.

The role of the Advanced Practice Nurse in the DNP role included knowledge of evidence-based practice, educating staff on best practice, strategies for implementing change, and analysis of the results. Throughout the Chiulli, Thompson, & Reguin-Hartman Acuity Tool project, there was consistent education, strategizing, and evaluation of the implementation. Leadership skills were utilized through a strong presence on the unit and accountability for ensuring that the project be completed appropriately. The benefits were to the patients, with improved outcomes; to the staff, in the equalization of workload; to the unit, with increased communication and accountability; to the hospital system, by demonstrated reduction of morbidity and mortality; and to the community, through the avoidance of preventable resuscitation events.

Limitations

There were challenges with the implementation and utilization of the tool. Some of these difficulties were based on human nature. Change is difficult, especially when trying to change behaviors. Based on tradition, nursing is no exception. It is only recently through the promotion of evidence-based research and practice that change is slowly taking place. Nurses talk about change and what they would like to change, but when it comes to implementation, change is uncomfortable, and there is anxiety that results from the uncertainty of venturing into unfamiliar patterns of behavior.

Translational research differs from discovery research in that the implementation of an intervention requires constant monitoring, facilitation, and problem-solving. The challenges required that I develop steps to facilitate the successful implementation and translation of

research in a clinical setting. When using discovery research in an application method to translate discovery into translation, the implementation does not take place in a static environment. I was required to be attuned to extraneous variables that become part of the translation of research into practice.

Other limitations had to do with the project. There was a marked improvement in the reduction of resuscitation occurrence events, but the period studied was only three months. Prolonging the time the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was utilized over six months to one year would provide a more complete representation of the effectiveness of the tool. Another limitation was the number of resuscitation events.

There continues to be a lack of a reliable, comprehensive, user-friendly system to alert clinicians of impending changes in medical-surgical patients' status leading to resuscitation event. Chiulli et al., (2014) stated that the acuity tool is easy to use, "does not require complex documentation, and requires about ten seconds per patient per shift to complete" (p. 12). The acuity tool is also malleable to fit the needs of any unit or "patient population" (Chiulli et al., 2014, p. 12). Through early recognition of physiological deterioration, changes in clinical severity and nurse workload indicators with measurable data points made a difference in patient safety by increasing awareness of the acuity of the patients on the unit. The difference was evident by a reduction in the number of occurrences of resuscitation events on the Orthopedic/Neurology Unit.

Communication on the unit also improved with the use of the acuity tool as a result of knowing what was happening on the unit. Communication about unit concerns occurred twice a day in shift-change, safety huddles. However, patients' status can change dramatically over the course of 12 hours between huddles. The utilization of the Chiulli, Thompson, & Reguin-

Hartman Acuity Tool improved communication between staff members. Often, during the bedside shift report, nurses would justify the patient's acuity score and this allowed a more thorough synopsis of the patient's clinical severity and the nurse workload that was required.

One of the complaints of nurses is that the safety huddles take too much time. On some units, the safety huddles resemble mini staff meetings. In the Orthopedic/Neurology Unit, the safety huddles typically last about 5-10 minutes. Some units have safety huddles four times a day, when there is a transition in some of the staff. By having more frequent reporting of patient acuity, the charge nurse and nursing staff were more aware of patients who were more acutely ill than what might be reported in less frequent safety huddles.

The cost of the acuity tool will result in savings to the unit and hospital system through the reduction in the number of resuscitation and sentinel events that result from imbalanced workloads and improved staff and patient satisfaction. With a 33% decrease in the rate of resuscitation codes, the value placed on human life is priceless. While it is possible that there may be an increase in labor costs as a result of ensuring the appropriate staffing skill-set mix or having a charge nurse out of staffing, there would be fewer safety issues and increased synergy between patient needs and nurse competencies.

Enhanced safety and synergy with patients and nursing staff improved patient satisfaction. When nurses feel empowered to provide safe and effective care the care they provide is better (Kidd et al., 2014). Improved patient satisfaction results in better Hospital Consumer Assessment of Healthcare Providers and Systems reporting and higher reimbursement rates from CMS (CMS, 2014).

The amount of time required to complete the Chiulli, Thompson, & Reguin-Hartman Acuity Tool took longer than reported. The acuity tool was described to take "about ten seconds

per patient per shift to complete" (Chiulli et al., 2014, p. 12). The time for completion was not the case during the project. It took on average approximately 20-30 seconds per patient to complete, multiplied by five to six patients, twice during a shift, resulting in a loss of two to three minutes per shift. The bigger problem was managing to complete the acuity scoring before the staffing was set for the next shift.

The Orthopedic/Neurology Unit is a busy unit with a high patient turnover. There are approximately one to three admissions on average and just as many discharges for each nursing patient assignment. Many of the surgeries start coming to the unit around noontime. The acuity scoring was to be completed by 1330 and 1730, which were often busy times on the Orthopedic/Neurology Unit. This resulted in the need for the acuity scores to be gathered by the secretary and occasionally, the charge nurses. The patient should take priority over paperwork and nurses were critical of a process that required them to complete acuity scores, which may have led to inconsistency in using objective data to score the patients' acuity.

Since the projected ended, there has been some discussion on other units about the need and desire to try the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. One unit is looking at the tool as a way to retain nurses and improve the quality of patient care. The nurses who floated to the unit from other units have brought the information back to their units and shared their satisfaction with the use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool.

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool, previously used on Medical/Surgical units, had been used to balance workload through the use of objective data. This project was attempted to translate research from balancing nurse workload to determining if it could be used to reduce the number of resuscitation event occurrences through alignment of patient clinical severity and nurse workload indices.

The project was a quasi-experimental design with the independent variable being the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. The tool was not consistently used as prescribed in the project proposal. There was increased adherence by the staff when management and I were present; it was used consistently during the final month of the project. It was during this month that the unit had no resuscitation event occurrences. The final month was also the only month that the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was used consistently and appropriately.

There was little control over the assignments made by the secretary. The unit management attempted to appease the staff while meeting the objectives of the project framework. Some difficulties were the transition back to having the charge nurse make the assignments and to change how assignments were made. Many of the charge nurses did not want to take an assignment that had a lower acuity score than the other registered nurses on the unit. They expressed the fear of looking like they were slacking when everyone else was working hard. Some of the charge nurses felt that since they were in charge, they should have more complex patients, which made it difficult for them to assess the acuity scores and match the nurse's level of expertise and skill with patient assignments (Cathro, 2013).

There was difficulty moving the staff from the traditional volume-based distribution of patients to an acuity-based assignment. The fixation was on the number of patients and not the amount of work patients required. At the beginning of the project, the assignments reflected the number of patients assigned to each nurse. By the third and final month of the project, the assignments reflected the acuity score, in most cases, instead of the number of patients assigned to each nurse. The nurses also felt that, in some cases, the tool did not accurately reflect the clinical severity and nurse workload indicators.

Many of the nurses did not want to change their assignment mid-shift when acuity scores changed. They expressed that they would rather keep the patients they had because they were already familiar with them. Despite the opportunity to decrease their workload, the desire to change was not there. Some expressed concern that if the patient workload was redistributed, then they could be assigned an admission, which would require more work than if they had just kept the assignment they had.

Part of the quasi-experimental application of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was that it was not randomly assigned. The Orthopedic/Neurology Unit was chosen specifically because of the strong managerial support, retention, and longevity of the unit leadership, and limitations on the types of patients admitted to the unit. The acuity tool, when utilized correctly, was applied throughout the unit. While some nurses did not willingly participate, they followed the direction of the unit manager, which allowed for completion of the project.

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was not intended to be a static instrument. The authors purposely did not copywrite the tool in order to allow others to use the tool and make necessary changes to fit the needs of the nursing unit. There were some changes made to the original tool to align with the needs of the Orthopedic/Neurology Unit. The ability to revise the tool as necessary was one of the attributes that made it applicable to this project.

Going forward, incorporating the Chiulli, Thompson, & Reguin-Hartman Acuity Tool with assessment data recorded in the electronic health care record would produce an acuity score for patients and would improve inter-rater reliability, while eliminating the need to have nurses determine the scores mid-shift and having to find each nurse who had not turned in his/her scores.

The intended use of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was further studied in the translation of applicability to be used in alternative ways. Because the tool has not been used in a variety of settings and research for additional applicability, the validity and reliability of the tool have not been established. While this can be remedied through continued use of the acuity tool, the adaptability of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool will require continued application and study in a variety of settings.

Inter-rater reliability between the nursing staff members was a limitation of assessing the acuity of patients. Acuity can vary among staff members due to subjectivity and perceptions of the complexity of care required. The indices can vary between shifts due to changes in patient needs they can change among nursing staff, and there are differences among shifts (Kidd et al., 2014).

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool uses objective data that was part of shift documentation and could be easily mined from the EHR. The scores would be reflected in the unit census as soon as the nurse's charting was complete. The unit acuity scores could then be assessed at any time during a shift and adjustments made to assignments based on the data-driven scores. A similar system is in place for the VSA scores.

Training on the use of the tool was completed by a variety of people. The primary training was done before the start of the project by me, a DNP student. Training for staff nurses who floated onto the unit was completed by the clinical resource leader, charge nurses, and other staff. While the Chiulli, Thompson, & Reguin-Hartman Acuity Tool was relatively easy to use and self-explanatory, it did take time to become familiar with the indices and the scoring categories.

VII. Implications for the DNP in the Advanced Practice Role

The implications for the DNP in the Advanced Practice Role would warrant continued studies to help build the knowledge base of translational research utilizing the application of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. Repeated testing using the acuity tool will help establish reliability in the results. Additional studies utilizing the tool in a greater variety of settings would help establish validity and reliability in the pursuit of scientific knowledge. The results on the Orthopedic/Neurology Unit demonstrated clinical significance; therefore, it would be beneficial to determine if these results could be replicated on other Medical/Surgical units to reduce the number of resuscitation event occurrences. The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was used in this study to reduce resuscitation event occurrences by synergizing the patient clinical severity and nurse workload indicators.

Additional ways this tool could be utilized are in consideration of nurse workload indicators in the development of unit specific nursing competencies. Translational research using the Chiulli, Thompson, & Reguin-Hartman Acuity Tool continues to evolve with other units inquiring about the applicability of the tool on their units. The tool is adaptable, which will augment the use on other units. Inquiry by other units into the research and project demonstrates nurses' desires to improve patient outcomes and helps build the body of knowledge in nursing science.

The DNP leadership skills and understanding of systems-thinking in the implementation of a practice change requires an understanding of the environmental culture in the practice setting. The DNP needs to be able to lead the project through collaboration with stakeholders and managers, rallying support from staff in introducing practice change. Synthesizing new information into the application of practice takes time. As was evident in June with the spike in

the number of resuscitation event occurrences and the experienced resistance to change, staff needed time to be acclimated to the changes being made that were different from their traditional ways of staffing.

Suggestions for improving additional studies would include additional collaboration with staff, management, and administrative personnel in adapting the tool for unit-specific criteria. Using established change theories to incorporate collaboration and adaptation would be beneficial in ownership of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool. Successful implementation would be improved by allowing additional time for acclimation to the implementation of the Chiulli, Thompson, & Reguin-Hartman Acuity Tool.

To establish inter-rater reliability in the application of the tool, the DNP would utilize technology to develop a computer-based learning module (CBL). Computer-Based Learning modules are a method of demonstrating competencies for staff and would be an appropriate learning strategy. Descriptive text or video scenarios would provide additional ways of meeting and assessing learner's competencies through the application of knowledge, skills, and attitudes. Many institutions have mandatory CBL module training for the transfer of knowledge and expectation of applying the knowledge into practice.

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool was based on objective data. While this study used the acuity tool as a paper-based form, the data was available through the Electronic Health Record and could be mined to determine acuity scores based on nursing documentation. This would eliminate the need to ensure nurses were completing the tool and turning their scores over to the charge nurse before staffing assignments needed to be made.

One of the challenges of this study was that the facility staffing office did not take acuity into account when determining staffing for the units. Advocating for policy change in the

delivery of healthcare, the DNP examines the history of nursing policy and how nursing units are staffed based on volume, instead of on patient and workload indicators. Policy development for the facility that addressed staffing needs and alignment of the nurse competencies with the patient needs which would result in positive effects. The nursing staff was better able to provide quality, patient-centered care that was commensurate with their training. The patients would receive more individualized care based on their clinical needs and the nurse's competencies. Balancing workload would improve nurse morale and reduce burnout, fatigue, and despair.

The ANA is advocating for ratios, but acuity needs to be considered in the staffing mix. This project demonstrated the DNP's ability to apply translational research into practice. Patient clinical severity and nurse workload indicators needed to be considered when developing nursing assignments to improve patient outcomes and reduce mortality. Acuity needs to be studied further in the realm of medical-surgical units concerning staffing ratios.

The DNP role as an advocate for healthcare policy realized that there was an opportunity to revise the policy for the role of the charge nurse. The charge nurse was the person who should be most aware of the unit's patients' needs and the competency levels of the nursing staff. The role of the charge nurse should be a foundational piece for further advancement in nursing. The charge nurse was placed in a position of responsibility for the unit for each shift. Having the charge nurse available to aid other staff members, help place admissions, and develop nursing assignments provides an increased level of safety and can improve patient outcomes and satisfaction for both the patient and the staff members.

Policy development and exploring how nursing competencies are evaluated and recognizing nurses for their strengths in clinical practice will improve the quality of care the patient receives and enhance patient outcomes. Leadership should be demonstrated and modeled

in the role of the charge nurse. Being assigned the role of charge nurse should be reserved for those individuals looking to advance their career in a leadership-type role, not just randomly assigned based on taking turns. The DNP was positioned to assist the charge nurse to develop leadership and systems thinking in the development of the nursing assignment and to use objective data to align the patient needs with nurse workload competencies.

The DNP, utilizing the essential competencies, is positioned to incorporate the elements of the curriculum from the DNP program into practice. The ability to adapt the tool as needed made it applicable to a variety of medical-surgical units. The Chiulli, Thompson, & Reguin-Hartman Acuity Tool's original intent was to balance assignments by aligning with nurse competencies with patient clinical severity and nurse workload indicators. The tool could be adapted to help with patient placement in the acute care setting. Much like the Certification and Compliance for the Emergency Medical Treatment and Labor Act, screening methods can be utilized to ensure patients receive the most appropriate care to treat the patient. If the skill-set needed for a patient is not available on a specific unit, then alternatives for placement or staffing could be made.

The clinical practice application demonstrated the adaptability to meet the needs of the different medical-surgical units, such as the Orthopedic/Neurology Unit. It was found that the Chiulli, Thompson, & Reguin-Hartman Acuity Tool had an effect on reducing the number of resuscitation event occurrences on the unit. While there were challenges and resistance to change with the application of the acuity tool, there were positive comments about its use on the unit. Months after the project ended, the staff members from the Orthopedic/Neurology Unit have recalled how effective they thought the tool was. Other medicals-surgical units in the facility are in the process of considering the use of the Chiulli, Thompson, & Reguin-Hartman

Acuity Tool on their units to improve patient outcomes, enhance staff morale, and ensure an equitable balance of staffing assignments.

VIII. Conclusion

This project utilized the Chiulli, Thompson, & Reguin-Hartman Acuity Tool and demonstrated the application of the Essentials of Doctoral Education for Advanced Practice Nursing. The care patients require will continue to increase in complexity. People are living longer with more co-morbid conditions. Medical procedures and the care patients require continue to be more involved. The current trend to shorten patient's hospitalizations and discharge patients will continue. Reimbursement rates are on a downward trajectory and hospital systems, providers, and nursing staff are all expected to do more with fewer resources and reduced compensation. Bundled payments from insurance companies require that the systems all work efficiently and effectively to ensure the patient has the best outcome possible.

Nurses want to feel that they can provide the best care they can. Change in healthcare is a necessity. Nurses want to change, but are challenged by the numerous changes that occur in healthcare. Nurses feel overwhelmed and conflicted when they want a change to distribute the workload of patient care. Changing practice takes time and nurses are so busy that there is resistance to interventions that can improve care delivery.

The ANA legislation for Safe Staffing is gaining support to improve patient safety. The focus is on implementing a ratio standard to improve patient outcomes, reduce nurse fatigue and burnout, thus protecting nurses and making hospital systems more accountable to maintaining safe nursing to patient ratios in all areas of the hospital. While ratios are important, the acuity of patient care also needs to be considered. Nurses want fair and equitable assignments. They want their patients to have a good outcome, and that is where the rewarding part of nursing work lies.

When nurses are overwhelmed by the workload in their assigned patient care groups, their ability to be aware of impending change is challenged and significantly reduced. The need

to find data-driven, objective ways of determining patient clinical severity and nurse workload indicators is necessary. Acuity tools need to be simple, easy to use, and have an appropriate inter-rater reliability. The complex process of development of staffing assignments to ensure decreased resuscitation events, improved patient outcomes and staff satisfaction, and the equitable distribution of workload for patient care make a case for the need to use patient acuity in making assignments. The Chiulli, Thompson, & Reguin-Hartman Acuity Tool has demonstrated that there are ways to equalize nursing assignments to balance patient clinical severity and nurse workload indicators to improve care.

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References

Aiken, L. H., Clarke, S. P., Cheung, R. B., Sloane, D. M., Sochalski, J., & Silber, J. H. (2003). Education levels of hospital nurses and surgical patient mortality. *Journal of the American Medical Association, 290*(12), 1617-1623. doi: 10.1001/jama.290.12.1617

Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J., & Silber, J. H. (2002). Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA, 288*(16). doi: 10.1001/jama.288.16.1987

Altman, D., & Bland, J. M. (1995). Statistics notes: Absernce of evidence is not evidence of absence. *BMJ, 311*(485). doi:10.1136/bmj.311.7003.485

American Heart Association (2016). *Resuscitation fact sheet. Get With The Guidelines.* Retrieved from http://www.heart.org/idc/groups/heart-public/@private/@wcm/@hcm/@gwtg/documents/downloadable/ucm_434082.pdf

American Heart Association (2017). *About cardiac arrest.* Retrieved from http://www.heart.org/HEARTORG/Conditions/More/CardiacArrest/About-Cardiac-Arrest_UCM_307905_Article.jsp#.WNnBRKK1vIU

American Association of Critical Care Nurses. (2016). The AACN Synergy Model for Patient Care. *Synergy Model.* Retrieved from http://www.aacn.org/wd/certifications/content/synmodel.pcms?menu=

American Nurses Association. (2003). *Health Professions Education: A Bridge to Quality: Institute of Medicine Report.* Retrieved from http://www.indiananurses.org/pdf_files/iom_report_4_2003.pdf

American Nurses Association. (2015). *Safe Staffing: The Registered Nurse Safe Staffing Act* (H.R. 876/S. 58). Retrieved from www.anapoliticalpower.org

American Nurses Association. (2016a). *Nurse Staffing.* Retrieved from http://www.nursingworld .org/MainMenuCategories/Policy-Advocacy/State/Legislative-Agenda-Reports/State-StaffingPlansRatios

American Nurses Association. (2016b). *Florence Nightingale Pledge*. Retrieved from http://www.nursingworld.org/FunctionalMenuCategories/AboutANA/WhereWeComeFrom/FlorenceNightingalePledge.aspx

Andrews, T. & Waterman, H. (2005). Packaging: A grounded theory of how to report physiological detrioration effectively. *Journal of Advanced Nursing*, *52*(5), 473-481. Retrieved from http://content.ebscohost.com/ContentServer.asp?T=P&P=AN&K=106387918&S=R&D=ccm&EbscoContent=dGJyMNLe80Seqa84y9fwOLCmr06eprVSs6u4SraWxWXS&ContentCustomer=dGJyMN%2Fk4orj7fFT69fnhrnZ54bf3uoA

Ashcraft, A. S. (2004). Differentiating between pre-arrest and failure-to-rescue. *MedSurg Nursing*, *13*(4), 211-215.

Benner, P. (1984). *From novice to expert: Excellence and power in clinical nursing practice*. Menlo, CA: Addison-Wesley.

Bonnici, T., Gerry, S., Wong, D., Knight, J., & Watkinson, P. (2016). Evalution of the effects of implementing an electronic early warning score system: Protocol for a stepped wedge study. *BioMed Central Medical Informatics and Decsion Making*, *16*(19). doi:10.1186/s12911-016-0257-8

Brewer, B. B., Wojner-Alexandrov, A. W., Triola, N., Pacini, C., Cline, M., Rust, J. E., & Kerfoot, K. (2007). AACN Synergy Model's characteristics of patients: Psychometric analysis in a tertiary care health system. *American Journal of Critical Care*, *16*(2), 158-167. Retrieved from http://web.b.ebscohost.com.ezproxy.cc.andrews.edu/ ehost/ detail/detail?vid=16&sid=38f1073d-bcc1-4363-8ff8-d5ac62443e4f% 40sessionmgr114&hid=123&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#AN=106272888&db=ccm

Burkart-Jayez, S. F. (2014). Information systems/technology and patient care technology for the improvement of and transformation of health care. In M. E. Zaccagnini & K. W. White (Eds.), *The Doctor of Nursing Practice Essentials: A New Model for Advanced Practice Nursing* (2nd ed., pp. 37-60). Burlington, MA: Jones & Bartlett Learning.

Burppert, C. (2017). What's being done about nurse staffing? *Medscape Nurses.* Retrieved from http://www.medscape.com/viewarticle/877838?nlid=113935_2822

Calzavacca, P., Licari, E., Tee, A., Egi, M., Haase, M., Haase-Fielitz, A., & Bellomo, R. (2008). A prospective study of factors influencing the outcome of patients after a Medical Emergency Team review. *Intensive Care Medicine*, *34*(2112). doi: 10.1007/s00134-008-1229-y

Carter, K. F., & Burnette, H. D. (2011). Creating patient-nurse synergy on a medical-surgical unit. *MedSurg Nursing*, *20*(5), 249-254.

Cathro, H. (2013). A practical guide to making patient assignments in acute care. *Journal of Nursing Administration*, *43*(1), 6-9. doi:10.1097/NNA.0b013e3182785fff

Centers for Medicare and Medicaid Services. (2014). *HCAHPS: Patients' perspective of care survey*. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalHCAHPS.html

Chiulli, K., Thompson, J., & Reguin-Hartman, K. L. (2014). Development and implementaiton of a Patient Acuity Tool for a Medical-Surgical Unit. *Academy of Medical-Surgical Nurses*, *23*(2), 9-12.

Choi, S. P., Cheung, K., & Pang, S. M. (2013). A field study of the role of nurses in advocating for safe practice in hospitals. *Journal of Advanced Nursing*, *70*(7). doi: 10.1111/jan.12316. Retrieved from http://content.ebscohost.com/ ContentServer.asp?T=P&P=AN&K=103955395&S=R&D=ccm&EbscoContent=dGJyMNLe80Seqa84y9fwOLCmr06ep7RSs6q4SLSWxWXS&ContentCustomer=dGJyMN%2Fk4orj7fFT69fnhrnZ54bf3uoA

Corwin, L. S., Hengstberger-Sims, C., Eagar, S. C., Gregory, L., Andrew, S., & Rolley, J. (2008). Competency measurements: testing convergent validity for two measures. *Journal of Advanced Nursing*, *64*(3). doi: 10.1111/j.1365-2648.2008.04774.x. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2648.2008.04774.x/abstract;jsessionid=4C7F380BB217B4D2949FA9EB841D0CFA.f04t04

Cronk, B. C. (2008). *How to use SPSS: A step-by-step guide to anaylsis and interpretation* (5th ed.). Glendale, CA: Pyrczak.

Curley, M. A. Q. (1998). Patient-nurse synergy: Optimizing patients' outcomes. *American Journal of Critical Care*, *7*(1), 64-72.

Donahue, L. (2009). A pod design for nursing assignments. *American Journal of Nursing*, *109*(11), 38-40. doi:10.1097/01.NAJ.0000362019.47504.9d

Edwards, D. F. (1999). The Synergy Model: Linking patient needs to nurse competencies. *Critical Care Nurse, 19*(1). Retrieved from http://www.aacn.org/wd/certifications /content/synpract2.pcms?menu

Eldridge, C. R. (2016). In M. E. Zaccagnini & K. W. White (Eds.). *The Doctor of Nursing Practice Essentials: A New Model for Advanced Practice Nursing* (2nd ed., pp. 3-36). Burlington, MA: Jones & Bartlett Learning.

Engelmann, L., Brady, M., Larson, J., Perkins, I., & Schulz, C. (2012). Transforming nursing education: The NLN education competencies model. *Nursing Education Perspectives.* Retrieved from http://www.readperiodicals.com/201205/2697658441.html

Gelinas, L. (2016). Patient assignment vs. nurse staffing: More than just numbers. *AmericanNurseToday.com, 11*(9), 6.

Gelman, A., & Stern, H. (2012). The difference between "significant" and "not significant" is not itself statisitcally significant. *The American Statistician, 60*(4). doi:10.1198/ 000313006X152649

Ghaferi, A. A., & Dimick, J. B. (2015). Understanding failure to rescue and improving safety culture. *Annals of Surgery, 261*(5), 839-840. doi:10.1097/SLA.0000000000001135

Griffin, F. A., & Resar, R. K. (2009). *IHI global trigger tool for measuring adverse events.* Retrieved from http://www.ihi.org/resources/Pages/Tools/ IHIGlobalTriggerToolforMeasuringAEs.aspx

Health Research & Educational Trust. (2016a). Failure to Rescue Change Package: 2016. Chicago, IL: Health Research & Educational Trust. Retrieved from www.hret-hen.org.

Health Research & Educational Trust. (2016b). Participating states and hospitals. *Hospital Engagement Network 2.0.* Retrieved from http://www.hret-hen.org/about/map.dhtml

Hendren, R. (2010). CMS will soon track your failure to rescue data-Are you ready? *Health Leaders Media*. Retrieved from http://www.healthleadersmedia.com/nurse-leaders/cms-will-soon-track-your-failure-rescue-dataare-you-ready?page=0%2C1

Hospital Engagement Network 2.0. (2016). *Failure to Rescue. Health Research & Educational Trust.* Retrieved from www.hret-hen.org/topics/failure -to-rescue.shtml

Howard, D. (2016). Using the Military Medical Acuity Model to guide patient care. *Nursing2016, 46*(1), 14-17. doi:10.1097./01NURSE.0000475493.62149.71

Hravnak, M., Schmid, A., Ott, L., & Pinsky, M. R. (2010). Causes of failure to rescue. In M. A. DiVita, K. Hillman, & R. Bellomo (Eds.), *Textbook of Rapid Response Systems: Concept and Implementation* (pp. 141-150). Philadelphia, PA: Springer.

Hwang, J. (2015). The development and testing of a patient-centred care competency scale for hospital nurses. *International Journal of Nursing Practice, 21*, 43-51. Retrieved from http://content.ebscohost.com/ContentServer.asp?T=P&P=AN&K=103873437&S=R&D=ccm&EbscoContent=dGJyMNXb4kSeqLE4y9fwOLCmr06ep7FSsae4TLCWxWXS&ContentCustomer=dGJyMN%2Fk4orj7fFT69fnhrnZ54bf3uoA

Johnston, M., Arora, S., Anderson, O., King, D., Behar, N., & Darzi, A. (2015). Escalation of care in surgery: A systematic risk assessment to prevent avoidable harm in hospitalized patients. *Annals of Surgery*, 261, 831-838.

Johnstone, M. J., & Hutchinson, A. (2015). 'Moral distress' - time to abandon a flawed nursing construct? *Nursing Ethics, 22*(1), 5-14. doi: 10.1177/0969733013505312

Joint Commission Incorporated. (2012). *Hospital Engagement Network.* Retrieved from http://www.jcrinc.com/about-jcr/hospital-engagement-network/

Jones, B. G. (2013). Developing a vital sign alert system. *Amercian Journal of Nursing, 113*(8), 36-44.

Kalisch, B. J., Gosselin, K., & Choi, S. H. (2012). A comparison of patient care units with high versus low levels of missed nursing care. *Health Care Management Review, 37*(4), 320–328.

Kavanagh, K. T., Cimiotti, J. P., Abusalem, S., & Coty, M.-B. (2012). Moving Healthcare Quality Forward With Nursing-Sensitive Value-Based Purchasing. *Journal of Nursing Scholarship, 44*(4), 385–395. doi.org/10.1111/j.1547-5069.2012.01469.x

Kidd, M., Grove, K., Kaiser, M., Swoboda, B., & Taylor, A. (2014). A new patient-acuity tool promotes equitable nurse-patient assignments. *AmericanNurseToday.com, 9*(3), 1-4.

Kohr, L. M., Hickey, P. A., & Curley, M. A. Q. (2012). Building a nursing productivity measure based on the Synergy Model: First steps. *American Journal of Critical Care, 21*(6). 420-430. doi: 10.4037/ajcc2012859

Krishnan, S. (2011). *2 key assumptions to be aware of before applying the chi-squared test.* Retrieved from http://www.simafore.com/blog/bid/56480/2-key-assumptions-to-be-aware-of-before-applying-the-chi-square-test

Lakeland HealthCare. (2014). Lakeland earns award for electronic health record implementation [Press release]. Retrieved from http://www.lakelandhealth.org/patient-visitor-guide/about-lakeland/newsroom/Detail/Lakeland-Achieves-Electronic-Health-Record-Milestone/7a5c41ad-c230-6723-add8-ff0000ca780f

Landro, L. (2015). Hospitals find new ways to monitor patients 24/7. *Wall Street Journal.* Retrieved from http://webreprints.djreprints.com/3670891403610.html

Lewis, R. (2016). Better nursing environments linked to greater surgical value. *Medscape.* Retrieved from http://www.medscape.com/viewarticle/857550?nlid=97686_2822&src=wnl_edit_medp_nursing

Magnan, M. A. (2016). The DNP: Expectations for theory, research and scholarship. In L. A. Chism (Ed.), *The Doctor of Nursing Practice: A Guidebook for Role Development and Professional Issues* (3rd ed., pp. 117-149). Burlington, MA: Jones & Bartlett Learning.

McGee, E. (2016). Failure to rescue. *Advance Healthcare Network.* Retrieved from http://nursing.advanceweb.com/Editorial/Content/PrintFriendly.aspx?CC=195828

McEvoy, M. (2013). *How to assess and treat acute respiratory distress.* Retrieved from http://www.jems.com/articles/print/volume-38/issue-8/patient-care/how-assess-and-treat-acute-respiratory-d.html

Melnyk, B. M., Gallagher-Ford, L., Long, L. E., & Fineout-Overholt, E. (2014). The establishment of evidence-based practice competencies for practicing registered nurses and advanced practice nurses in real-world clinical settings: Proficiencies to improve healthcare quality, reliability, patient outcomes, and costs. *Worldviews on Evidence-Based Nursing, 11*(1), 5-15.

Michigan Nurses Association. (2017). *Campaign for safer hospitals: Safe patient care act* (MI H.R. 4629, 4630, 4631; MI S. 387, 388, 389). Retrieved from http://www.misaferhospitals.org/

Mund, A. (2014). Healthcare policy for advocacy in health care. In M. E. Zaccagnini & K. W. White (Eds.), *The Doctor of Nursing Practice Essentials: A New Model for Advanced Practice Nursing* (2nd ed., pp. 177-216). Burlington, MA: Jones & Bartlett Learning.

Needleman, J., Buerhaus, P. I., Stewart, M., Zelevinsky, K., & Mattke, S. (2006). Nurse staffing in hospitals: Is there a business case for quality? *Health Affairs, 25*(1), 204-211. doi:10.1377/hlthaff.25.1.204

Nolan, M. R. (2016). The more RNs, the higher the patient survival. *Medscape.* Retrieved from http://www.medscape.com/viewarticle/867620?nlid=109030_785&src=WNL_mdplsfeat_160830_mscpedit_nurs&uac=116995HZ&spon=24&impID=1188260&faf=1

Oh, H., & Seo, W. (2008). Validity for the critical patients severity classification system developed by the Korean Clinical Nurse Association. *Australian Journal of Advanced Nursing, 25*(3), 49-57.

O'Keeffe, M. (2016, September). Practical steps for applying acuity-based staffing. *American Nurse Today, 11*(9). Retrieved from https://www.americannursetoday.com/practical-steps-applying-acuity-based-staffing/

Parker, C. G. (2014). Decision-making models used by medical-surgical nurses to activate rapid response teams. *MedSurg Nursing, 23*(3), 159-164.

Pattison, N., & Eastham, E. (2012). Critical care outreach referrals: A mixed-method investigative study of outcomes and experiences. *Nursing in Critical Care, 17*(2), 71-82. doi: 10.1111/j.1478-5153.2011.00464.x.

Peterson, S. W. (2014). Systems thinking, healthcare organizations, and the advanced pratice nurse leader. In M. E. Zaccagnini & K. W. White (Eds.), *The Doctor of Nursing Practice Essentials: A New Model for Advanced Practice Nursing* (2nd ed., pp. 37-60). Burlington, MA: Jones & Bartlett Learning.

Polit, D. F., & Beck, C. T. (2017). *Nursing Research: Generating and Assessing Evidence for Nursing Practice* (10th ed.). Philadelphia, PA: Wolters Kluwer.

Pope, B. B. (2002). The synergy match-up. *Nursing Management, 114*, 38-41.

Rethman, M. P., & Nunn, M. E. (1999). Clinical versus statistical significance. *Journal of Periodontology, 70*(6), 700-702. doi:10.1902/jop.1999.70.6.700

Royal Children's Hospital (n.d.). *Nursing competency framework: Demonstration of competence.* Retrieved from http://www.rch.org.au/mcpc/nursing_competency_framework/

Sage Publications. (n.d.). *Morse Fall Scale*. Retrieved from http://www.networkofcare.org/library/Morse%20Fall%20Scale.pdf

Schadewald, D., & Pfeiffer, J. (2014). Clinical prevention and population health for improving the nation's health. In M. E. Zaccagnini & K. W. White (Eds.), *The Doctor of Nursing Practice Essentials: A New Model for Advanced Practice Nursing* (2nd ed., pp. 257-300). Burlington, MA: Jones & Bartlett Learning.

Selanders, L., & Crane, P. K. (2012). The voice of Florence Nightingale on Advocacy. *OJIN: The Online Journal of Issues in Nursing, 17*(1). doi:10.3912/OJIN.Vol17No01Man01

Shamliyan, T. A., Kane, R. L., Mueller, C., Duval, S., & Wilt, T. J. (2009). Cost savings associated with increased RN staffing in acute care hospitals: Simulation exercise. *Nursing Economics, 27*(5). Retrieved from http://www.austincc.edu/nursmods/rrc/rrc_lev4/rnsg_2221/documents/Cost_Savings_Associated_with_Increased_RN_Staffing_module_4.pdf

Sherwood, G., & Zomorodi, M. (2014). A new mindset for quality and safety: The QSEN competencies redefine nurses' roles in practice. *Nephrology Nursing Journal, 41*(1). Retrieved from http://web.a.ebscohost.com.ezproxy.cc.andrews.edu/ehost/pdfviewer/

pdfviewer?sid=98da0bcc-3da8-4429-b32c-a380fe23d67e %40sessionmgr4001&vid=16&hid=4104

Shiloh, A. L., Lominadze, G., Gong, M. N., & Savel, R. H. (2016). Early warning/track-and-trigger systems to detect deterioration and improve outcomes in hospitalized patients. *Semin Respir Crit Care Med 2016, 37*(01). 88-95. doi:10.1055/s-0035-1570352.

Silber, J. H., Sankey, V., Krakauer, H., & Schwartz, S. (1992). Hospital and patient characteristics associated with death after surgery: A study of adverse occurrence and failure to rescue. *Medical Care, 30*(7). Retrieved from http://journals.lww.com/lww-medicalcare/Abstract/1992/07000/Hospital_and_Patient_Characteristics_Associated.4.aspx

Sullivan, L. M. (2012). *Essentials of Biostatistics in Public Health* (2nd ed.). Burlington, MA: Jones & Bartlett Learning

Tappen, R. M. (2011). *Advanced Nursing Research*. Sudbury, MA: Jones & Bartlett Learning.

Twigg, D. E., Geelhoed, E. A., Bremner, A. P., & Duffield, C. M. (2013). The economic benefits of increased levels of nursing care in the hospital setting. *Journal of Advanced Nursing, 69*(10), 2253-2261.

Tymkow, C. (2014). Clinical scholarship and evidence-based practice. In M. E. Zaccagnini & K. W. White (Eds.). *The Doctor of Nursing Practice Essentials: A New Model for Advanced Practice Nursing.* (2nd ed., pp. 61-122). Burlington, MA: Jones & Bartlett Learning.

University of California at Davis. (n.d.). *Sampling distributions*. Retrieved from http://pba.ucdavis.edu/files/45001.pdf

Vaartio, H. (2008). Nursing advocacy: A concept clarification in context of procedural pain care. *Turun Yliopiston Julkaisuja Annales Universitatis Turkuensis.* Retrieved from https://www.doria.fi/bitstream/handle/10024/42558/D826.pdf?sequence

Vahabi, S., Noormohammadi, R., & Rahnama, S. (2013). Clinical versus statistical significance in the Iranian postgraduate periodontal theses. *Journal of Education and Ethics in Dentistry, 3*(2), 88-92.

Volchenboum, S. L., & Mayampurath, A. (2016). Association between in-hospital critical illness events and outcomes in patients on the same ward. *JAMA, Journal of the American Medical Association, 316*(24), 2674-2675. doi: 10.1001/jama.2016.15505

Wangensteen, S., Johansson, I. S., & Nordstrom, G. (2014). Nurse competence scale – Psychometric testing in a Norwegian context. *Nurse Education in Practice, 15*, 22-29. doi: 10.1016/j.nepr.2014.11.007. Retrieved from http://content.ebscohost.com /ContentServer.asp?T=P&P=AN&K=103765855&S=R&D=ccm&EbscoContent=dGJyMNXb4kSeqLE4y9fwOLCmr06ep7BSr664SLWWxWXS&ContentCustomer=dGJyMN%2Fk4orj7fFT69fnhrnZ54bf3uoA

Wasserstein, R. L., & Lazar, N. A. (2016). The ASA's statement on p-values: Context, process, and purpose. *The American Statistician, 70*(2), 129-133. doi:10.1080/ 000313052016.1154108

Weiner, J. P., Fowles, J. B., & Chan, K. S. (2012). New paradigms for measuring clinical performance using electronic health records. *International Journal of Quality Health Care, 24*(3), 200-205. Retrieved from www.medscape.com/viewarticle/764288_print

White, K. W. (2014). Emerging roles for the DNP. In M. E. Zaccagnini & K. W. White (Eds.), *The Doctor of Nursing Practice Essentials: A New Model for Advanced Practice Nursing.* (2nd ed., pp. 355-413). Burlington, MA: Jones & Bartlett Learning.

Wielkiewicz, R. M. (2000). Chi-square with SPSS. In R. Runyon, K. Coleman, & D. Pittenger (Eds.), *Fundamentals of Behavioral Statistics* (4th ed.). Retrieved from http://www.mhhe.com/socscience/psychology/runyon/spss/chisquare.html

Appendix A

LAKELAND HEALTH CARE
DEPARTMENT, Ortho/Neuro ***REGISTERED NURSE*** ANNUAL COMPETENCY FORM

Date: 2015-2016 Associate Name: _____ Associate #_____

This form is to be completed by the employee. For each of the performance criteria below, the method of validation is identified and the employee may choose which one to complete, if all methods are to be completed or if a validator's signature is required. Return the completed form to your department manager no later than September 1, 2016. If you complete it before September 1, 2016, please turn it in!

Performance	Method of Validation	Documentation of method of validation	References for the associate
Universal Performance Criteria			
Diabetes Management	Complete the following online modules as well as the assessments for the modules: http://ondemand.mopi16.com/lakelandhealthcare **Complications**: Hypoglycemia Hyperglycemia Diabetic Ketoacidosis (DKA) Hyperglycemic Hyperosmolar State (HHS) **Medication Options:** Non-Insulin Medications Insulin Therapy Insulin Pumps	Complete the modules and the assessments for **Complications** and **Medication Options**; attach the certificates of completions to this document. Certifications can be printed from the Reward tab.	Here is the website to access the modules and assessments: http://ondemand.mopi16.com/lakelandhealthcare . You will use your Lakeland username and password to access this site.

Performance	Method of Validation	Documentation of method of validation	References for the associate
EMMI – patient education videos	You must order at least one EMMI video and document that the patient has viewed the video in the Education activity. This must be performed on three (3) patients. Education activity on three (3) patients: #1 MRN: _____ Date: _____ #2 MRN: _____ Date: _____ #3 MRN: _____ Date: _____	Document three (3) patients that you have ordered EMMI videos and had the patient view them and documented that in the Education activity in EPIC.	References found on the Intranet: Our Directory Lakeland University Patient Education Emmi Orders & Tablet Use.
Culture of Safety	You must complete the two (2) assigned eLearnings in myLearning: #1 PowerPoint entitled: Culture of Safety-What I Need to Know. #2 Recognizing unsafe patient practices - video	You will need to complete the two (2) assigned eLearnings. They will be assigned at different intervals: #1 – live November, 2015 # 2—live January, 2016.	Please monitor your myLearning account for these assigned eLearnings. Once you have completed them, they will be placed on your transcript.
Department Specific Criteria			

Performance	Method of Validation	Documentation of method of validation	References for the associate
PICC/ PORT **STERILE DRESSING CHANGE**	Demonstrate a sterile dressing change on a PICC or Demonstrate accessing a port and a sterile dressing change. Verbalizes how to declot a PICC Line.	PICC Validator Observation _____ PORT Validator Observation _____ Validator Observation _____	PICC & Midline Catheter Insertion & Care Policy L6000-083 Port, Accessing and Care Policy L6000-082 Central Line Declotting L6000-L6000-232
CPM	Demonstrates proper setup, patient education and documentation of the CPM	CRN/ Validator Initials/Date: _____	Policies/Patient Care Services/CPM MACHINE .6000-189.docx
URINARY CATHETER INSERTION	Watch the Bard SureStep Urinary Catheter tray Video on the Intranet/Our Directory/Lakeland University/Education/ Clinical Education/ Videos Demonstrate and complete Urinary Catheter insertion Check list	Return completed checklist to Manager	Bard SureStep Urinary Catheter tray Video Intranet/Our Directory/Lakeland University/Education/ Clinical Education/ Videos Policy: Urinary Catheter L6000-323
BUCKS TRACTION	Demonstrates proper setup of Bucks Traction	CRN/ Validator Initials/Date: _____	Policy: Traction, Care of Patient L6000-178

Performance	Method of Validation	Documentation of method of validation	References for the associate
INTAKE AND OUTPUT	Demonstrates accurate documentation of I&O's	CRN/ Validator Initials/Date: 1)_____ 2)_____	Policy: Intake and Output L6000-080

1. **myLearning Requirements: Complete/sign attached myLearning Requirement form for your specific department. Attach <u>completed</u> myLearning documentation sheet to this form.**

2. **BLS / ACLS expiration dates: Attach copy of most current BLS/ACLS cards.**

3. **Complete 4 successful IV Sticks to be signed off by another RN. 1st one by House Supervisor/ Manager/ CRN/ Educator. If approved, then following ones by any staff RN.**
   a. **Date: _____ RN Signature: _____**
   b. **Date: _____ RN Signature: _____**
   c. **Date: _____ RN Signature: _____**
   d. **Date: _____ RN Signature: _____**

   OR

   Attend IV Access Class; Attach certificate. Date completed: _____

4. **NIHSS Certification--Required to complete online every 2 year (identify year completed or attach certificate of completion) (Required A3, Ortho/Neuro, PCU, ICU, CCU, ED) Date:_____ (http://nihss-english.trainingcampus.net/uas/modules/trees/windex.aspx)**

I, the undersigned, acknowledge that I have completed one of the methods of validations identified above for each Performance Criteria and have included the appropriate documentation required as stated for each.

Associate's Signature: _____ Date: _____

Unit Manager's Signature: _____ Date: _____

Validators Signature_____ Printed Name_____

Validators Signature_____ Printed Name_____

Validators Signature_____ Printed Name_____

Validators Signature_____ Printed Name_____

Return to Manager/ Director

Appendix B

Durham Raleigh Acuity Tool

DRAH 5th floor Acuity Tool	2 ✓ Stable Patient Typical Workload		3 ✓Complex Patient Increased Workload		4 ✓ High Risk Highest Workload	
Clinical Severity Indicators						
Assessment	Q4 hour, Alert and oriented CIWA score <= 7		Q2 hour Confused w-w/o sitter CIWA score >7		Q1 hour or 1:1 Care Deteriorating LOC Delirium (Post-op or DT)	
Respiratory	Stable Room Air or NC<=2L O2		Treated, NC>2L, nasal CPAP Continuous Pulse Ox		Compromised/At Risk Masks, BIPAP, Full face CPAP	
Cardiac	BP, HR +/- 15% of Baseline, Medical pt w/monitor		Changes BP/HR/Rhythm Post-op monitor, AICD/ Pacemaker		Unstable Rhythm, New atrial fib, Frequent ectopy	
Medications and Therapeutic Protocols	PO/IVPB, TPN, BG AC HS 0300, Q6, Q4 Mg / K protocols		Blood administration BG w/ Carb Ct, 2hr PC, Heparin Drip, CBI		2 or more Transfusions Fluid Bolus for BP, UOP, Endotool, insulin drip	
Drainage Devices	JP, Hemovac, NGT, Pneumostat, Heimlich, CT Waterseal, Truvent		Q2 Hr measure→ any CT to Suction, Pleurx, NG/J-Tube with Feeding		Q1 Hr measure →ie. lumbar drain 2 or More CT to Suction CT Output >100ml/2hr	
Pain Management	PO, Q4 IV, PCA, OnQ		Paravertebral, Epidural, Intrathecal		Uncontrolled Pain, Multiple Device	
Nurse Workload Indicators						
Admit/DC/Transfer	Post-op, Routine DC, Inpatient – staying		Post-op (first 24 hours) Complex DC, Admit/Transfer In		Post-op (complicated) Transfer to higher level	
Education and/or Psychosocial	Calm, Cooperative		Anxious, Service Recovery EBP Education Protocol BluePhone/Translator		Highly Agitated 1:1 Extensive patient /family service recovery	
Wound/Ostomy/ Continence	QD/BID Dressing by RN Wound Vac, Ostomy 1 assist to BR/Bedpan		TID Dressings by RN, High Output Ostomy Enemas or Bowel Prep		Dressing >30min >TID Multiple Wound Vacs Q1 Toilet/Incontinence	
ADLs and Isolation	Independent of ADL 1 person assist w/ADL Standard Precautions		Turns Q2 hours, 2 person assist for OOB Isolation – all types		Para- or Quadraplegic Total Care	
	All 2s makes a "2"		**Any 3 makes patient a "3"**		**Any 4 makes patient a "4"**	

The Chiulli, Thompson, & Reguin-Hartman Acuity Tool provides objective indicators for clinical severity indicators and nurse workload indicators. The scale rating is a 2 (stable), 3 (complex), and 4 (high risk). Any score at a higher level, automatically moves the patient to that score (Chiulli, et al., 2014, p. 10).

Appendix C

Orthopedic/Neurologic Unit Acuity Tool

O/N Acuity Tool	2 ✓ Stable Patient Typical Workload		3 ✓ Complex Patient Increased Workload		4 ✓ High Risk Highest Workload	
Clinical Severity Indicators						
Assessment	Q4h VS/Neuro ✓, A &O, CIWA score </=7		Q2h VS/Neuro ✓, Confused, CIWA score >7		Q1h or 1:1 care, deteriorating LOC, Delirium (post-op/DTs)	
Respiratory	Stable Room air or NC</=2L O_2		Treated NC>2L, nasal CPAP, Continuous Pox		Compromised/At Risk Masks, BiPAP, Full face CPAP	
Cardiac	BP,HR, +/- 15% of baseline, telemetry		Changes in BP/HR/Rhythm Post-op monitoring/Epidural AICD/Pacemaker		Unstable rhythm, New Afib, freq ectopy	
Medications/ Therapeutic Protocols	PO/IVPB, TPN, BSM ac/hs/q 4-6h Mg/K^+ protocols		Blood administration, Q 2h pain control, Heparin IV, CBI		>2 transfusions, fluid boluses for BP/UOP, Amiodarone, DOPAmine/DOBUtamine, drip	
Drainage Devices	JP/Hemovac, NGT, Thoradrain/CT		Q2h measure of CT, NG/J/G-Peg tube w/feeding		Q1h measurement of CT, 2 CT, or >100mL/>2h CT output	
Pain Management	PO, Q4h IV, PCA		Nerve block/Epidural,		Uncontrolled pain, Multiple devices	
Nurse Workload Indicators						
Admit/DC/Transfer	Post-op, Routine DC, In-pt staying		Post-op (1st 24h), Complex DC, Admit/Transfer in-pt.		Post-op (Complicated) Transfer to a higher level of care, Rapid Response	
Education and/or Psychosocial	Calm, Cooperative		Anxious, Service Recovery, EBP Education Protocol, Interpreter/Translator		Highly Agitated 1:1, Extensive patient/family service recovery	
Wound/Ostomy/ Continence	QD/BID/Dressing by RN, Wound Vac, Ostomy, 1 person assist to BR, Bedpan		TID Dressings by RN, High Output Ostomy, Enemas or Bowel Prep		Dressing >30 min>TID Multiple Wound Vacs, Q1h toileting/Incontinence	
ADLs and Isolation	Independent ADLs, 1 person assist w/ADLs, Standard Precautions		Turn Q2h, 2 Person assist OOB, Isolation – all types		Para/Quadraplegic Total Care	
	All 2s make a "2"		**Any 3 makes a patient a "3"**		**Any 4 makes a patient a "4"**	

Adapted from Chiulli et al., 2014.

Appendix D

National Institutes of Health Certificate

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Tanya Sobaski** successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 01/13/2016

Certification Number: 1950263

Appendix E

Permission from Facility to Conduct Research

Lakeland HealthCare
Medical Excellence. Compassionate Care.

March 15, 2016

To whom this may concern:

Tanya Sobaski, RN, Doctor of Nursing Practice (DNP) student, has proposed to conduct a Capstone Process Improvement Project on the Orthopedic Neurology Unit at Lakeland Hospital, St. Joseph, MI.

This serves as a letter of intent for Lakeland to be supportive and open to this project completion at the facility.

The Capstone Project is based on the implementation of acuity tool based on patient characteristics and nurse and unit competencies to reduce the number of failure to rescue (code blues).

This letter is not a binding agreement and does not supersede the Internal Review Processes of Andrews University or Lakeland HealthCare.

Regards,

Eileen M. Willits

Eileen Willits, PhD.
VP Patient Care Services

1234 Napier Avenue, St. Joseph, MI 49085 ◦ (269) 983-8300 ◦ www.lakelandhealth.org

Appendix F

Permission to Use the Acuity Tool

Thompson, Jackie

March 23, 2016
10:41 AM (7 hours ago)

to
me

Hello Tanya,

Yes – you have my permission. The tool was never copyrighted by our employer (myself and Kathy Chiulli) at the time, Duke University Health System.
I was informed by their nurse scientist that this means anyone can use the tool.

The intention is that the tool is not used verbatim, but that you use the iterative process to develop a unit-specific tool for your work group.

Please keep me informed on your progress – I would love to know how your project turns out.

Jackie Thompson

Jackie Thompson MSN RN
Stroke Program Coordinator
UNC Rex Healthcare
4420 Lake Boone Trail
Raleigh NC 27607

919-784-2054 Office

jackie.thompson@unchealth.unc.edu

Appendix G

Andrews University IRB Approval

Andrews University
Office of Research & Creative Scholarship

May 18, 2016

Tanya Sobaski
Tel. 269326-1610
Email: sobaski@andrews.edu

RE: APPLICATION FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS
IRB Protocol #:16-065 **Application Type:** Original **Dept.:** Doctor of Nursing Practice
Review Category: Exempt **Action Taken**: Approved **Advisor:** Cynthia Small
Title: The effect of implementation of an acuity tool for medical-surgical patients in an acute care setting.

Your IRB application for approval of research involving human subjects entitled: *"The effect of implementation of an acuity tool for medical-surgical patients in an acute care setting" IRB protocol #* 16-068 has been evaluated and determined Exempt from IRB review. You may now proceed with your research.

Please note that any future changes (see IRB Handbook pages 11-12) made to the study design and/or informed consent form require prior approval from the IRB before such changes can be implemented. Incase you need to make changes please use the attached report form.

While there appears to be no more than minimum risks with your study, should an incidence occur that results in a research-related adverse reaction and/or physical injury, (see IRB Handbook pages 12) this must be reported immediately in writing to the IRB. Any research-related physical injury must also be reported immediately to the University Physician, Dr. Reichert, by calling (269) 473-2222.

We ask that you reference the protocol number in any future correspondence regarding this study for easy retrieval of information.

Best wishes in your research.

Sincerely,

Mordekai Ongo
Research Integrity and Complaince Officer

Institutional Review Board - 4150 Administration Dr Room 322 - Berrien Springs, MI 49104-0355
Tel: (269) 471-6361 Fax: (269) 471-6543 E-mail: irb@andrews.edu

Appendix H

Facility IRB Approval

Lakeland Hospitals
Niles and St. Joseph IRB #1

To: Tanya Sobaski, RN, Doctor of Nursing Practice (DNP) Student

Re: Capstone Process Improvement Project – Orthopedic Neurology Unit at Lakeland Hospital, St. Joseph, MI

Date: May 10, 2016

This is to inform you Lakeland Hospitals Niles and St. Joseph, IRB# 1 has approved the above research study to be conducted at Lakeland Health Care. The study has been determined to be exempt according to our Standard Operating Procedures and Claim of Exemption Checklist.

Please send a final report upon completion of the study.

The IRB operates in compliance with GCP and applicable laws and regulations to the best of its knowledge. The IRB consists of members of the clinical and scientific communities, non-scientists, as well as members of the community as required by Federal regulations to assure a fair and thorough review process.
It is not the Institution's policy to submit individual lists of IRB members. I can assure you, however, that a quorum of the members were present at the meeting to authorize the chairperson to make decisions regarding a studies exemption status. Lakeland Hospitals Niles and St. Joseph, IRB# 1 is registered with the Office for Human Research Protections (OHRP). Please refer to OHRP's Web site for at http://ohrp.osophs.dhhs.gov/irbasur.htm for a list of registered IRBs.

Please call me if you have any questions. The IRB wishes you success with this research.

Jann Totzke

Jann Totzke, IRB Chairperson
Lakeland Hospitals Niles and St. Joseph, IRB# 1

Lakeland Hospitals at Niles and St. Joseph,IRB
Marie Yeager Cancer Center ● St. Joseph, MI 49085-1258 ● (269)556-7168
www.lakelandhealth.org

Appendix I

Example of Unit Assignments Worksheet

Paige CN III		Gigi CN IV		Ashley CN II	
Room #	Acuity	Room #	Acuity	Room #	Acuity
5200	3	5233	4	5201	2
5203	4	5234	4	5204	2
5210	3	5222	2	5206	2
5212	2	5221	3	5224	2
				5226	3
Helen CN IV		**Ellen CN III**		**Betsy CN IV**	
Room #	Acuity	Room #	Acuity	Room #	Acuity
5209	4	5235	2	5224	3
5207	4	5238	3	5228	3
5236	3	5240	3	5229	2
5237	3	5215	3	5230	3
		5212	3	5232	3

Example of Unit Assignment sheet completed by the charge nurse. Patient assignments based on acuity to balance the workload (Chiulli, 2014, p. 12). In this example, nurses are listed by their first names and level of competency or experience indicated by Roman numerals, with a II being less experienced than a IV.

Appendix J

Unity Acuity Score Worksheet

Unit Acuity Scores

Date_____ Shift_____

Rm	Acuity Score
1020	_____
1021	_____
1022	_____
1023	_____
1024	_____
1025	_____
1028	_____
1029	_____
1030	_____
1031	_____
1032	_____
1033	_____
1034	_____
1035-1	_____
1035-2	_____
1036-1	_____

Rm	Acuity Score
1036-2	_____
1037	_____
1038	_____
1039	_____
1040	_____
1041	_____
1042	_____
1043-1	_____
1043-2	_____
1044-1	_____
1044-2	_____
1045	_____
1046	_____
1047	_____
1048	_____
1049	_____