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# Quality and Safety Education in Newly Hired RNs and RNs in Staff Leadership Roles

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QUALITY AND SAFETY EDUCATION IN  
NEWLY HIRED RNs AND RNs IN STAFF LEADERSHIP ROLES

Dennis Alan Bertch

A Dissertation Submitted to the Faculty of  
GRAND VALLEY STATE UNIVERSITY

In

Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF NURSING PRACTICE

Kirkhof College of Nursing

December 11, 2012

## **Dedication**

This scholarly project is dedicated to my wife, Julie, for without her unwavering support and encouragement I could have never achieved so much in my nursing career.

## **Acknowledgements**

I would like to acknowledge Dr. Cynthia Coviak, Committee Chair, for her insight, scholarship, and guidance along my journey to complete this project. I appreciate the input and support of my committee members Dr. Rebecca Davis, Dr. Stephen Borders, and Lois VanDonselaar. I am indebted to Lois VanDonselaar for her commitment and willingness to facilitate my educational transformation allowing me the opportunity to learn and grow forever raising the standard for excellent patient care.

## Abstract

The intent of this project was to examine the potential knowledge, skills, and attitudes (KSA) gap of practicing bedside registered nurse (RN) care providers regarding the quality and safety education for nurses (QSEN) core competencies. Based on this perceived gap two key questions were explored: (a) do newly hired RNs and RNs in staff leadership roles demonstrate an understanding of the KSAs of the QSEN core competencies?; and (b) was there a difference in the understanding of the KSAs of the QSEN core competencies related to RN educational preparation, years of RN experience, and/or previous quality improvement training within and between each group?

This evidence-based project assessed and compared the KSAs of the QSEN core competencies in two groups of RNs at a tertiary healthcare facility using the Quality Improvement Skills, Knowledge, and Attitudes (QulSKA) questionnaire (Dycus & McKeon, 2009). In this quality improvement project RNs in staff leadership roles demonstrated a greater understanding of the QSEN core competencies for informatics when compared to newly hired RNs. Overall, on average, participants scored 69.2% on the knowledge portion of the QulSKA with newly hired RNs scoring 67.6% and RNs in staff leadership roles scoring 72.1%. These scores were not significantly different.

The mean self-rating of skill proficiency on the QSEN core competencies was 2.91 on a six-point Likert-type scale for both groups (1 = novice; 6 = expert). The nurse's role was perceived as important to highly important for each of the QSEN core competencies.

The results of this project will be used to inform the development of an organization specific evidence-based interventional strategy that is strategically aligned

and enhances the institution's *culture of safety* initiatives. If the QSEN core competencies are used as an assessment tool, organizations could align their findings to inform and develop ongoing flexible educational interventions that address areas of need in the practice setting and contribute to enhanced quality and safety outcomes.

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## Chapter One

### Introduction

In 2007, the World Health Organization (WHO) recognized patient safety as a healthcare priority. Over the last ten years several national commissions have reported and documented multiple problems related to quality and safety within the health care system of the United States. These commissions have also concluded that if health care is to improve, providers need to be equipped with a different set of competencies than those currently included in core healthcare educational programs, as well as continuing educational offerings.

In 2003, the Institute of Medicine (IOM) published *Health Professions Education: A Bridge to Quality*. This document delineated several recommendations for improving professional healthcare education competencies regarding quality and safety. According to this report the health professions' formal education programs lacked evidence-based curricula, and teaching was guided by personal beliefs and opinions dominated by intuition and tradition instead of scholarly inquiry (Li & Kenward, 2006). The report recognized the need to include quality and safety content within the curriculum of all healthcare professionals' education (Day & Smith, 2007) with the expected outcome that patient care quality and safety would subsequently be positively impacted. More specifically the IOM (2003) challenged academia to develop and implement teaching/learning strategies consistent with their curricula whereby health professional graduates would acquire competencies in patient-centered care to practice as members of an interdisciplinary team, integrating evidence-based practice, applying quality improvement, and utilizing informatics.

Data from the IOM (2003) defined the five core competencies for health professionals. Stevens and Staley (2006) further described characteristics of health professionals who attained each of the IOM (2003) competencies. Healthcare professionals competent to *provide patient-centered care* are able to identify, respect, and care about patients' differences, values, preferences, and expressed needs; relieve pain and suffering; coordinate continuous care; listen to, clearly inform, communicate with, and educate patients; share decision-making and management; and, continuously advocate disease prevention, wellness, and promotion of healthy lifestyles, including a focus on population health. *Working in interdisciplinary teams* requires collaborating, cooperating, communicating, and integrating care in healthcare teams to ensure that care is continuous and reliable. A health professional competent in *employing evidence-based practice* integrates best research with clinical expertise and patient values for optimum care, and participates in learning and research activities to the extent feasible. *Applying quality improvement* requires one to identify errors and hazards in care; to exhibit understanding and to implement basic safety design principles, such as standardization and simplification; to continually understand and measure quality of care in terms of structure, process, and outcomes in relation to patient and community needs; and to design and test interventions to change processes and systems of care, with the objective of improving quality (Stevens & Staley, 2006). A competent health care professional *utilizing informatics* would be characterized as able to effectively communicate, manage knowledge, mitigate error, and support decision making using information technology.

From the IOM (2003) report, the *Quality and Safety Education for Nurses* (QSEN) initiative was created with support from the Robert Wood Johnson Foundation.

In 2006 QSEN was initiated and led by Dr. Linda Cronenwett, Dean and Professor at the University of North Carolina, Chapel Hill, School of Nursing. The QSEN team included expert content and pedagogical representation from graduate, baccalaureate, associate, and diploma pre-licensure nursing programs. The QSEN team adapted the five IOM (2003) quality and safety healthcare education competencies, expanding these to six core competencies or domains for nursing. QSEN defined the six core competencies and developed recommendations regarding how best to infuse the competencies into all levels of nursing education. When actualized, QSEN's recommendations are expected to prepare the next generation of nurses with the requisite knowledge, skills, and attitudes believed essential to improving patient care quality and safety.

According to Sullivan (2009), QSEN's primary goal was to transform nursing's professional identity. This transformation was to include not only key nursing attributes of caring, knowledge, and integrity as the core of its practice, but also the ability of nurses to consistently demonstrate quality and safety competencies. Therefore, QSEN's challenge was to define the core competencies and develop recommendations on how best to infuse these competencies into all levels of nursing education, preparing the next generation of nurses with the required knowledge, skills, and attitudes believed to be essential to improving patient care quality and safety outcomes.

### **QSEN Competencies**

Nursing has long valued quality and safety competencies, as evidenced by its multiple professional publications devoted to quality and safety topics, standards of practice, and accreditation guidelines. However, nursing has not yet achieved consensus on those essential competencies that would apply to all nurses, further defining what it

means to be a respected and qualified professional (Cronenwett, et al., 2007). Sullivan (2010) described QSEN's work as an attempt to unite nursing education and practice. However, absent from the work of the QSEN team is the process of effectively integrating the knowledge, skills, and attitudes of the QSEN core competencies into the ongoing education and development of practicing bedside clinicians irrespective of their formal pre-licensure educational preparation. More specifically one might ask, do practicing acute-care registered nurses (RNs) demonstrate an understanding of the knowledge, skills, and attitudes of the QSEN core competencies? And, is the practicing bedside clinicians' understanding of the knowledge, skills, and attitudes of the QSEN core competencies a result of a difference in RN pre-licensure educational preparation, years of experience as an RN, and/or employment status?

A potential gap exists in the continuing education paradigm of practicing RNs related to quality and safety. Sherwood (2012) advocated that practicing nurses be able to recognize quality and safety issues in their practice setting. This requires a change in mindset, as many practicing nurses are unaware of the scope of quality and safety problems and have had little to no formal or ongoing education on quality improvement processes to inform systematic changes contributing to a just culture (Sherwood, 2012).

QSEN's work to date can be separated into three distinct phases. Phase one involved clearly defining the quality and safety competencies. Phase two focused on identifying and sharing effective teaching/learning strategies for quality and safety topics. Finally, phase three included facilitating faculty preparation and convening a national safety forum to focus on quality and safety in nursing education. Again, missing from

QSEN's work was a plan to address the education and development of the practicing nurses to acquire the knowledge, skills, and attitudes of the QSEN core competencies.

Work in the first phase of the QSEN initiative centered on assessing the current environment, and engaging key stakeholders. This work resulted in the development and definition of the quality and safety competencies. The QSEN competencies are expected to be applied to all registered nurses across all practice settings. That is, regardless of educational preparation and whether working in hospitals, clinics, community mental health centers, long term care, or private practice, nurses in every specialty must meet the six core competencies (Fetter, 2009).

Phase two of the QSEN initiative focused on facilitating learning collaboratives among pilot schools and achieving consensus on the QSEN graduation competencies. In this phase a variety of nursing schools volunteered to be a part of this initiative. A majority of these schools were baccalaureate schools. As well, a Delphi study was used to reach consensus on the QSEN competencies.

In phase three the QSEN team was tasked with identifying multiple approaches to faculty development and integrating the core competencies into textbooks, licensure expectations, and accreditation standards. Over time it is anticipated that the competencies will guide curricular development in pre-licensure and graduate nursing programs, transition to practice models, and continuing education offerings. These uses then provide a framework for regulatory bodies that set standards for initial licensure and re-licensure, certification, and accreditation of nursing education programs (Cronenwett, et al., 2007).

The QSEN core competencies are patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. QSEN further delineated each core competency within the context of knowledge, skills, and attitude sub-competencies, each considered essential for development not only as a component of the pre-licensure nursing education process, but as a part of graduate education and continuing professional education attributes.

### **QSEN's Impact on Nursing Education and Practice**

Three years before QSEN, Long (2003) aligned the IOM (2003) core competencies for healthcare professionals with the 1998 American Association of Colleges of Nursing's (AACN) *The Essentials of Baccalaureate Education for Nursing Practice*. At that time, Long (2003) identified seven recommendations for baccalaureate nursing education programs. The recommendations included developing a common language throughout healthcare disciplines to ensure each discipline understood the core competencies in the same way; incorporating the core competencies into the accreditation, licensure, and certification process; implementing competency-based assessments for licensure and certification; developing demonstration learning centers creating education-practice partnerships; changing healthcare funding to encourage interdisciplinary education and practice; researching relationships between core competency education and actual health outcomes; and, measuring the core competencies in relation to national healthcare goals (Long, 2003). Following the initial work by Long (2003), the AACN, in 2008, revised *The Essentials of Baccalaureate Education for Professional Nursing Practice* to include the IOM (2003) core competencies.



Smith, Cronenwett, and Sherwood (2007) identified the need to make significant changes in curricula if students were to graduate possessing a basic level of competency in quality and safety practices as identified and defined by the QSEN initiative. The QSEN core competencies do not differentiate knowledge, skills, and attitudes within or between pre-licensure nursing programs (baccalaureate, associate, or diploma) nor do they differentiate knowledge, skills, and attitudes of the practicing bedside provider. The six core competencies are no different for the baccalaureate graduate, when compared to the associate graduate, or the graduate from a diploma school of nursing. In fact, these same competencies are applicable to all pre-licensure graduate level nursing students. In essence, the QSEN competencies were developed with all levels of pre-licensure education in mind (Brown, Feller, & Benedict, 2010).

During phase two of QSEN's existence, 15 schools of nursing representing baccalaureate degree, associate degree, and diploma education participated in a learning collaborative focused on facilitating the integration of the six QSEN competencies into their specific curricula (Barton, Armstrong, Preheim, Gelmon, & Andrus, 2009). The schools of nursing represented during phase two were heavily weighted toward the baccalaureate degree with only two associate degree programs participating. At the University of South Dakota (USD), one of only two associate degree pilot programs that participated in this phase of the QSEN project, faculty developed what they described as creative alternative teaching strategies for students. These were viewed as key accomplishments when the QSEN competencies were integrated within their curriculum. After extensive review of the research and standards the USD decided to use the QSEN competencies as their overarching programmatic learning objectives. The authors claimed

that as a result of their involvement in the QSEN project the USD nursing program enhanced didactic and clinical learning through curriculum revision, developed a clinical tool kit, implemented simulation activities consistent with the QSEN competencies, and developed alternative teaching strategies (Brown et al., 2010). However, their claims were not quantified in relation to outputs as might be measured in enhanced student performance in the clinical environment, National Council Licensure Examination – Registered Nurse (NCLEX-RN) results, graduate performance in the clinical setting, employer satisfaction and feedback, or reported demonstrable improvement in patient care quality and safety outcomes.

Dycus and McKeon (2009) used the QSEN competencies to develop a Quality Improvement Knowledge, Skills, and Attitudes (QulSKA) questionnaire to measure practicing pediatric oncology nurses' quality knowledge, skills, and attitudes. Overall, the respondents' average knowledge score was 69.2%, with 82.9% being the highest mean score achieved for safety and the lowest for teamwork, at 48.6%. The findings suggested that those pediatric oncology nurse respondents were knowledgeable in quality improvement, yet lacked skills in practice application. Although not generalized, these findings suggest that the pediatric oncology nurse respondents needed additional exposure to and integration of the QSEN core competencies in their practice environment. This could be accomplished by incorporating quality and safety knowledge, skills, and attitudes into the pediatric certification examination and continuing education offerings. Of note as reported, their findings do not differentiate respondents by educational background or inclusion of the QSEN core competencies within their pre-licensure preparation.

Barton et al. (2009) stated “traditional nursing curricular models do not adequately address the current complexity of healthcare systems and the need for nurses to serve as care providers, care designers, managers, coordinators of care, and as members of interprofessional healthcare teams” (p. 314). Barton et al. (2009) believed the QSEN competencies and their associated knowledge, skills, and attitudes provided a map and the tools to redesign the traditional nursing curricula and address quality and safety outcomes using a systems approach. As such, using a modified web-based Delphi survey involving 18 subject matter experts, consensus was achieved on 152 of the 162 identified QSEN knowledge, skills, and attitudes. Their work helped determine the level at which each competency would be introduced, and which knowledge, skills, and attitudes would be emphasized within pre-licensure registered nurse curricula. Their findings suggest an emphasis on individual patients early in the curriculum, with a shift to teams and systems later in the curriculum. Newer and increasingly complex concepts were considered more appropriate in advanced courses. Overall, their work in curriculum redesign, as defined by QSEN and other national initiatives, was to better prepare nursing graduates to enter the health care environment to function effectively as vital participants in, and contributors to, complex health systems. The outcomes of their work do little to address differences in pre-licensure nursing education preparation.

Sherwood and Drenkard (2007) discussed the need to develop strategic partnerships between practice and education to effectively address quality and safety competencies as applied in the practice environment, with their corresponding implications in transforming the nursing educational experience. Sherwood and Drenkard (2007) determined that the gap between practice and education must be bridged if

academia is to redesign the clinical learning experience, facilitating a rich experiential learning opportunity appropriate for students to transition into practice.

Debourgh (2012) further explored this relationship as part of a Synergy Partnership Model between academia and a healthcare service provider involving third-semester, prelicensure, clinical nursing students and the clinical practice setting. Survey data revealed moderate to large effect sizes in gains for safety and quality knowledge and for students' perceptions of increased confidence to impact patient care outcomes (Debourgh, 2012).

For the most part, the literature regarding the QSEN competencies has focused extensively on integrating the QSEN competencies into the pre-licensure nursing education curricula to include theory, lab, and clinical, as well as facilitating faculty professional development and the development of alternative teaching/learning strategies. However, gaps in the initiative include identifying and systematically understanding the level of knowledge, skills, and attitudes possessed by the practicing bedside nurse regarding the QSEN core competencies. Additionally, how that understanding is carried out, and the measurement of the impact on patient care quality and safety is not known. Nurses who can demonstrate the knowledge, skills, and attitudes of the QSEN core competencies are expected to positively impact patient care quality and safety. Understanding that the development and implementation of the QSEN core competencies is a critical component of nursing pre-licensure educational preparation and is relatively new, the challenge becomes assessing, measuring, and effectively addressing the practicing bedside clinician's knowledge, skills, and attitudes relative to the competencies.

Pre-licensure students need to be able to actively observe and connect the knowledge, skills, and attitudes of the QSEN core competencies within the practice setting. This critical connection occurs when and if the pre-licensure student consistently observes and models the QSEN core competencies demonstrated by the bedside clinician on a day-to-day basis reinforcing the relationship between pre-licensure educational preparation and the clinical environment. The student develops a sense of salience about what is important and unimportant (Benner, Sutphen, Leonard, & Day, 2010). Students need to understand the relevance, demands, resources, and constraints that practicing nurses confront in their daily work schedule in a variety of patient care situations that affect quality and safety outcomes. It is the practice connection of the knowledge, skills, and attitudes of the QSEN core competencies to the development of the student in the clinical environment that will ultimately legitimize the integration of education and practice. Initially the knowledge, skills, and attitudes of the practicing bedside nurse will need to be assessed and measured in order to determine the need for an interventional strategy that could transform clinical quality and safety practices, thus influencing the ongoing educational development of nursing care providers.

Based on this perceived need in the practice setting for this project; the knowledge, skills, and attitudes of the QSEN core competencies were assessed and measured in newly hired RNs and RNs in staff leadership roles at a tertiary acute care setting in southwest Michigan. The findings were used to develop a collaborative interventional strategy consistent with the organization's quality and safety priorities.

## Summary

Nurses represent the largest segment of clinicians aligned at the point of care having the ability to exponentially impact patient care quality and safety outcomes (Deborough, 2012). Assessing practice patterns related to and integrating the knowledge, skills, and attitudes of the QSEN core competencies as a necessary skill set of the acute care nurse provider has not yet been addressed. Rather, the focus has been on pre-licensure education. In the long-term, measuring the impact of the QSEN core competencies on healthcare quality and safety could facilitate the transformation of nursing's professional identity.

The QSEN core competencies, as endorsed, challenge nurse educators to realign their traditional pedagogical approaches to nursing education and graduate preparation. The QSEN team has yet to determine how their current work might be integrated to address the potential QSEN core competency knowledge, skills, and attitude gaps of every practicing nurse. Practicing nurses are an untapped resource and function at a critical impact point. They can model QSEN behaviors for the pre-licensure student, ultimately impacting patient care quality and safety outcomes in positive ways.

Exploration of the level of understanding of the knowledge, skills, and attitudes of the QSEN core competencies in practicing acute care nurses is critical if nursing is going to expand its influence on patient care quality and safety outcomes. Nursing will need to use this knowledge to transform pre-licensure preparation, continuing professional education, and patient care quality and safety. To further utilize the findings of the QSEN work group, one might ask if the practicing nurses' understanding of the knowledge,

skills, and attitudes of the QSEN core competencies are a result of a difference in nursing educational background and/or years of experience?

To date, there has been very little evidence in the literature systematically supporting the integration of the QSEN core competencies and sub-competency knowledge, skills, and attitudes not only in the formal preparatory nursing educational process, but also in the concurrent education and development of the practicing bedside nurse. One might assert that students need to actively observe enactment of the QSEN core competencies in the practice setting, further strengthening the relationship between education and practice. Intuitively, the QSEN core competencies make sense as a framework that can better prepare graduates for the complexities they will encounter in the work environment. Carried one step further, assessing the bedside clinician's understanding of the QSEN core competencies and the requisite knowledge, skills, and attitudes may accelerate the implementation of patient care quality and safety initiatives, and inherently improve healthcare outcomes.

Limiting QSEN education to only the pre-licensure student assumes that the bedside nurse already possesses and demonstrates the core competencies and these are reflective in their knowledge, skills, and attitudes, when in reality, we have no evidence to support this assumption. As such, we may have either underestimated or forgotten the potential impact the largest proportion of nurses could have on improving patient care quality. In essence, conducting QSEN education simultaneously in both pre-licensure education and in the post graduate practice environment can accelerate and diversify nursing's role in addressing quality and safety outcomes in healthcare. Moving a nursing graduate from novice status to that of a competent professional requires collaboration of

nursing employers and pre-licensure educators to integrate quality and safety initiatives throughout the educational continuum.

Considering the relative infancy of QSEN, many currently practicing bedside RNs may have never been exposed to the knowledge, skills, and attitudes of the QSEN core competencies during his/her initial formal education or transition to practice. To this end, the purpose of this scholarly project was to assess the potential knowledge, skills, and attitude gaps in two groups of practicing bedside RN care providers regarding the QSEN core competencies. The results of this quality improvement project were expected to inform the development of organization-specific evidence-based educational interventions that align with and enhance the institution's quality and safety initiatives.



## Chapter Two

### Background and Literature Review

According to the Institute of Medicine's (IOM) (2001) report on *Crossing the Quality Chasm: A New Health System for the 21<sup>st</sup> Century*, the health care system in the United States does not provide consistent, high quality patient care. Our system has fallen short of its ability to translate knowledge into practice and to apply new technology safely and appropriately. This report cites multiple reasons for the disconnect, including unprecedented advances in medical science and technology and the growing complexity of healthcare.

The IOM (1999) estimated that in United States (US) hospitals between 44,000 and 98,000 annual deaths could be attributed to preventable medical errors. Examples of some common preventable healthcare service errors may include adverse drug events, wrong-site surgery, restraint injuries, patient falls, and skin breakdown (Brady et al. 2009). Adverse events have significant financial implications not only on health care institutions with their resultant increased lengths of stay and potential litigation but also on the patient and family in lost earnings potential. Financial implications to the patient and family can be further compounded by increased pain, suffering, and anxiety, loss of trust and confidence in the healthcare system, and decreased satisfaction. According to Dunn (2003), multidisciplinary education and ongoing staff development have been associated with reducing adverse events and errors in health care, thereby improving clinical safety and the overall quality of care. Reducing adverse events in healthcare requires an organizational commitment and cultural shift with top leadership support that

promotes patient safety and an open dialogue with all employees in a no-blame environment.

Cronenwett et al. (2007) determined that the overall goal of the Quality and Safety Education for Nurses (QSEN) project was to “better prepare future nurses with the appropriate knowledge, skills, and attitudes (KSAs) necessary to continually improve the quality and safety of healthcare systems within which they work” (p. 122). QSEN adapted and expanded the initial five Institute of Medicine (IOM) (2003) healthcare competencies to six core competencies or domains for the nursing profession. These core competencies were to act as a tool to bridge what was considered a disconnect between quality and safety education in the practice environment and the academic setting (Brown, Feller, & Benedict, 2010). Each of the QSEN competencies is seen as working in unison with, and in many respects impacting each of the other QSEN competencies.

The American Nurses Association (ANA) (2010) defined competency as “an expected level of performance that integrates knowledge, skills, abilities, and judgment” (p. 78). Therefore, it stands to reason that a competent person is able to perform successfully at an expected level (ANA, 2010). The ANA (2010) also defined each of the key attributes comprising their definitions of competency, nursing knowledge, skills, abilities, and judgment.

*Knowledge*, according to the ANA (2010) “encompasses thinking; understanding of science and humanities; professional standards of practice, and insights gained from practical experiences; personal capabilities, and leadership performance” (p. 78). *Skills* was defined as including the “psychomotor, communication, interpersonal, and diagnostic skills” (ANA, 2010, p. 78) of the nurse. *Ability* (attitude) is the “capacity to act

effectively requiring listening, integrity, knowledge of one's strengths and weaknesses, positive self regard, emotional intelligence, and openness to feedback" (ANA, 2010, p. 78). Although the QSEN core competencies don't include judgment as a separate sub-competency metric that would be developed during pre-licensure and continuing nursing education, it should be noted that it is reflected within the knowledge, skills, and attitude competencies of each QSEN domain. *Judgment*, according to the ANA (2010), "includes critical thinking, problem solving, ethical reasoning, and decision making" (p. 78).

In review, the QSEN core competencies are: patient-centered care (PCC), teamwork and collaboration, evidence-based practice (EBP), quality improvement (QI), safety, and informatics. These core competencies are expected to apply to pre-licensure as well as practicing registered nurses irrespective and independent of their specific healthcare practice setting. Although QSEN focuses on developing and implanting teaching strategies that address the KSA of each core competency, any educational strategy should focus on the learning, not the teaching, if nursing practice is to change (Regnier, Kopelow, Lane, & Alden, 2005).

This chapter will focus on the literature related to each dimension of the QSEN core competencies as independently presented and developed by the QSEN team of faculty and their advisory board. Each core competency is explored within the QSEN framework and then separately as a unique or stand-alone component of achieving overall healthcare quality and safety outcomes. The literature review was completed using CINAHL, Medline, and PubMed. Key words used were: quality and safety education for nurses, QSEN, quality, quality improvement, QI, safety, patient-centered care, teamwork and collaboration, evidence-based practice, and informatics. Throughout this review was

the apparent linkage by individual and collective agreement that each of the QSEN domains were critical to achieving safe quality patient care outcomes.

Nursing leader respondents to a Nursing Executive Center survey conducted by Berkow, Virkstis, Stewart, and Conway (2009) indicated dissatisfaction with the proficiency of new nursing graduates from both baccalaureate and associate degree programs regarding their ability to provide safe and effective care. The focus of this survey was on new graduate nurse performance reflective of over 36 competencies grouped into six general skill categories of clinical knowledge, technical skills, critical thinking, communication, professionalism, and management of responsibilities. Of interest on those units staffed predominantly by bachelor of science in nursing (BSN) graduates, the frontline nursing leaders reported greater satisfaction with their performance on most competencies when compared to graduates of associate degree and diploma programs.

### **Patient-Centered Care**

Patient-centered care (PCC) has been viewed as a core value of nursing. New evidence suggests that if the patient is placed as the source of control this will facilitate error reduction, improve understanding of care goals, and enhance culturally sensitive care (Durham & Sherwood, 2008). Williams (2010), citing an evidence-based practice study, identified several patient reported nursing interventions that facilitated their perception of PCC. These interventions were responsiveness, individuation, coordination, and proficiency. In a PCC environment nurses would need to know their patients and tailor their plan of care in consideration of patients' life circumstances, perspectives, beliefs, and values.

One could assert that PCC is an essential aspect of nursing practice and PCC is a basic human right of all people requiring healthcare services (Foley, 2011). Adopting a fully integrated PCC approach requires nurses and other healthcare disciplines partner with the patient and significant other, addressing their physical, cultural, emotional, and spiritual needs, and ultimately improving their healthcare quality and safety. Cronenwett et al. (2007) defined PCC as the nurse's ability to "recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patients' preferences, values, and needs" (p. 123). Walton and Barnsteiner (2012) expanded on the original QSEN PCC competency to patient and family-centered care, to recognize the significant role families play in the healthcare experience.

The QSEN team identified 11 knowledge and 15 skills and attitude objectives considered critical to meeting the PCC competencies (see Appendix A). A nurse demonstrating competence in PCC would be able to integrate an understanding of multiple dimensions of PCC, eliciting patient values, preferences, and expressed needs as part of the clinical assessment, valuing the view of healthcare situations as seen through the patient's eyes (Cronenwett et al., 2007). As such, nurses are expected to apply knowledge of patient values and preferences in caring for their clients and with others on the care team.

The PCC competency requires nursing education programs to adjust their focus to that of developing the knowledge, skills, and attitudes that elicit and incorporate patient preferences and values in the plan of care; valuing the patient and/or significant other and/or surrogate as a partner in care; appreciating the legal and ethical dilemmas posed

by shared decision-making; and developing expertise in managing conflict. More specifically, the key competencies of PCC are: eliciting patient values and preferences to assess, plan, and evaluate care; initiating effective treatments to relieve pain and suffering in light of patient values, preferences, and expressed needs; assessing the level of patient's decisional conflict and provide access to resources; recognizing the boundaries of therapeutic relationships; facilitating informed patient consent for care; and, participating in conflict resolution and consensus building (Cronenwett et al., 2007).

In a study examining the relationship between the implementation of PCC and patient outcomes, Poochikian-Sarkissian, Sidani, Ferguson-Pare, and Doran (2010) reported increased patient self-care efficacy and improved satisfaction with their care and quality of life. The authors used a descriptive correlational design measuring the perceptions of implementing dimensions of PCC on patient outcomes. Data were collected from 63 nurses and 44 patients admitted to cardiology, neurology/neurosurgery, and orthopedic units. The nurse competent in PCC recognized each patient as a unique person, respecting patient's values and beliefs, and was responsive to the patient's individual needs and preferences. This implied that the nurse would assess each patient's needs and preferences, encouraging his/her active participation in care, and implement appropriate interventions that were consistent with and reactive to patient needs.

Murphy (2011) described PCC as inclusive of the patient and/or significant other as an integral member of the healthcare team, encouraging patients to take responsibility for important aspects of their preventative as well as disease management self-care strategies. The patient, in this case, is an active participant in his/her healthcare, facilitating removal of unneeded and/or unwanted services. According to Girdley,

Johnsen, and Kwekkeboom (2009), formal pre-licensure education on PCC is commonly addressed through coursework on therapeutic communication and care planning.

Subsequently, however, students are not provided the opportunity to experience shared decision-making between a patient and the healthcare provider, limiting their capacity to implement patients' preferences and values as a component of the plan of care (Sherwood & Drenkard, 2007).

In a pilot study by McKeon, Norris, Cardell, and Britt (2009), unfolding case-scenario computer based simulation assignments were used to develop PCC competencies in pre-licensure nursing students. The investigators reported that computer based simulation was an efficient and effective learning strategy. Testing two groups of baccalaureate nursing students (n = 53), approximately half of the participants completed computer-based simulation and the other half completed the traditional simulation exercise. The authors reported group PCC competency scores improved similarly although fewer faculty hours were required to administer the computer-based intervention (McKeon, Norris, Cardell, & Britt, 2009).

In a paper commissioned by the Picker Institute, Shaller (2007) interviewed several healthcare leaders regarding their experiences and expertise in either designing or implementing strategies for achieving PCC excellence. Shaller (2007) identified what he considered to be several key factors necessary for achieving PCC at the organizational level. These factors were: leadership engagement; a clear and consistently communicated strategic vision; patient and family inclusion at multiple levels of the healthcare system; a supportive work environment (also called care for the care-giver); systematic data

collection and feedback/reporting; the quality of the physical environment; and a supportive informatics system.

Strategies that may facilitate widespread implementation of PCC would focus on the organizational and/or system level(s). Organizational-level strategies would be designed to strengthen capacity to achieve PCC, such as leadership training and development, rewards and incentives tied to PCC as an overall performance measure, quality improvement training targeted at improving the patient care experience, and the integration of evidence-based practical tools. System-level strategies would target public and patient education, public reporting of outcomes based on standardized measures, and achievement of accreditation and certification requirements (Shaller, 2007). Shaller (2007) further determined six core elements that defined PCC. These core elements were: education and shared knowledge; involvement of family and friends; collaboration and team management; sensitivity to nonmedical and spiritual dimensions of care; respect for patient needs and preferences; and, free flow and accessibility of information.

Nationally, regulatory agencies have become more intrusive in stipulating expectations, monitoring performance, and reporting outcomes related to patients' perceptions of their care, tying reimbursement to performance. A culture of patient and family-centered care will ensure, in part, patient engagement as an essential precursor to improved quality and safety outcomes (Walton & Barnsteiner, 2012).

### **Teamwork and Collaboration**

Effective teamwork and collaboration can have a demonstrable impact on patient safety and outcomes (IOM, 2011; McKay & Crippen, 2008; Richardson & Storr, 2010; Wagner, Liston, & Miller, 2011). As healthcare and the healthcare system have evolved



they have become increasingly more complex, necessitating an ever-increasing focus on enhanced teamwork and collaboration skills among all healthcare professionals (Pilcher, 2009). Teamwork and collaboration, as such, should be considered a core competency of every healthcare professional's initial and ongoing educational development. It should include communication and negotiation skills necessary to coordinate care across disciplines, and skills in mutual respect, situation monitoring, and cross monitoring in sharing care tasks and responsibilities (Durham & Sherwood, 2008).

Individual patients are most often exposed to a broad array of different healthcare providers with whom nursing personnel must be able to competently interact, such as physicians; pharmacists; respiratory care therapists; dieticians; physical therapists; occupational therapists; nurse practitioners; clinical nurse specialists; physician assistants; social workers; care managers; licensed practical nurses; and unlicensed assistants. Effective teamwork and positive interdisciplinary collaboration among and between healthcare providers are seen as important contributors to improved patient outcomes. Cronenwett et al. (2007) defined teamwork and collaboration as “functioning effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care” (p. 125). Eleven knowledge, 16 skills, and 10 attitude sub-competencies complete the domain of teamwork and collaboration (see Appendix B). The essential features of the teamwork and collaboration KSAs include components related to self, team, team communication and conflict resolution, and the impact of systems on team functioning, safety, and quality of care. Nursing graduates possessing and demonstrating the knowledge, skills,

and attitudes of this competency would consistently use team communication practices and seek system support for effective team functioning wherever they practiced.

Key nursing expectations would require one to use personal strengths to foster effective team functioning, integrate quality and safety science in communicating across diverse teams, and include the patient and family as members of the healthcare team (Cronenwett & Sherwood, 2011). Inadequate communication and poor working conditions are the most frequent root-cause of safety events and near misses. Lapses in communication further undermine teamwork and collaboration, increasing the likelihood of more errors (Cronenwett & Sherwood, 2011). According to Disch (2012), barriers to collaboration include “persistent worldview differences, professional autonomy, and inequitable power gradients” (p. 91).

The American Nurses Association (ANA) (2010) defined collaboration as “a professional partnership grounded in a reciprocal and respectful recognition and acceptance of: each partner’s unique expertise, power, and sphere of influence and responsibilities; the commonality of goals; the neutral safeguarding of the legitimate interest of each party; and the advantages of such a relationship” (p. 64). In practicing registered nurses, according to the ANA (2010), collaboration can be measured based on the nurse’s capacity to effectively communicate with the patient, family and healthcare provider; create a plan of care focused on outcomes, care decisions, and service delivery; partner with other healthcare providers and patients; and, document referrals, including provisions for continuity of care.

McKay and Crippen (2008) defined collaboration as an interdisciplinary process of problem solving, shared responsibility for decision making, and the ability to carry out

a plan of care while working towards a common goal. McKay and Crippen (2008) further discussed the concept of collaboration using Donabedian's structure-process-outcome model as a framework for embedding best practice components necessary for multidisciplinary collaboration in an acute care setting. Subsequently, a care model was developed that purposefully wove collaboration into structure and process to effect change in organizational outcomes. According to McKay and Crippen (2008) their Clinical Integration Model improved patient outcomes as evidenced by the average length of stay decreasing by 0.87 days without a significant change in case-mix index, and the cost per admission dropped by \$804.00 over a year. Readmission rates were only minimally impacted while global patient satisfaction scores as measured by Press Ganey, increased from 89.0 to 90.2% within a year (McKay & Crippen, 2008).

Profession-specific socialization is common in the educational process, creating and further supporting discipline-specific silos. This is further supported in the practice environment, where interdisciplinary collaboration may not be fostered (Wagner, Liston, & Miller, 2011). From a nursing perspective, the nurse is in a key position and can be instrumental in fostering teamwork and collaboration among the healthcare team. The coordination and mobilization of institutional resources for timely intervention and rescue are key nursing functions impacting quality and safety. Each nurse must be able to demonstrate competence in teamwork and collaboration with the ability to make a persuasive clinical case to his/her healthcare counterparts (Wagner et al., 2011).

The IOM (2004) identified several precursors to effective interdisciplinary collaboration including individual clinical competence and mutual trust and respect. Characteristics of collaboration are further described as the aggregation of key behaviors

such as shared understanding of goals and roles, effective communication, shared decision-making, and conflict management (IOM, 2004). The IOM (2004) further recognized the impact organizational structures and processes might have on building and nurturing collaboration. As such, collaboration can be facilitated by leadership modeling collaborative behaviors; dedicating resources to build nurse expertise; working and workspace redesign; implementing interdisciplinary practice forums; training; and developing human resource policies that address verbal abuse, hostile behaviors, and interpersonal expectations. The IOM (2004) further recommends “healthcare organizations take action to support interdisciplinary collaboration by adopting interdisciplinary practice mechanisms such as interdisciplinary rounds, and by providing ongoing formal education and training in interdisciplinary collaboration for all healthcare providers on a regularly scheduled continuous basis (e.g., monthly, quarterly, or semiannually)” (p. 217). If nursing is to effectively impact patient safety and quality, given the complexity in healthcare, collaboration with the healthcare team and patient is an essential core competency for pre-licensure and practicing professionals.

### **Evidence-Based Practice**

Evidence-based practice (EBP) has been adopted as a technique gaining in popularity among healthcare professionals due to its potential to positively impact clinical outcomes and enhance patient care (Majid et al., 2011). To some extent the integration of evidence-based practice has been driven by external agencies such as The Joint Commission (TJC), the Centers for Medicare and Medicaid Services (CMS), and Blue Cross/Blue Shield (BC/BS). These agencies have broad-based authority to influence

a healthcare organization's reimbursement and subsequent financial viability, in addition to its reputation within the greater healthcare community.

EBP has been defined by Cronenwett et al. (2007) as “integrating best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal healthcare” (p. 126). The QSEN team developed seven knowledge; eight skills; and six attitude EBP sub-competencies (see Appendix C). For the most part the QSEN EBP sub-competencies focus on pre-licensure nursing programs and not the practicing RN.

A pre-licensure graduate possessing the EBP KSAs would be able to differentiate clinical opinion from various levels of scientific evidence and value the need for continuous improvement based on new knowledge (Cronenwett et al., 2007). These graduates would be expected to practice from a spirit of inquiry, basing care standards on evidence and applying technology to search the evidence for best care approaches, clarifying decisions (Cronenwett & Sherwood, 2011). Graduates having met the knowledge, skills, and attitude competencies of evidence-based practice would have the tools necessary to translate evidence into clinical practice to deliver high quality, patient-centered care. QSEN has challenged nursing to integrate EBP into pre-licensure curricula thus decreasing wide variations in individual clinicians' practice patterns, thereby eliminating unsupported practices and building on best practices (Burns & Foley, 2005).

The ANA (2010) defines EBP as “a scholarly and systematic problem-solving paradigm that results in the delivery of high quality care” (p. 65). This requires external evidence substantiated by research blended with internal evidence, clinical expertise, quality improvement data, availability of resources, and consumer-driven values and

preferences, thus achieving the best healthcare outcomes. Melnyk and Fineout-Overholt (2011) defined EBP as a lifelong problem-solving approach to clinical practice that integrates external evidence, internal evidence, and patient preferences and values while Titler (2007) defined EBP as the “conscientious and judicious use of current best evidence” (p. 26). Although EBP is not a new concept, it has only recently gained increasing popularity, aspiring to be a dominant healthcare services theme for practice, policy, management, and education (Doody & Doody, 2011). Durham and Sherwood (2008) stated, “new scientific knowledge requires application of EBP in designing care interventions to ensure patients are receiving eligible care based on scientific evidence and best practices” (p. 428).

According to Ciliska (2005) a major issue facing EBP in nursing education is the lack of evidence. That is, evidenced-based practice in nursing education has not been evaluated. Therefore, the processes put into place lack external or internal validation to support their value. Having determined this as a gap, the process of EBP was subdivided into six stages or steps: asking a clinical question; collecting relevant evidence; critically assessing the evidence; integrating the change into practice; evaluating the impact of the change on practice; and disseminating the outcomes (Burns & Foley, 2005; Ciliska, 2005; Melnyk & Fineout-Overholt, 2011).

Melnyk and Fineout-Overholt (2011) identified multiple barriers impacting adoption of EBP by nurses, physicians, and other healthcare professionals. Examples of barriers may include: a lack of EBP knowledge and skills; lack of time and resources; overwhelming workloads; lack of EBP mentors; organizational constraints;

misperceptions or negative attitudes about EBP; lack of belief that EBP will result in positive change; and overwhelming amounts of information to review.

Using a set of nine statements, Majid et al. (2011) asked nurses in Singapore about barriers that might prevent them from implementing EBP. The major barrier cited by the respondents was lack of time at the workplace to search for and read research articles. This was followed in order by an inability to understand statistical terms; inadequate understanding of technical jargon found in research articles; difficulty determining the quality level of research articles and reports; lack of time at work to implement EBP changes; insufficient resources; inability to appropriately interpret research study results; difficulty determining how to apply research findings; and inability to implement research study recommendations into clinical practice (Majid et al., 2011).

Using the continuous quality improvement (CQI) framework developed by Shortell, Bennett, and Byck (1998), comprised of four interrelated dimensions: strategic, cultural, technical, and structural, Solomons and Spross (2011) examined the barriers and facilitators to implementing EBP. Based on their findings the most common barriers reported were lack of time, and lack of autonomy. The authors concluded that multidimensional approaches were needed to overcome these barriers. The use of staff-led councils to support EBP has been suggested as a tool to empower, engage, satisfy, and reduce nursing turnover, thus improving quality outcomes as part of a healthy organization and as a mechanism to decrease healthcare costs (Brody, Barnes, Ruble, & Sakowski, 2012).

Translating evidence into practice may produce interventions for a lone patient or it may lead to algorithms, care guidelines, standards of care, policies, and/or procedures for an entire patient population (Bliss-Holtz, 2010). Recognizing that the goal of translating evidence into practice is quality patient outcomes, one must assess the patient or patient population's attributes, the strength and level of the evidence, and the amount of resources consumed that any practice change might demand (Bliss-Holtz, 2010). "When EBP is delivered within the context of caring and in a supportive organizational culture the highest quality of care and best patient care outcomes can be achieved" (Melnik, Fineout-Overholt, Gallagher-Ford, & Stillwell, 2011, p. 57).

Schifalacqua, Soukup, Kelley, and Mason (2012) discussed the impact of an evidence-based nursing program to demonstrate cost of care avoidance on five healthcare-acquired conditions (catheter-associated urinary tract infections, clostridium difficile infections, methicillin-resistant staphylococcus aureus infections, patient falls, and surgical "never" events). Their program established benchmark costs used to gauge the return on investment when assessing nursing's demonstrable contribution to achieving healthcare value and to address the Catholic Health cost-avoidance initiative. In short, the initiative implemented specific healthcare bundles to prevent healthcare-acquired conditions. Their focus on event prevention and improved patient outcomes during hospitalization, using evidence-based practice, was expected to positively impact clinical outcomes.

In essence, EBP bases care standards and protocols on current scientific evidence, assessing the level of care patients receive, matching it to the quality and standard of care, and best-known practice. EBP initiates quality improvement processes, closing



practice gaps, accommodating patient preferences within the standard of practice, guiding patients in their quest to determine levels of evidence, and working with clinical units to update their practice standards to remain current. The IOM recommended a common educational base for both pre-licensure and continuing education, focusing on critical skill development that provides healthcare workers with the capacity to translate evidence into practice (Newhouse & Spring, 2010).

### **Quality Improvement (QI)**

Healthcare systems have become increasingly complex, impacting the healthcare team's ability to provide high-quality care. High-quality care can be identified and measured using a variety of methods such as underuse, misuse, and overuse of healthcare resources, adverse drug events, healthcare acquired infections, and medical errors.

According to Hall, Barnsteiner, and Moore (2008), 3-4% of hospitalized patients suffer a serious adverse event, with one in 200 hospitalized patients dying of a preventable event.

In 2001, the US reportedly spent \$4,887.00 per person on healthcare. Compare this to \$2,792.00 in Canada, \$1,992.00 in the United Kingdom, and \$2,131.00 spent in Japan (Farquhar, Kurtzman, & Thomas, 2010). Despite the US reputation as the most technologically advanced country, concerns regarding its ability to provide safe, quality care have been raised. Care can be uneven or suboptimal with enduring racial and ethnic disparities further compromising the integrity of the system. With the number of uninsured increasing, accounting for about 15% of the population, many more are underinsured and have limited access to pay for services. In 2005, the IOM stated "there is little doubt that rapidly rising healthcare costs, driven in part by waste in the healthcare system, hampers efforts to expand coverage" (p. 19).

Quality of care is a key issue impacting all healthcare settings. Quality care is dynamic, driving healthcare reform, patient preferences, safety, and choice. A well-designed quality management framework can result in improved patient satisfaction, improved quality of care, improved performance, and reduced operational costs. Talib, Rahman, and Azam (2011) discussed eight quality management practices as best practices for the successful implementation of a total quality management framework in a healthcare setting. These practices were: top management commitment; teamwork and participation; process management; customer focus and satisfaction; resource management; organizational behavior and culture; continuous improvement; and training and education (Talib, Rahman, & Azam, 2011).

Competencies associated with quality from a nursing perspective may include the capacity to address patient flow problems; safe management of high census periods; effective communication and patient handoffs; medication safety; preventing catheter associated urinary tract infections; preventing central line catheter associated blood stream infections; avoiding hospital acquired skin breakdown; medication reconciliation; ventilator associated pneumonia; and, fall risk prevention (Hall, Barnsteiner, & Moore, 2008). Knowledge of quality improvement requires understanding variation and measurement to assess quality of care, knowing, strategies for learning about the outcomes of care related to practice, and designing appropriate interventions. “Investment in the development of skills in quality improvement provides a means for nurses to improve the lives of patients, build their own careers, and improve the joy derived from their work” (Hall, Barnsteiner, & Moore, 2008, p. 424). Johnson (2012) advocates nurses

“be taught a systematic process of defining problems, identifying potential causes of those problems, and methods for testing possible solutions to improve care” (p. 113).

Historically, Florence Nightingale has been credited with outlining a comprehensive approach to healthcare quality improvement through her data collection methods and statistical analyses (Johnson, 2012). Her work has been influential in healthcare settings regarding the need to rigorously collect data on patient outcomes beyond mortality to more fully “understand the interactions of multiple factors in determining outcomes of care” (Johnson, 2012, p. 114).

Cronenwett et al. (2007) defined quality improvement (QI) competence as the ability to “use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of healthcare systems” (p. 127). Graduates with the QI KSAs would use improvement mechanisms as a component of their daily workload, participating in unit and organizational improvement opportunities. These graduates would integrate quality improvement into their nursing role and identity using quality tools, evidence, patient preferences, and benchmark data, to assess current practice and design continuous quality improvement systems (e.g., rapid cycle change; benchmarks; root cause analysis; trending; variance reports; human factors; authority gradients; and rapid response teams) (Cronenwett & Sherwood, 2011). The QSEN QI domain includes five knowledge, 10 skills, and six attitude objectives (see Appendix D).

Burhans and Alligood (2010), using a qualitative study design, found that the meaning of quality nursing for the practicing nurse was influenced by meeting human needs through caring, empathetic, respectful, interactions within which responsibility,

intentionality, and advocacy were essential. The authors recommend nurse educators modify their curricula to address the intrinsic qualities identified within these meanings of quality nursing care. Williams (1998) discussed the perception of quality nursing care as it related to the degree patients' physical, psychosocial, and extra care needs were met. The subsequent outcome of quality care was interpreted by the level of therapeutic effectiveness ultimately impacting patients' healing/wellness.

In an effort to enhance quality improvement in the practice setting, Murray, Douglas, Girdley, and Jarzemsky (2010) implemented curricula focusing on student application of the QSEN QI and teamwork and collaboration domains. Students were exposed to two processes of systematic approaches to QI: the Plan, Do, Check, Act (PDCA), and the Define, Measure, Analyze, Improve, Control (DMAIC) methods. A variety of QI tools were introduced (i.e., flow charts, brainstorming, cause and effect diagrams, run charts, and effective meeting processes) with additional class sessions focusing on teamwork and collaboration, sentinel events and root-cause analysis, and actual QI projects. Based on student feedback integrating QI processes including application assignments, implementing change processes, measuring results, and having access to expert hospital staff as a part of the pre-licensure education experience provided nursing students with what the authors concluded were valuable clinical tools to improve quality and safety patient outcomes (Murray et al., 2010). However, the long-term outcome of such an approach was not reported.

Sherwood (2010) called for the radical redesign of nursing education to match the radical change in healthcare delivery impacting quality and safety. Nursing, according to Sherwood (2010), must investigate effective pedagogies; care intervention outcomes;

strategies for reporting and investigating adverse events; system malfunctions leading to work-arounds; and communication processes that promote interprofessional teamwork. Healthcare organizations are challenged to align their quality data with national and international benchmarks to discover quality gaps, create QI teams to close these gaps, and encourage interdisciplinary collaboration and teamwork to achieve quality outcomes.

As the largest healthcare professional group, nurses are well positioned if appropriately educated and mentored, to effectively change healthcare quality. Nurses are the primary clinical care providers. As such, their roles need to be reframed to drive quality improvement benchmarks creating a culture of quality and safety. This means nurses need to be able to demonstrate QI competencies seamlessly from the classroom into the clinical practice setting venues, often seen as disconnected.

### **Safety**

All patients have a right to effective safe care at all times (WHO, 2007). Achieving significant improvements in patient safety is viewed as one of the key challenges confronting healthcare. The IOM (2001) identified nine strategies that provide opportunities to enhance patient safety in the workplace. These include: incorporating user-centered designs; avoiding reliance on memory; attending to work safety; avoiding reliance on vigilance; training for team collaboration; involving patients in their care; anticipating the unexpected; designing for recovery; and improving access to accurate, timely information (IOM, 2001). Morath (2011) identified the need for nurses to understand and develop the skills necessary to improve care processes and own the work of improvement. Consequently, nursing is being challenged to incorporate specific

content related to the science of safety as an educational component of nursing professional preparation (Barnsteiner, 2012).

Perceptions of physicians, pharmacists, and nurses regarding the impact of various aspects of healthcare systems on patient safety were reported by Durbin, Hansen, Sinkowitz-Cochran, and Cardo (2006). These healthcare professionals identified both barriers to patient safety and strategies for improving patient safety. Areas having the greatest impact on patient safety were provider education, provider norms/values, patient/family characteristics, continuity of care across healthcare settings, and organizational policies/procedures. In many cases those areas positively impacting patient safety were also considered barriers, such as the gap between education and practice; emphasis on care versus health promotion; values not supportive of teamwork; resistance to change; poor patient accountability for their own health; lack of communication between policy makers and healthcare providers; and inadequate staffing (Durbin et al., 2006).

Many healthcare organizations have adopted a culture of safety which translates into shared core values and goals, non-punitive responses to adverse events and errors, celebrating good catches, and promoting safety through education and training. A patient safety culture emphasizes accountability, excellence, honesty, integrity, and mutual respect (Barnsteiner, 2012). Organizations that have fully integrated a culture of safety are considered high-reliability organizations. These organizations foster learning, evidence-based care, positive working environments, and are committed to constant quality and safety improvements. This requires direct involvement of the executive

leadership team as well as middle management understanding the complexities of healthcare systems, safety design principles, and human factors.

“Minimizing the risk of harm to patients and providers through both system effectiveness and individual performance” (Cronenwett, et al., 2007, p. 128) has been used to define the core competency of safety by QSEN. This definition and the accompanying knowledge, skills, and attitude sub-competencies require a focus on complex systems and human factors associated with safety. The QSEN competency for safety requires that students demonstrate the KSAs to practice safely (Barnsteiner, 2011). Graduates would be expected to understand the importance of error reporting and safety cultures, and value vigilance and cross monitoring among patients, families, and members of the health care team (Cronenwett, et al., 2007). This competency also emphasizes the equivalent importance of the systems role in patient safety (Fetter, 2009).

Cronenwett, et al. (2007) identified seven knowledge, eight skills, and five attitude attributes for the safety domain (see Appendix E). The integration of this core competency may be reflected in the practice setting with improved risk awareness, use of checklists, enhanced error recognition, and enhanced reporting. The practitioner competent in the safety domain would constantly assess his/her actions and ask, “how might these actions put the patient at risk?” or, “where might the next error likely occur?” and “what is my role in preventing near misses and errors?”

Pre-licensure nursing education, for the most part, requires that as a product of their formal development process students focus on the care of individuals and significant others primarily in one or more acute care settings (Day & Smith, 2007). This method of preparation limits students’ capacity to practice the professional nursing role necessary to

understand and participate in larger highly complex healthcare systems. The mismatch between education preparation and practice reality further supports the need to integrate the core safety competencies as defined by the QSEN team. QSEN advocates for dramatic changes in nursing education based on the increasing complexity of healthcare systems.

Richardson and Storr (2010) defined patient safety as “freedom from accidental injury, emphasizing the processes, workplace practices, and systematic activities that prevent or reduce the risk of patient harm” (p. 14). In their study they identified the impact nursing leadership, collaboration, and empowerment had on patient safety, but found a lack of evidence in the literature regarding the extent of influence and nature of roles nurses played in improving patient safety. This is despite the pervading viewpoint that suggests nurses are ideally placed to prevent errors and make improvements in patient safety. For example, in acute care settings, nurses are recognized as the primary group of healthcare providers, possessing relationships closest to patients and significant others. They are also acknowledged as the clinicians spending the most time in the patient care departments (Vaismoradi, Salsali, & Marck, 2011).

Another key issue impacting patient safety is the nursing work environment related to leadership, staffing, work design, and organizational culture. Absenteeism, emotional exhaustion, and voluntary turnover further potentiate safety outcomes and are recognized as an unfortunate but reversible occupational risk. Achieving a safe work environment requires a culture of fairness on the part of leadership, and respect for the views and concerns raised by all members of the healthcare team. Understanding that no one action will change the nursing environment to improve patient safety, effective



nursing leadership and the judicious use of evidence-based management practices are important elements supportive of safety initiatives (Squires, Tourangeau, Laschinger, & Doran, 2010). Sammer and James (2011) further discussed the concept of a culture of patient safety within a framework consisting of seven driving factors: leadership, evidence-based practice, teamwork, communication, a learning culture, a just culture, and a patient-centered culture.

### **Informatics**

Healthcare professionals and patients will become increasingly reliant on information technology as a tool to communicate, manage knowledge, mitigate errors, manage data, and support decision-making. This requires all healthcare professionals demonstrate core knowledge and skill competencies appropriate to practice in a technology rich healthcare environment (Thompson & Skiba, 2008). Informatics knowledge, skills, and attitude competencies are considered critical for developing the other five QSEN competencies. Informatics is the “use of information and technology to communicate, manage knowledge, mitigate error, and support decision-making” (Cronenwett, et al., 2007, p. 129). In fact, informatics has been considered a major infrastructure component supporting patient safety initiatives (Warren, 2012).

Graduates with the informatics KSA sub-competencies will be expected to participate in the design, selection, and evaluation of informatics used to support patient care delivery. The competent healthcare provider would be able to use technology to manage and improve care and care processes. These clinicians would be able to navigate the electronic health record; search for evidence; experiment with communication technologies that support care coordination and safe effective transitions in healthcare;

and, acknowledge/recognize system alerts (Cronenwett et al., 2007). The QSEN informatics domain includes five knowledge, eight skill, and four attitude sub-competencies (see Appendix F).

McGonigle and Mastrian (2009) defined informatics as “a specialty that integrates the specialty’s science, computer science, cognitive science, and information science to manage and communicate data, information, knowledge, and wisdom in a specialty’s practice” (p. 455). The use of informatics in nursing practice is considered critical if patient safety and error prevention are to be mitigated (Effken & Carty, 2002). Informatics has been recommended as a core competency for all healthcare professionals (IOM, 2003). Over the years informatics intelligence has evolved from a nice-to-know to a need-to-know (Simpson, 2003).

Simpson (2007) suggests that as healthcare transitions, the demand for nurses with informatics competencies will increase. He believes informatics education is currently lacking in nursing programs and the level of understanding about what nurses need to know based on their roles is lacking. According to Simpson (2007), of those nurses that responded to an information technology (IT) survey, 30% reported that they had received no IT training in the previous year while 56% received one to eight hours of training. He concluded that few faculty have the requisite knowledge, skills, and abilities in informatics to educate students and that formal informatics education offerings and programs in informatics are only available at the postgraduate level. Simpson (2007) stated “nursing’s need for informatics knowledge already outpaces academia’s ability to provide it” (p. 17).

The IOM (2011) report on the future of nursing discussed what is viewed as the impact of technology on healthcare quality, efficiency, and outcomes. Technology, according to the IOM (2011), in the framework of electronic health records and other health information technologies, has the potential to lower the cost per unit of patient care services and/or improve the quality of care as measured by well-defined outcomes or other touch points such as increased adherence to standards and guidelines. “Although research regarding the impact of health information technology on the quality of nursing care is limited, documentation quality and its accessibility generally improve after the implementation of health information technology” (IOM, 2011, p. 141).

Nurses are expected to provide safe care in a complex healthcare system and in an increasingly technical environment. Nurses that have not mastered even the most basic informatic competencies will be at a decided disadvantage considering governmental mandates for full electronic health record adoption by 2014 (Warren, 2012). To achieve informatics competence, academia and practice must partner to ensure current and future nurses have the informatics knowledge, skills, and attitudes to meet healthcare needs.

In a national survey of nursing education programs assessing the level of integration of computer and information literacy into curricula, significant gaps were reported related to computer use and information literacy competencies (McNeil, Elfrink, Beyea, Pierce, & Bickford, 2006). The authors reported that of those baccalaureate nursing programs responding, greater emphasis was placed on computer literacy skills than on informatics literacy skills; the breadth and depth of faculty preparation for teaching informatics competencies was unclear; and, the future need for nurses to be knowledgeable in the use of informatics in nursing practice was critical (McNeil et al.

2006). Their findings suggest better preparation of nursing faculty to provide well developed teaching/learning strategies encompassing the role of information management in an evidence-based practice environment.

Informatics is considered essential for nurses to achieve the other five QSEN competencies (Fetter, 2009). The IOM (2003) identified one's capacity to understand, value, and use informatics as one of the core healthcare competencies to reduce errors, manage knowledge and information, and make decisions and communicate. Informatics can facilitate a synthesis of evidence, and dissemination of practice guidelines; provide information for consumers via the internet; and foster the use of decision support systems.

Ehnfors and Grobe (2004) suggested two methods nurses could use to achieve this core competency. First, by incorporating informatics in patient care as suggested content in continuing education guidelines where continuing education is required for licensure or license renewal; and/or, secondly to have employers incentivize employees to achieve stated goals in nursing informatics education. Nurses with the capacity to use informatics will have the skill sets to utilize information technology to synthesize evidence, access and disseminate practice guidelines, facilitate the exchange of information for patients, and integrate decision support systems (Ehnfors & Grobe, 2004).

### **Summary**

Throughout this chapter the collective QSEN core competencies of PCC, teamwork and collaboration, EBP, QI, safety, and informatics were explored as integral to the QSEN initiative and as separate "stand-alone" healthcare competencies capable of ensuring improved quality and safety outcomes for patients. These competencies cannot

be mastered solely through a traditional lecture/discussion format in a singular course or in an online module. The transformation of nursing will require a broad variety of teaching/learning strategies be explored including, but not limited to, inter-professional engagement in the clinical environment; simulation exercises integrating the QSEN core competencies; reflective papers and journals; case studies; and preceptor role modeling the values and attitudes for quality and safety work. This requires transitioning QSEN's work into all healthcare settings.

There exists a potential gap of knowledge, skills, and attitudes in the licensed practicing, bedside registered nurse regarding the QSEN core competencies. This gap must be assessed. Appropriate interventions, if needed, would then need to be developed to not only enhance the work of QSEN but to also improve the quality and safety of the healthcare system in which nurses work and students are prepared, ultimately impacting patient care quality and safety outcomes.

This project was expected to provide additional evidence supporting the utility of the knowledge, skills, and attitudes of QSEN as a core component of the ongoing development of practicing bedside clinicians. Linking education with practice in this context addresses the application of QSEN's core competencies along the continuum of healthcare professionals' formative education. It fosters ongoing development of care givers in the practice setting, positively impacting quality and safety outcomes and addressing, in part, healthcare effectiveness.

## Chapter Three

### Theoretical Framework

In review, QSEN's six core competencies are patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. Each core competency/domain is further delineated within the context of essential knowledge, skills, and attitudes necessary for pre-licensure and graduate nursing education preparation as well as continuing professional education and development.

To date, the QSEN core competencies have focused primarily on the formative pre-licensure nursing educational process; however, the QSEN core competencies are expected to be applied to registered nurses across all practice settings. Cronenwett et al. (2007) projected that over time the QSEN core competencies would guide curricular development in pre-licensure and graduate nursing programs, transition to practice models, and continuing education offerings, providing a framework for regulatory bodies that set standards for initial licensure, certification, and accreditation of nursing education programs. Hall, Barnsteiner, and Moore (2008) discussed the importance of nurses learning more about quality competencies through ongoing nursing education and active participation as a mechanism to enhance nursing's effectiveness as members of interdisciplinary healthcare teams, accelerating meaningful change within the workplace setting.

There has been very little evidence in the literature systematically supporting the integration of the knowledge, skills, and attitudes of the QSEN core competencies in the formal pre-licensure preparation of nurses. Additionally, there has been only a limited focus on QSEN's impact on the practicing bedside clinician's concurrent education and

development, let alone the assessment of QSEN's influence on patient care quality and safety outcomes.

## **Quality**

Central to the issue of understanding the impact of QSEN is determining an acceptable definition of quality that is broad-based and inclusive of the patient, care provider, healthcare system, and community. The Institute of Medicine (2001) identified quality as “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge” (p. 44). Cronenwett et al. (2007) conceptually defined quality within the context of the knowledge, skills, and attitudes of QSEN's six core competencies of patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. According to Aday, Begley, Lairson, and Balkrishnan (2004), quality in healthcare is doing the right thing well.

Donabedian's model of quality in healthcare (1993, 1997, 2003) was chosen as the conceptual framework to further explore quality and safety education for nurses. The attributes of Donabedian's (2003) model (efficacy, effectiveness, efficiency, optimality, acceptability, legitimacy, and equity) closely align with the QSEN core competencies further delineating the inter-relationship between quality and education. Each of Donabedian's (2003) quality components can be linked with three or more QSEN core competencies as defined by Cronenwett et al. (2007) (see Appendix G). It is because of the strong similarities between Donabedian's (2003) model and Cronenwett et al. (2007) QSEN domains that Donabedian's quality model was identified as the conceptual framework.

In Donabedian's (2003) model, *quality* is conceptualized as the coming together of the science and technology of healthcare and the application of that science and technology in healthcare to produce excellence. According to Donabedian (2003), science and technology includes biological factors as well as behavioral sciences. Understanding the attributes of quality is necessary as this conceptual framework is further explored. *Efficacy* as defined by Donabedian (2003) is "the ability of the science and technology of health care to bring about improvements in health when used under the most favorable circumstances" (p. 4). Efficacy in-and-of itself cannot be monitored when the quality of practice is being assessed; rather, it should be considered a product of research, experience, and professional consensus. In essence, efficacy could be considered the product of sound evidence-based practice. Evidence-based practice is a core competency of QSEN. Additionally, quality improvement, safety, and informatics were considered relevant QSEN core competencies associated with *efficacy*.

Another attribute of quality according to Donabedian (2003) is *effectiveness*. *Effectiveness* in healthcare can be assessed by comparing the actual performance of science and technology to the expected performance under ideal or specified conditions or "the degree to which attainable improvements in health are, in fact, attained" (Donabedian, 2003, p. 6). Similarly, Aday et al. (2004) determined effectiveness as focusing on the benefits produced by healthcare. The QSEN core competencies linked to *effectiveness* were patient-centered care, evidence-based practice, quality improvement, safety, and informatics.

Donabedian (2003) defines *efficiency* as an equation where assessed expected improvements in healthcare are divided by the cost of that care. It is the "ability to lower



the cost of care without diminishing attainable improvements in health” (Donabedian, 2003, p. 9). The attribute of *efficiency* was linked to the QSEN core competencies of teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. According to Donabedian (2003) there are three ways to improve efficiency in healthcare: clinical efficiency, production efficiency, and distributional efficiency. Clinical efficiency requires the healthcare provider be knowledgeable, skillful, and use sound judgment in prescribing and implementing care. Production efficiency focuses on the ability of the healthcare provider/system to produce goods and services that minimize errors and patient injuries. Distributional efficiency recognizes the need to provide quality healthcare to different classes of patients no matter their level of income or status.

*Optimality*, another attribute of Donabedian’s (2003) model, balances improvements in health against the cost of such improvements. This implies that there is a point at which benefits of a healthcare intervention and the associated costs are optimized, producing the most benefit for the lowest costs. If the relative benefits of a healthcare intervention are too costly one might consider the high cost too large to warrant any corresponding benefit (Donabedian, 2003). From a business perspective one might look at *optimality* within the framework of a return on investment or achieving the “biggest bang for your buck.” The QSEN core competencies that most closely linked to optimality were evidence-based practice, quality improvement, safety, and informatics.

*Acceptability* is conforming to the wishes, desires, and expectations of patients and significant others (Donabedian, 2003). *Acceptability*, according to Donabedian (2003), is based on five core components: accessibility, patient-practitioner relationship, amenities of care, patient preferences, and consideration of fairness and equitability. Each

core component of acceptability is driven by the patient and/or significant other. Each requires healthcare meet patient-specific expectations in the realm of every contact/event. From an *acceptability* perspective, the patient would look at his/her ability to access care as an aspect of quality. A positive patient-practitioner relationship enhances the effectiveness of care. Amenities of care contribute to the overall healthcare experience and are dependent upon circumstances under which care is provided. Patient preferences are associated with the risks, benefits, and cost of care, each of which are value based. And, *acceptability* from a fairness and equity perspective is considered a matter of social concern. Donabedian's (2003) attribute of *acceptability* was linked to the QSEN competencies of patient-centered care, evidence-based practice, quality improvement, safety, and informatics.

*Legitimacy* is considered social acceptability in that quality healthcare conforms to social preferences, as expressed through ethical principles, values, norms, laws, and regulations (Donabedian, 2003). The difference between *legitimacy*/social acceptability and *acceptability* as described earlier is that with *legitimacy*, society determines the kind of care that is most effective, efficient, optimal, or equitable, whereas *acceptability* is determined at an individual level or a patient specific preference. This can ultimately result in conflicts between the interests of individuals and the greater society. QSEN core competencies linked to *legitimacy* were patient-centered care, evidence-based practice, and informatics.

*Equity* is defined by Donabedian (2003) as “conformity to a principle that determines what is just and fair in the distribution of healthcare and of its benefits among members of a population” (p. 24). As a component of quality, *equity* is dependent on

access to care and the effectiveness and acceptability of the care received (Donabedian, 2003). From the QSEN core competencies *equity* was linked to evidence-based practice, quality improvement, safety, and informatics. From a health services research and policy perspective, *equity* as described by Aday et al. (2004), is “concerned with health disparities and the fairness and effectiveness of the procedures for addressing them” (p. 1).

According to Donabedian’s (2003) model, there are several levels at which quality can be assessed. These include provider specific technical and interpersonal knowledge and skills, amenities, care implemented by the patient, and care received by the community. Access to care and provider, patient, and family performance are believed to have a direct impact on effectiveness and equity in the distribution of care. For this project the level of provider specific technical and interpersonal knowledge, skills, and attitudes of the QSEN core competencies was assessed. The seven key attributes of Donabedian’s (2003) model were applied as a tool to address the issue/problem defined by the questions in this project.

When comparing the definitions of the QSEN core competencies to those attributes Donabedian (2003) identified as impacting the quality experience, there are multiple noted relationships. For example, if one considered Donabedian’s (2003) quality component of efficiency with one or more of the QSEN core competencies, a linkage can be established with, at a minimum, evidence-based practice, quality improvement, safety, and informatics. In fact, each of the QSEN core competencies by definition can be linked to one or more of Donabedian’s (2003) key attributes as is described in the chart in Appendix G.

Donabedian (2003) discussed what he believed were three approaches to assessing the quality of healthcare, *structure*, *process*, and *outcome*. *Structure*, *process*, and *outcome* are not considered attributes of quality; rather, there must be a relationship among structure, process, and outcome to make inferences about quality.

*Structure* designates the conditions under which quality care is provided such as material resources, human resources, and organizational characteristics (Donabedian, 2003). Structural quality evaluates health system capacities (IOM, 2001). *Process* are those activities that constitute the full spectrum of healthcare delivery from diagnosis to care contributions (Donabedian, 2003), while *process* quality assesses interactions between clinicians and patients (IOM, 2001). *Outcomes* are the changes (favorable or unfavorable) in individuals and populations attributed to healthcare (Donabedian, 2003). *Outcomes* are the evidence about changes in patients' health status. In this project structure and process are demonstrated in assessing the workforce's capability and the workforce's affect on healthcare activity.

These relationships lead to the exploration of the applicability of Donabedian's (2003) quality conceptual framework to the questions of interest in this scholarly project and the proposed conceptual model of nursing quality (see Appendix H). The primary questions of interest are (a) do practicing acute-care adult medical-surgical RNs demonstrate an understanding of the knowledge, skills, and attitudes of the QSEN core competencies? and (b) is there a difference in the understanding of the knowledge, skills, and attitudes of the QSEN core competencies related to an RN's educational background, years of RN experience, employment status, and/or previous quality improvement training? Based on this needs assessment a recommended intervention and

implementation plan will be developed in collaboration with the organizational strategic priorities, and consistent with knowledge, skills, and attitudes of the QSEN core competencies.

### **Effectiveness**

In addition to Donabedian's model (2003) of quality, this project was assessed within Aday et al. (2004) health services research effectiveness criteria at a macro level, in that "effectiveness examines the extent to which healthcare improves the health of patients and populations" (p. 1). Effectiveness is concerned with the actual practice of healthcare and the resultant outcomes with typical patients and providers (Aday et al. 2004). The focus of this project was to assess the newly hired bedside clinicians' and RNs in staff leadership roles' understanding of the knowledge, skills, and attitudes of the QSEN core competencies. Based on the findings and in collaboration with the organization a relevant intervention plan and a plan for implementation can be recommended that best fits within the context of the organization's strategic priorities for patient care quality and safety.

Furthermore, the phenomenon of interest looked at effectiveness from a clinical provider perspective, assessing the contribution of nursing care within the institution. It is intended to analyze the clinician's level of understanding of the knowledge, skills, and attitudes of the QSEN core competencies with an expectation of enhancing patient care quality and safety and improving healthcare effectiveness. Future work could assess the direct impact of the QSEN core competencies on patient care quality and safety outcomes. The results of this project are expected to inform the development and implementation of an organizational endorsed educational process focused on enhancing

patient care quality and safety. Secondly, following implementation, this project would improve organizational performance through enhanced integration of the knowledge, skills, and attitudes of the QSEN core competencies by the bedside nursing clinician.

Aday et al. (2004) discussed the various dimensions of effectiveness within the context of structure, process, and outcomes. Although this project did not purport to directly measure quality, the phenomenon of interest was studied as a process from the perspective of quality and appropriateness. That is, the potential for quality of care was assessed, based on provider demonstrated knowledge, skills, and attitudes of the QSEN core competencies and not on specific healthcare outcomes. According to Aday et al. (2004), healthcare quality is “that component of the difference between efficacy and effectiveness, attributed to care providers, taking into account the work environment” (p. 69). Appropriateness aligns with the scholarly project questions as it is reflective of the clinician’s utilization of available knowledge, skills, and attitudes to manage the healthcare needs of each patient. One would expect that nurses having and demonstrating the necessary knowledge, skills, and attitudes of the QSEN core competencies would ultimately positively impact healthcare outcomes.

### **Summary**

Assessing and translating the knowledge, skills, and attitudes of the QSEN core competencies into the acute-care practice setting and subsequently measuring their impact on healthcare quality and safety is critical if nursing is to transform its professional identity. Limiting education regarding the QSEN core competencies to only the pre-licensure nursing student assumes the bedside nurse already possesses the knowledge, skills, and attitudes that QSEN described. This approach could be considered

short-sighted because in reality it excludes a significant proportion of nurses who could have an immediate impact on improving patient care quality and safety outcomes if they possess the knowledge, skills, and attitudes of the QSEN core competencies.

It is important to recognize that the term *quality* can mean different things to patients, care providers, healthcare systems, and communities. The Donabedian (2003) conceptual framework of quality in healthcare closely aligns with the QSEN core competencies and can be used as a model to assess nurses' understanding of quality and safety. The key attributes of Donabedian's (2003) model are expected to effectively address the primary questions of this project.

From a health services research perspective this project fits within the effectiveness criteria as defined by Aday et al. (2004), as effectiveness is concerned with the actual practice of healthcare and the resultant outcomes with typical patients and providers. The focus of this project was to assess a component of the bedside clinician's potential effectiveness in providing quality patient care within the framework of understanding the knowledge, skills, and attitudes of QSEN's core competencies. Future work would need to evaluate the impact of nurses' understanding of the knowledge, skills, and attitudes of QSEN's core competencies and how these attributes influence patient care quality and safety outcomes through their contribution to decrease serious safety events, length of stay, and mortality; thereby increasing patient satisfaction and nursing engagement.

*Quality* in this project was operationally defined using the QulSKA (Quality Improvement Skills, Knowledge, and Attitudes) questionnaire developed by Dycus and McKeon (2009) as revised (see Appendix I). The QulSKA tool was used to measure

newly hired practicing acute-care RNs' and RNs in staff leadership roles' understanding of the knowledge, skills, and attitudes of the QSEN core competencies.

Donabedian's model of quality (2003) was used as a framework for this project. Donabedian's attributes of quality (efficacy, effectiveness, efficiency, optimality, acceptability, legitimacy, and equity) linked with each of the QSEN core competencies (patient-centered care, evidence-based practice, teamwork and collaboration, quality improvement, safety, and informatics). From a health services research perspective this project was focused on assessing and analyzing the understanding of the knowledge, skills, and attitudes of the QSEN core competencies among two groups of practicing nurses related to effectiveness as described by Aday et al. (2004).



## Chapter Four

### Methods

The phenomenon of interest in this project generated two key questions for this needs assessment survey: (a) do newly hired practicing acute-care RNs and RNs in staff leadership roles in a southwestern Michigan hospital demonstrate an understanding of the knowledge, skills, and attitudes of the QSEN core competencies?; and (b) in this healthcare setting is there a difference in the understanding of the knowledge, skills, and attitudes of the QSEN core competencies related to status as newly hired RNs or as experienced RNs in staff leadership roles, educational background, years of RN experience, and/or previous quality improvement training? In each of the needs assessment survey questions, the dependent variable was an RN's understanding of the knowledge, skills, and attitudes of the QSEN core competencies. A conceptual model of nursing quality is proposed suggesting basic educational preparation and understanding of the knowledge, skills, and attitudes of the QSEN core competencies in combination with an RN's years of experience may have a greater impact on healthcare quality and safety outcomes.

The independent variable in the first question is the status as newly hired practicing acute-care RNs, or as experienced RNs in staff leadership roles. In the second question the independent variables are the educational background, and the years of RN experience of newly hired RNs and RNs in staff leadership roles'. Donabedian's (2003) model recognizes that provider-specific technical and interpersonal knowledge and skills are potential assessment linkages in measuring quality outcomes. Demographic variables were also measured to determine if additional relationships among the variables existed.

These relationships may further inform relevant system changes that, as discovered, require focused support or implementation of targeted educational interventions.

### **Design**

This project used a survey methodology that included an assessment in the form of a questionnaire to determine participants' level of understanding of the knowledge, skills, and attitudes of the QSEN core competencies. The assessment was conducted in order to inform the design of an evidence-based intervention plan for staff development that would be consistent with the organization's strategic priorities. The plan could include the provision of educational units on the QSEN core competencies. The healthcare setting was encouraged to expand its assessment to include additional RNs and to re-assess RN knowledge, skills, and attitudes following the implementation of interventions to determine the effectiveness of educational interventions.

### **Participant Selection**

Participants were recruited from monthly new hire general nursing orientation sessions and from nursing shared governance council meetings within a tertiary acute-care setting in southwest Michigan. General nursing orientation sessions for new RN hires are held every month with varying numbers of participants. Newly hired RN participants were staff nurses hired to work in a full time, regular part time, part time, or on an as needed basis in any inpatient or outpatient acute-care unit within the healthcare setting. Newly hired RNs meeting the selection criteria were administered the Quality Improvement Skills, Knowledge and Attitude (QulSKA) questionnaire (Dycus & McKeon, 2009) to assess their baseline knowledge, skills, and attitudes of the QSEN core competencies. Data were collected over three months during one of the mandatory

orientation sessions until an adequate sampling of newly hired RNs scheduled in nursing orientation was obtained.

RNs in staff leadership roles were bedside staff nurses working in a full-time, regular part-time, part-time, or on an as needed basis in any inpatient or outpatient acute care unit within the healthcare setting. To qualify as an RN in a staff leadership role these individuals were members of one or more nursing shared governance councils. In order to be a nursing shared governance council representative unit staff RNs were recruited and selected to their role. In some cases these RNs volunteered to represent their specific unit of employment. RNs in staff leadership roles meeting the selection criteria were given the QulSKA questionnaire (Dycus & McKeon) as revised to assess their baseline knowledge, skills, and attitudes of the QSEN core competencies. Data were collected over two months from four of the six shared governance councils. Two of the shared governance councils were not included in this project as the vast majority of the representatives were in nursing roles excluded from participation. RNs in staff leadership roles on these two councils were also member of another shared governance council already included in the assessment.

### **Sample**

Using a nonprobability sampling plan, a convenience sample of newly hired RNs in each of three monthly general nursing orientation sessions and RNs in staff leadership roles from one of the nursing shared governance councils were recruited for participation. A typical number of newly hired RNs participating in general nursing orientation varies from as few as four or five to as high as twenty or more in any month. Inclusion criteria for this group of RNs encompassed practicing newly hired RNs from any inpatient or

outpatient acute-care unit. As part of the needs assessment survey newly hired RNs that would float between patient care units, also known as members of the nursing resource team (NRT), and services with a task (SWAT) nurses were included. The final sample of this subgroup included 37 nurses.

RNs in staff leadership positions included all practicing RNs from any inpatient or outpatient acute-care unit or those considered a part of the NRT or SWAT team. The staff leadership RNs participating in this project were members of one or more of the six nursing shared governance councils. The total number of nurses in this subgroup was 19.

Nurses working in advanced practice roles (Nurse Practitioners and/or Clinical Nurse Specialists), management/administrative staff, unit educators, case managers, and RNs hired to work off-site were excluded from participation in this needs assessment survey. These nursing professionals were excluded from participation because they were expected to have a deeper understanding of the QSEN core competencies. In many cases these same individuals provide very little day-to-day bedside care, and it was the knowledge and attitudes of bedside care providers that were desired for the needs assessment.

Depending on the final sampling the possibility existed that many of the newly hired respondents would be new graduates. The resultant sample was considered to be representative of the total newly hired RN staff population as well as RNs in staff leadership roles in the inpatient and outpatient care units at this healthcare facility. It was also considered a possibility that the full population of newly hired RNs and RNs in staff leadership positions would participate in the needs assessment survey because the needs assessment survey would be integrated as a component of the general nursing orientation

schedule and as a part of nursing shared governance council meetings if allowed by the group.

Newly hired RN participants were recruited from three monthly orientation sessions. To enhance recruitment of participants from this group the investigator met with each general nursing orientation group on their final day of orientation as a cohort to discuss the needs assessment survey, solicit participants, discuss the potential benefits to patient care quality and safety outcomes, distribute, and collect the survey.

RNs in staff leadership roles were recruited from four of the six nursing shared governance councils. The surveyor was invited to each of the council meetings and was given 30 minutes of meeting time to discuss the survey, solicit participants, discuss the potential benefits to patient care quality and safety outcomes, distribute, and collect the survey.

As this needs assessment survey used a convenience sample, pre-existing differences could have been present between and among newly hired RNs and RNs in staff leadership roles. Differences in age, highest level of education, and years of experience were possible. The number of newly hired RNs participating in the survey varied by month as did the number of available RNs in staff leadership roles at each shared governance council meeting. Historically, for this organization, a larger number of newly hired RNs begin their employment during the summer and early fall months due to nursing school graduations and their subsequent availability. Considering this assessment survey was conducted during the summer the chances of obtaining a representative sample were higher. In addition, attendance at nursing shared governance council meetings by RNs in staff leadership roles varies by month and time of the year.

It was also determined that units with greater turnover might have more newly hired RNs in general nursing orientation sessions during the time that this needs assessment was conducted. However, staff turnover was not a variable measured in this project. For the most part RNs in staff leadership roles were limited by unit size and designation in that many units had one representative serving on more than one council. All newly hired RNs and RNs in staff leadership roles from any inpatient or outpatient acute-care unit meeting the inclusion criteria were recruited to participate.

### **Instrument**

The data collection tool used for this project was the Quality Improvement Skills, Knowledge, and Attitudes (QulSKA) questionnaire (Dycus & McKeon, 2009). Permission was obtained from the original authors of the QulSKA (Dycus & McKeon) to use their data collection tool and to make revisions accordingly (see Appendix J). The QulSKA was distributed to newly hired inpatient and outpatient acute-care RNs during the final day of their general nursing orientation and to RNs in staff leadership positions during a scheduled nursing shared governance council meeting. Data were collected over three months. The results from the questionnaire were expected to inform the potential development of a targeted educational intervention focusing on cognitive, behavioral, and affective needs of participants in their understanding of the knowledge, skills, and attitudes of the QSEN core competencies.

The QulSKA was initially developed and tested by Dycus and McKeon (2009) as a tool to measure nursing quality knowledge, skills, and attitudes in experienced practicing pediatric nurses. The QulSKA is a 73-item questionnaire (see Appendix I). More specifically, 32 items on the QulSKA measure knowledge, 30 items measure skills,

and 11 items measure attitude across the six core QSEN domains (patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics). Fifteen of the skill items were included in the multiple-choice and true/false knowledge questions reflecting a participant's ability to apply the skill. As stated, the tool, as developed by Dycus and McKeon (2009), has 17 knowledge items having multiple-choice or true-false response formats with an additional 15 of the 45 skills items having multiple-choice or true-false response formats. The remaining 30 skill item responses use a self-reported six-point Likert type scale ranging from "novice" to "expert," designed for respondents' self-assessment of their competency. Eleven items measured self-reported attitudes in all six QSEN domains using a four-point Likert type scale ranging from "not important at all" to "high importance."

The mean score for all respondents when aggregated in this project was 69.2%. This result was similar to that reported by Dycus and McKeon (2009). However, QSEN domains with the highest scores differed from those reported as the highest in Dycus and McKeon's (2009) sample.

Dycus and McKeon (2009) determined the QulSKA internal consistency using Cronbach's alpha for the scaled items, obtaining a value of  $\alpha = 0.839$ . The small sample size ( $N = 37$ ) prevented intra-item correlation analysis on six quality domains. On the knowledge items and items with dichotomous scoring no reliability coefficient such as a KR20 was reported.

Face and content validity of the original QulSKA questionnaire was established by three pediatric oncology, three quality improvement, and two test-construction experts (Dycus & McKeon, 2009). Three quality improvement nurse analysts and two pediatric

oncology staff nurses completed the questionnaire prior to broader dissemination requiring additional revisions to the QulSKA. Because many items originally included in the tool reflected pediatric oncology practice for the current project there were further revisions made to the QulSKA questionnaire. To fit with the general acute-care adult population for this project the QulSKA was further modified in that questions that originally referenced pediatric patients or pediatric oncology patient populations were altered to reference a broader general adult patient population.

### **Procedure**

Following approval by each institutional research review board/committee (see Appendix K and Appendix L) data collection was begun. Routine monthly general nursing orientation sessions were used to collect data from newly hired RN participants meeting the inclusion criteria. Data were collected from RNs in staff leadership roles meeting the inclusion criteria during a portion of each shared governance council meeting.

Initially, a meeting was held with the nursing education department to establish a mutually agreeable defined block of time in the general nursing orientation schedule to conduct the needs assessment survey with each group of newly hired RNs. A short article was then published in the organizations nursing news letter broadly explaining the needs assessment survey. To solicit support from the RNs in staff leadership roles an email was sent to the chairperson of each shared governance council briefly explaining the project. The email also requested time during one of their upcoming council meetings to conduct the needs assessment survey. The nursing news letter is distributed throughout the organization primarily targeting nursing units.



Once dates and times were confirmed, the questionnaire was explained and distributed by the Doctor of Nursing Practice (DNP) student during the new hire general nursing orientation sessions and nursing shared governance council meetings. The DNP student responded to questions and obtained the completed questionnaires from a volunteer who agreed to collect them upon completion by the participants. Respondents were expected to require about 30 minutes to fully complete the 73-item questionnaire. In the actual data collection sessions, as little as 20 minutes to as many as 45 minutes were needed to complete the survey.

No names or personal identifiers were part of the data collection process. All completed questionnaires were placed in a sealed brown envelope and stored in a secured location for analysis once data collection was complete. A minimum of three months was allowed for data collection to achieve a satisfactory sample from each subgroup of RNs.

### **Threats to Validity**

The primary emphasis of this needs assessment survey was to determine the level of understanding of knowledge, skills, and attitudes of the QSEN core competencies among newly hired RNs and RNs in staff leadership positions in a specific institution. Once this was determined, targeted educational interventions with customizable implementation plans that best fit within the organizational patient care quality and safety strategic priorities would be developed in collaboration with the institution.

The internal validity of this project could have been impacted by selection, and sampling. A selection threat, in this needs assessment survey, might have centered on over representation of the work units and/or in certain demographic variables such as age, years of experience, and/or educational preparation of the participating newly hired RNs

or RNs in staff leadership roles. It was expected that many of the newly hired RNs would be recent graduates from one of the local two-year community colleges or the four-year university with limited to no nursing experience but unknown whether those surveyed would be representative of the entire group of newly employed RNs for the year.

A non-probability approach with convenience sampling was used for this project. Convenience sampling is considered the weakest form of sampling as it may not be representative of the population being studied in regards to the key variables of interest (Polit & Beck, 2012). However, selecting all newly hired RNs and RNs in staff leadership roles who met the eligibility criteria was thought to minimize this potential threat to internal validity.

As this is a needs assessment survey that provided the foundation for an organizational initiative to enhance patient care quality and safety, generalizability and issues of external validity are concerns only to the extent to which the survey's results can be applied to RNs already practicing at this healthcare setting as well as those who will join the organization after the survey period has concluded. Conclusions from this project are limited to newly hired RNs and RNs in staff leadership roles within the organization and should not be considered applicable to newly hired RNs or RNs in staff leadership roles who work in other settings. The outcomes of this project are expected to inform the development of an interventional strategy to address future newly hired staff RNs and RNs in staff leadership roles independent of their patient specific unit assignment, patient population, and/or nursing skill mix.

To improve the project design to the extent possible, the DNP student adhered to consistency of conditions in several circumstances. This was done through consistency in

timing (collecting data during prescribed orientation and council meeting times, during prescribed days of the week) and in communications using a prescribed script. In addition, inclusion and exclusion criteria were maintained in that newly hired RNs were RNs who had been offered a position; been vetted; and, had agreed to begin full time, regular part-time, part-time, or on an as needed employment status at the healthcare setting. An RN in a staff leadership role was a bedside staff RN working on a regular basis (full time, regular part-time, part-time, or on an as needed employment status) on one of the inpatient or outpatient acute patient care units and was a recognized member on one or more of the nursing shared governance councils. For newly hired RNs the needs assessment survey was conducted on the final day of general nursing orientation prior to the start of each nurse's unit specific orientation. The needs assessment survey for RNs in staff leadership roles was completed during a nursing shared governance council meeting.

Five methods have been identified as quality data enhancements. These methods were initiated based on the data collection process described: (a) clearly define the selection criteria and target only those newly hired RNs and RNs in staff leadership positions that met the selection criteria; (b) definitively determine a method for distributing and collecting the questionnaires guaranteeing anonymity and limiting perceptions of coercion or intimidation; (c) actively recruit participants that work on all shifts across every day of the week; (d) assess the reliability of the QulSKA questionnaire using Cronbach's alpha and compare the results to those reported by Dycus and McKeon (2009); and, (e) review survey responses for completeness and determine inclusion or exclusion based on missing data points. In addition, content validity of the QulSKA

questionnaire, as revised, was determined using two subject matter experts prior to distribution to the participants. Internal consistency of the knowledge items on the QulSKA was also determined for this sample using the Kuder Richardson 20 (reported in Chapter 5)

### **Strengths and Limitations**

Several strengths and limitations were associated with the measures planned to answer the needs assessment survey questions and subsequent design methodology. Potential strengths included, but were not limited to: ready access to newly hired RNs and RNs in staff leadership positions; irrespective of the RNs assigned work group understanding of the knowledge, skills, and attitudes of the QSEN core competencies using the QulSKA were assessed; the QulSKA was determined to be a reliable and valid tool for measurement of the knowledge, skills, and attitudes of the QSEN core competencies by Dycus and McKeon (2009); and, the ability to compare and contrast the findings with other studies that used the same measurement tool. Limitations included the use of a non-probability convenience sample; the testing environment; the length of the questionnaire; and/or, potential low response rates.

A variety of interventional strategies were required to minimize the limitations. These strategies required the investigator to target multiple new hire RN orientation sessions and nursing shared governance council meetings to obtain an adequate sample size from each group; recruit participants from all shifts, days of the week, and work schedules; and, include RNs from inpatient and outpatient care units. No incentives were offered to eligible participants as a means to potentially increase the number of respondents. In the long term, educators will be solicited to incorporate the survey tool

within future general nursing orientation sessions to expand the findings and identify additional interventions for development opportunities.

### **Human Subjects Considerations**

As this needs assessment survey was intended to assess knowledge, skills, and attitudes of newly hired RNs and RNs in staff leadership roles as well as their educational and experiential backgrounds, it involved minimal risk completion of the needs assessment survey tool was considered exempt from Federal Regulations (<http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html#46.110>). Clear communication of the intent of the needs assessment survey with assurances of anonymity and aggregate reporting of results further helped to assure exempt status. Questionnaires did not include any personal identifying information and were collected in a manner that removed linkages of names to data.

The survey tool and process were reviewed and endorsed by the Human Research Review Committee at Grand Valley State University (see Appendix K) and the Institutional Research Review Board at the healthcare facility (see Appendix L) involved in this project.

To ensure participation of an adequate sample of RNs, respondents were intentionally solicited from mandatory new nursing orientation functions and from RNs in staff leadership roles while they were participating in nursing shared governance council meetings. Once recruited, all newly hired nurses and RNs in staff leadership roles meeting the inclusion criteria were encouraged to participate in the needs assessment survey. Completion of the questionnaire was not considered a requirement of the newly hired RN's orientation plan or as a component of his/her competency requirements.

Similarly, RNs in staff leadership roles from the nursing shared governance council meetings were not mandated to respond to the survey as a determinant of his/her continued participation in shared governance meetings and activities.

### **Data Analysis**

The independent variable in the first question of this project was the category of RN status as a newly hired or staff leadership RN. In the second question the independent variables were RN educational background, years of RN experience, and/or a history of previous quality improvement training that depended on the level of measurement for each independent and dependent variable. A variety of data management processes were utilized. Participant demographic attributes were reported through the use of descriptive statistics. For nominal level data frequencies and percentages were reported as appropriate.

The number of correct answers on the knowledge items of the QulSKA was totaled, and the percentage of correct items (of a possible 100%) was calculated for each respondent. The range of scores (from 0 to 100%) of the entire sample and for the two subgroups was calculated and measures of central tendency were obtained for the newly hired RNs, the RNs in staff leadership roles, and the entire sample. Measures of central tendency and associated percentages were reported in each of the six domains for the knowledge items from the QulSKA questionnaire. Newly hired RNs and RNs in staff leadership positions were grouped and compared in each of the domains. Subgroup distributions of central tendency, skewness, and kurtosis were examined using age, years of experience, and highest education level.

Similarly, total scores for the perceived skill and attitude items using a Likert-type scale response format were calculated by summing the numbers assigned to each self-assessment rating (1 to 6 or 1 to 4). The range of scores and measures of central tendency were calculated for the total sample and subgroups.

A reliability analysis of the QulSKA was necessary. Internal consistency using Cronbach's alpha was used on the QulSKA and compared to the results reported by Dycus and McKeon (2009) from their original findings. A Kuder Richardson 20 (KR20) was used to measure internal consistency of the knowledge items on the questionnaire.

### **Summary**

The practicing bedside nursing clinician, by virtue of his or her role in the healthcare setting, is pivotal in meeting patient care quality and safety expectations as delineated by the IOM (2003). Primary to the IOM (2003) recommendations is an RN's understanding and integration of the knowledge, skills, and attitudes regarding the QSEN core competencies within each practice setting. The current QSEN focus has been on pre-licensure education with only limited attention to the bedside provider's knowledge, skills, and attitudes of the QSEN core competencies and the assumed immediate impact these providers may have on achieving quality and safety outcomes.

This needs assessment survey provides additional evidence of the potential gap in knowledge, skills, and attitudes of the newly hired RNs and RNs in staff leadership roles related to the QSEN core competencies, further supporting the need to integrate QSEN core competencies in an RN's ongoing education and development. It stands to reason that healthcare settings would be better positioned to effectively address the complexities

of patient care delivery if all RN bedside providers demonstrated and modeled the knowledge, skills, and attitudes of the QSEN core competencies as set forth.

To address the aforementioned issue, a needs assessment survey was proposed. The needs assessment survey evaluated the knowledge, skills, and attitudes of the QSEN core competencies from newly hired RNs during their general nursing orientation and RNs in staff leadership roles during nursing shared governance council meetings. The two key questions addressed were: (a) do newly hired practicing acute-care RNs and RNs in staff leadership roles in a southwestern Michigan hospital demonstrate an understanding of the knowledge, skills, and attitudes of the QSEN core competencies?; and (b) in this healthcare setting was there a difference in the understanding of the knowledge, skills, and attitudes of the QSEN core competencies related to an RN's educational background, years of RN experience, and/or previous quality improvement training?

The results of this needs assessment survey are expected to inform the development of an organization specific education plan addressing identified deficiencies in participants' understanding and application of the knowledge, skills, and attitudes of the QSEN core competencies. Results could also be used as a "report-card," informing regional pre-licensure nursing education programs about the level of integration of the QSEN core competencies knowledge, skills, and attitudes in each graduate's preparation for the practice environment. Additionally, although not initially observable, would be modeling of the QSEN core competency knowledge, skills, and attitudes by bedside staff RNs that would be witnessed by pre-licensure nursing students in their clinical



educational preparation. This would provide a reinforcing connection between theory and practice.

Assessing and subsequently integrating the knowledge, skills, and attitudes of the QSEN core competencies into all practice settings can ultimately translate to improved healthcare quality and safety outcomes. Nurses who consistently demonstrate the knowledge, skills, and attitudes of the QSEN core competencies will positively impact patient care quality and safety outcomes thereby contributing to decreases in serious safety events, length of stay, failure to rescue, and ultimately, mortality. In the long term, and if used as a tool to inform and develop ongoing educational interventions, this needs assessment survey is expected to facilitate the transformation of nursing's professional identity in this organization. Nursing will then be positioned to demonstrate its capacity to positively influence quality and safety outcomes and to contribute to overall institutional effectiveness.

## Chapter Five

### Results

The results of this project, as reported in this chapter, reflect aggregate as well as disaggregated subgroup responses from participants to the demographic, knowledge, skills, and attitude items on the QulSKA questionnaire. Generally with only a few exceptions respondents completed the full questionnaire as instructed. One questionnaire submitted by a newly hired RN respondent was removed because several pages of responses to knowledge items were missing. Results are reported based on excluding this respondent.

The 73-item QulSKA questionnaire was distributed to newly hired RNs (n = 37) and RNs in staff leadership positions (n = 19). The newly hired RNs were recruited from three monthly general nursing orientation sessions. Over a two month period RNs in staff leadership positions were solicited to participate from four of six different nursing shared governance councils. Because all nurses serving on the remaining two councils were also members of the other four councils no RNs in staff leadership roles were solicited from the Nursing Education Council or the Nursing Research Council.

#### Participants

Sixty RNs in staff leadership positions were potential unduplicated participants for this project. More specifically, if an RN in a staff leadership role was a member and participated on more than one nursing shared governance council, the RN could only complete the QulSKA questionnaire once. All newly hired RNs and RNs in staff leadership positions who were asked participated in the needs assessment survey.

A total of 56 surveys were returned. One returned survey from the newly hired RN group was excluded because the questionnaire had a large number of missing responses (three pages) to the knowledge items of the QulSKA. For the most part, the remaining surveys were complete with very few missing responses. A total of 55 surveys were included in reporting the findings of this project, 36 from newly hired RNs (group 1) and 19 (32% of the unduplicated member count) from RNs in staff leadership roles (group 2). Thirty minutes were initially allotted for participants to complete the survey; however, the actual time needed to complete the questionnaire ranged from as little as 20 minutes to as much as 45 minutes. Responses to the QulSKA were collected using a paper and pencil process. Once data were collected from all respondents in both groups, individual responses were entered into the IBM SPSS Statistics 20 (2011) software package.

### **Demographics**

The mean age of all 55 respondents was 39.8 years ( $SD = 11.7$ ) and they reported an average of 8.6 years ( $SD = 11.5$ ) of nursing experience. Respondent ages ranged from 22 to 68 years old. Newly hired RN participants (group 1), on average, were 36.5 years old (range 22 – 68;  $SD = 10.9$ ). The average age of RNs in staff leadership roles (group 2) was 46.3 years (range 27 – 63;  $SD = 10.8$ ), almost ten years older than newly hired RNs.

When combined in one group years of experience, as an RN, ranged from 0 to 37. The mean years of experience for newly hired RNs was 2.8 years (range 0 to 33;  $SD = 6.0$ ). For RNs in staff leadership roles the average number of years of experience was 19.6 (range 2 to 37;  $SD = 11.3$ ). Overall, 33 respondents or 60% had five years or less of

nursing experience with 32.7% ( $n = 18$ ) having no years of nursing experience. Over three-quarters or 86% of the newly hired RN group had little to no RN experience (0 to 5 years). As would be expected, all of the respondents with no years of experience were from the newly hired RN group. Based on this finding one might assume these newly hired RNs were recent nursing graduates; however this question was not included on the survey. RNs with greater than 25 years of experience made up the third largest proportion of respondents or 16.4% ( $n = 9$ ) (see Table 1) of which 89% were from the group of RNs in staff leadership roles.

Table 1

*Years of Experience in Nursing as Reported by Group*

Years of Experience	All		Newly Hired RNs		RNs in Staff Leadership Roles	
	N = 55		$n = 36$		$n = 19$	
	$n$	%	$n$	%	$n$	%
0	18	32.7	18	50.0		
1-5	15	27.3	13	36.1	2	10.5
6-10	7	12.7	3	8.3	4	21.1
11-15	2	3.6	1	2.9	1	5.3
16-20	2	3.6			2	10.5
21-25	2	3.6	1	2.9	2	10.5
More than 25	9	16.4			8	42.1

As reported in Table 2, the associate degree in nursing (ADN) was the most frequently reported nursing degree of respondents. Not only was it the most frequent

level of initial education, but it was also the highest level of education for more than 54% of respondents. In this setting only 13% ( $n = 7$ ) of the RN respondents have advanced their formal nursing education beyond their initial preparation.

### **Knowledge**

Items 1 through 32 on the QulSKA questionnaire measured knowledge (see Appendix I). Items 1 through 26 were multiple choice questions and items 27 through 32 required a true or false response. Multiple choice items had one and only one correct answer, although three respondents circled more than one answer for several of the questions. In these cases, when more than one answer to any one question was marked, the answer was considered incorrect even if the correct answer was among the responses circled. That is, one could not assume which if any of the answers the respondent would have selected as his/her single best response/answer. The initial directions on the QulSKA for the multiple choice items instructed respondents to select the “BEST” answer.

Table 2

#### *Nurse Respondents Educational Preparation*

	Initial Education Level		Highest Education Level	
	<i>n</i>	%	<i>n</i>	%
Nursing Degree				
Associates	40	72.7	31	54.5
Diploma	2	3.6	2	3.6
Bachelors	13	23.2	18	32.1
Masters	0	0	2	3.6
Missing	0	0	2	3.6

The mean score on the knowledge portion of the QulSKA questionnaire for newly hired RNs was 67.6% (SD = 10.32) (range 47 to 84%). For RNs in staff leadership roles the mean score was 72.1% (SD = 8.06) (range 50 to 88%). The overall mean score when newly hired RNs and RNs in staff leadership roles were aggregated was 69.2% (SD = 9.76).

Table 3 disaggregates knowledge scores by highest education level. Knowledge scores were not significantly different between associate, diploma, baccalaureate, or masters prepared nurses as reported from the needs assessment.

Table 3

*QSEN Knowledge Scores by Level of Highest Nursing Education Attained*

	<i>n</i>	%	SD	Minimum %	Maximum %
Combined	55	69.2	9.8	47	88
Associates	30	67.7	9.2	50	84
Diploma	2	75.0	4.2	72	78
Bachelors	18	71.7	10.0	50	88
Masters	2	72.0	12.7	63	81
Missing	3	62.7	14.3	47	75

General knowledge scores for each QSEN core competency were highest in teamwork and collaboration for both groups. RNs in staff leadership roles scored lowest in evidence-based practice while newly hired RNs were least knowledgeable in informatics (see Table 4). A Mann-Whitney U was used to test for differences between newly hired RNs and RNs in staff leadership roles on overall knowledge and knowledge

in each of the QSEN domains (see Table 4). The only QSEN domain in which the two groups differed significantly was informatics ( $U = 450, p = .035$ ) (see Table 5). The Mann-Whitney U, a nonparametric test, was used because of its ability to test for differences between two independent groups (newly hired RNs and RNs in staff leadership roles). More specifically, the Mann Whitney U was used rather than the t-test because of the small sample size and the determination that that the two groups were not normally distributed with regards to age, years of experience, and highest education level.

Table 4

*Group Knowledge Differences Using Mann-Whitney U*

Knowledge Domains	Mann-Whitney U	<i>p</i>
Overall	434.50	.100
Patient-centered Care	416.00	.160
Teamwork & Collaboration	443.00	.052
Evidence-based Practice	289.50	.330
Quality Improvement	388.00	.405
Safety	392.50	.340
Informatics	450.00	.035

The Kuder Richardson 20 (KR20) was used to measure the internal consistency of the QulSKA knowledge test items (questions 1 – 32). For the KR20 procedure, SPSS included all but two of the 32 items for the analysis. Questions 24 and 25 were removed from analysis because there was no variance. That is to say, every respondent answered these two questions correctly. Question 24 referred to patient-centered care and question 25 referenced teamwork and collaboration. The KR20 coefficient for the remaining 30

items was .517 a finding revealing low internal consistency. Of note, Dycus and McKeon (2009) did not report a KR20 value or subsequent analysis.

Table 5

*Knowledge Scores by QSEN Domain by RN Group*

Domains	Newly Hired RNs		RNs in Staff Leadership Roles	
	%	SD	%	SD
Patient-Centered Care	66.1	19.0	72.6	11.9
Teamwork & Collaboration	72.2	11.9	81.1	16.9
Evidence-Based Practice	65.8	20.9	62.4	12.2
Quality Improvement	66.4	18.1	70.8	16.2
Safety	68.9	21.1	74.7	14.7
Informatics	*64.9	27.6	*80.9	16.7

\* $p = .035$

**Skills**

On the skill portion of the QulSKA questionnaire participants were asked to circle the response that most closely reflected their perceived level of skill. Statements reflected the six QSEN domains and responses were based on a Likert type six-item scale where 1 corresponded with “novice” (not familiar with, and never used); 2, “familiar” (heard of the process/term, but never used); 3, “understood” (understand the process/term and have used one to two times); 4, “skilled” (understand the process/term and have used three to



five times); 5, “proficient” (understand the process/term and have used six to eight times in my work); and, 6, “expert” (understand the process/term and have used greater than or equal to nine times in my work and am able to teach the concept to others) (Dycus & McKeon, 2009) (see Appendix I). When aggregated, the response endorsed most frequently by study participants from both groups was “proficient” to the statements concerned with “patient-centered care” (72.7%); “working in the role of a team member” (69.1%); and, “electronic medical record” (67.3%) (see Table 6). Conversely, when responses were aggregated from both groups, participants identified their lowest level (novice/familiar) of proficiency/skill to statements regarding quality improvement methodologies such as “analysis of variance (ANOVA)” (92.8%); “pareto charts” (90.9%); “regression analysis” (89.1%); complex statistical analysis such as “t-test” (87.3%); “control charts” (81.9%); “failure modes and effects analysis (FMEA)” (80%); “chi-square” (77.3%); and “normal (Gaussian distribution)” (76.4%) (see Table 7). They also considered themselves novice in the use of graphical representations of “run charts” (71.5%); “histograms” (69.1%); and, “Plan-Do-Check-Act or Six Sigma” (56.3%). On the 6-point scale the mean rating for all participants on skills was 2.98 (SD = 1.16). A t-test for independent groups was used to test for differences between each group mean skills score. The results indicated that newly hired RNs and RNs in staff leadership roles were not significantly different in mean scores.

When disaggregated, the responses of newly hired RN participants were similar to those of the total group. They rated their highest level of skill proficiency/expertise to the statements: “patient-centered care” (66.6%); “assuming the role as team member” (63.9%); and, “electronic medical record” (61.1%). The mean skill rating level for newly

hired RNs was 2.84 (SD = .97) which places this group between “familiar” and “understand” on the Likert type scale.

Table 6

*Top Five Rated Skill Proficiencies*

Domain (Skill)	Mean Rating	SD
PCC (PCC)	4.98	1.34
INF (Electronic Medical Record)	4.85	1.45
T&C (Role as Team Member)	4.82	1.35
PCC (Religious & Cultural Values)	4.29	1.38
EBP (Integrating best practices or guidelines into everyday clinical practice)	3.98	1.55

Note: PCC – Patient-centered care; INF – Informatics; T&C – Teamwork and Collaboration; EBP – Evidence-based Practice

RNs in staff leadership roles rated themselves as being most proficient/expert in: “patient-centered care” (84.3%); “assuming the role as team member” (79%); “electronic medical record” (79%); “assuming the role as team leader” (73.7%); “integrating religious and cultural values into the patient’s plan of care” (57.9%); “locating and using high quality sources of healthcare information” (52.6%); and, “putting most current best practices or guidelines into my everyday clinical practice” (52.6%). The mean rating of perceived skill level on all items for RNs in staff leadership roles was 3.13 (SD = 1.33) which corresponds to “understand” on the Likert type scale as defined. This was slightly higher than that reported by the newly hired RN group.

Newly hired RN participants indicated their lowest level of skill as novice/familiar (one to two) for the statements regarding: “ANOVA” (91.6%); “pareto

charts” (88.9%); “regression analysis” (88.8%); “chi-square” (83.3%); “failure modes and effects analysis” (83.3%); “t-test” (83.3%); “run charts” (81%); “control charts” (80.5%); “normal (Gaussian distribution)” (73.2%); “histograms” (72.3%); “root cause analysis” (69.5%); “quality improvement methodology such as Plan-Do-Check-Act or Six Sigma” (66.7%); “process mapping or flowcharting” (52.8%); and, “computerized physician order entry” (55.5%). RNs in staff leadership roles rated themselves as having their lowest level of skill (novice/familiar) regarding the statements: “t-test” (94.8%); “chi-square” (94.7%); “ANOVA” (94.7%); “pareto charts” (94.7%); “regression analysis” (89.5%); “run charts” (84.3%); “normal (Gaussian distribution)” (84.3%); “control charts” (84.2%); “failure modes and effects analysis” (73.7%); and, “histograms” (73.1%). Overall, both groups of nurses rated themselves lowest for statistical analysis and quality improvement skills.

Table 7

*Bottom Five Rated Skill Proficiencies*

Domain (Skill)	Mean Rating	SD
QI (Pareto Charts)	1.31	.77
QI (ANOVA)	1.36	.80
QI (Regression Analysis)	1.42	.74
QI (T-test)	1.50	.91
QI (Chi-square)	1.51	.92

Note: QI – Quality Improvement; ANOVA – Analysis of Variance

## **Attitudes**

For the 11 general statements regarding the importance of a nurse's role regarding items 62 - 73, respondents to the QulSKA questionnaire in this project were asked to identify the one response that best represented their perception using a four item Likert-type scale where 1 represented "not important at all;" 2, "low importance;" 3, "moderate importance;" and 4, "high importance" (see Appendix I). Each of the statements was related to a QSEN domain and represented a participant's attitude toward that domain. Almost all of the statements were rated as either 3, "moderate importance" or 4, "high importance." The mean rating for all statements was 3.85 (SD = .19). Statements 63, 64, 65, and 67 garnered a rating of 2, "low importance," by one respondent. This rating was understandable for statement 63 and 64 as these were related to the nurse's role in quality improvement. However, statement 65 talked to teamwork and collaboration and 67 to evidence-based practice, so the rating is somewhat surprising for these items.

The average rating of newly hired RNs on the 11 attitude items was 3.86 (SD = .08) and that of RNs in staff leadership roles was 3.84 (SD = .15), nearly identical ratings. A t-test for independent groups was used to test for differences between each group's mean attitudes score. The results indicated that newly hired RNs and RNs in staff leadership roles were not significantly different in mean attitude score. Overall, respondents perceived the nurse as important to patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics.

## **Reliability**

A Cronbach's Alpha was used to measure the reliability for both the skills and attitude Likert-type items, items 33 through 73, on the QulSKA questionnaire. The

Cronbach's Alpha for items 33 through 73 on the QulSKA was  $\alpha = .923$ , suggesting high internal consistency among the items on the questionnaire.

### **Summary**

Results from 55 respondents were presented, 36 from the subgroup of newly hired RNs and 19 from RNs in staff leadership roles. Years of nursing experience ranged from 0 to 37 with newly hired RNs averaging 2.8 years and RNs in staff leadership roles 19.6 years. The majority of respondents received their initial educational preparation at the associate degree level. Similarly, the highest level of educational preparation was also at the associate degree level.

When aggregated, the overall QSEN knowledge scores averaged 69.2% with the highest scores reported in teamwork and collaboration. The only QSEN domain in which the two groups differed significantly was in informatics where the newly hired RNs scored a 64.9% while RNs in staff leadership roles scored 80.9% ( $U = 450, p = .035$ ).

Perceived skill proficiency as reported in each subgroup was 2.84 ( $SD = .97$ ) for newly hired RNs and 3.13 ( $SD = 1.33$ ) for RNs in staff leadership roles. Both groups rated their skills lower on those items related to quality improvement tools and methodologies.

Both groups rated the importance of the nurses role as important to highly important on the 11 attitude items. The mean attitude scores were not significantly different and were very similar. Newly hired RNs average rating was 3.86 ( $SD = .08$ ) and RNs in staff leadership roles was 3.84 ( $SD = .15$ ).

The KR20 coefficient for items 1 through 32 on the QulSKA was low at .517. Conversely, the Cronbach's Alpha on items 33 through 73 was  $\alpha = .923$  suggesting high internal consistency among the items on the questionnaire.

## Chapter Six

### Implications

The underlying premise for this project was to establish a clearer understanding of the baseline knowledge, skills, and attitudes of the QSEN core competencies among two groups of practicing bedside nurses at a midsize tertiary healthcare facility. The results of the project are expected to drive the development of a collaborative educational intervention consistent with the organization's mission, vision, and strategic priorities. Implementation of agreed upon teaching/learning strategies applying recognized QSEN tools and addressing key areas of organizational need has the potential to profoundly impact patient care quality and safety outcomes.

Quality healthcare has always been important; however, its level of importance has taken on additional significance with the linking of quality outcomes to reimbursement. One tool currently being used to measure quality outcomes is the Hospital Consumer Assessment of Healthcare Providers and Systems survey, otherwise known as HCAHPS. This tool was developed by the Center for Medicare and Medicaid Services (CMS), the Agency for Healthcare Research and Quality (AHRQ), and the Department of Health and Human Services as a metric that represents the patient's perception of quality of care. The HCAHPS survey tool was built around three overarching goals: "1) To produce comparable data from a patient's perspective of care delivery to inform other consumers to make objective meaningful comparisons among healthcare settings; 2) To create incentives for healthcare organizations to improve their quality of care; and, 3) To enhance public accountability in healthcare by increasing the transparency of the quality of hospital care" (Studer, Robinson, & Cook, 2010, p. 2). The

HCAHPS survey has been set up as part of a values based purchasing initiative that ties reimbursement to quality outcomes (Studer, Robinson, & Cook, 2010). The implementation of HCAHPS and other core measures in 2013 will transition healthcare economics to a pay-for-performance system requiring organizations to hardwire quality. This is one point at which the QSEN core competencies can enhance quality and safety outcomes and influence a healthcare organization's bottom line, maximizing reimbursement and the patient experience.

The findings of this project will drive improvement action plans that facilitate achievement of organization specific quality and safety initiatives mandated by consumers, communities, national accreditation entities, and payors including CMS. Besides positively impacting quality and safety outcomes, integrating the knowledge, skills, and attitudes of the QSEN core competencies into nursing practice could improve quality measures, and subsequently HCAHPS scores.

## **Discussion**

This project generated two primary questions. To answer the first question: do newly hired practicing acute care RNs and RNs in staff leadership roles demonstrate an understanding of the knowledge, skills, and attitudes of the QSEN core competencies? the results for this healthcare setting would be mixed at best. That is, for the most part, newly hired RNs and RNs in staff leadership roles did not demonstrate a strong knowledge base regarding the QSEN core competencies attaining an aggregate score of 69.2%. Each group perceived their level of proficiency with the overall QSEN core competencies at or near the “understanding” level on the Likert type scale (2..98, SD = 1.16). This would indicate respondents, as a whole, do not believe they have the skill



proficiency and subsequent abilities to apply the QSEN core competencies in practice. Responses to the attitude statements however demonstrated their perceptions that the nurse's role was important to highly important in each of the QSEN domains (3.85, SD = .19). The respondents indicated it was important to highly important that the nurse have the necessary knowledge and skill sets to effectively impact patient care quality and safety.

The answer to the second question: is there a difference in the understanding of the knowledge, skills, and attitudes of the QSEN core competencies related to newly hired RNs or RNs in staff leadership roles' educational background, years of RN experience, and/or previous quality improvement (QI) training? was not conclusive. On average, knowledge scores of RNs were not significantly different based on an RN's highest education level. A nurse's years of RN experience was also not a determinant in a greater understanding of the knowledge, skills, and attitudes of the QSEN core competencies in this setting. The higher level of perceived skill proficiency by RNs in staff leadership roles may be related to their years of experience. Many participants in this needs assessment survey indicated no previous QI training (60%,  $n = 33$ ). Although not defined in the QulSKA questionnaire, QI training could be considered anything from collecting data through chart audits, to running the data and reporting the findings. The perceptions of the participants regarding quality improvement may be associated with the perceived low level of skill proficiency in the quality domain.

This needs assessment was completed to inform the development of an organizational interventional strategy to facilitate enhanced understanding and application of the QSEN core competencies for RNs providing bedside care in the setting.

Initial interventions will focus on the development of those core competencies where knowledge scores on the QulSKA were less than 70% in each group and as aggregated. For newly hired RNs the emphasis may be placed on informatics and evidence-based practice. Education for RNs in staff leadership roles might initially concentrate on evidence-based practice and quality improvement methodologies that can then influence other experienced nurses who look to these leaders to set standards of care.

The QSEN knowledge scores for RNs in staff leadership roles and newly hired RNs were not strong, and the difference in the overall mean score between the groups was not significant. This might indicate there is a knowledge gap with regards to the QSEN core competencies across all domains and across varying levels of RN experience. Dycus and McKeon (2009) did not establish a “passing” score for the knowledge portion of the QulSKA, as no minimum standard was reported to be considered competent in the six QSEN domains. Subsequently, using a common standard of 70% as average or an acceptable passing standard, a score of 70% could be used as the minimum threshold cut score to be considered QSEN competent on the knowledge portion of the QulSKA questionnaire.

Looking at each QSEN core competency in this project RNs in staff leadership roles scored highest on the knowledge questions related to teamwork and collaboration (81.1%) closely followed by informatics (80.9%) while quality improvement (70.8%) and evidence-based practice (62.4%) had the lowest percentage of correct responses. The lower score in the quality improvement domain was further supported on the self-reported skills assessment by this group of RNs. RNs in staff leadership roles considered themselves “novice/familiar” when using graphical tools to represent quality

improvement data such as run charts, control charts, histograms, and pareto charts; as well as simple statistical data analysis such as Gaussian distribution and more complex statistical analyses like t-test, chi-square, analysis of variance (ANOVA), regression analysis, and failure mode and effect analysis. This may be related to a limited exposure and subsequent understanding by RNs in staff leadership roles related to QI graphical tools, statistical analysis, and QI tools utilized in the practice setting.

Respondents to the attitude statements rated the nurse of moderate to high importance in each of the QSEN domains. Overall there was no significant difference between newly hired RNs (M = 3.86) and RNs in staff leadership roles (M = 3.84) perceptions.

### **Conceptual Framework**

Donabedian's (2003) model of quality was used as the conceptual framework for this project. In his model the relationship between structure, process, and outcome was used to assess quality in healthcare. This project focused on assessing the knowledge, skills, and attitudes of the QSEN core competencies of the RN bedside provider (newly hired RNs and RNs in staff leadership roles). These core competencies closely linked with Donabedian's (2003) attributes of quality healthcare (*efficacy, effectiveness, efficiency, optimality, acceptability, and equity*).

For this project a conceptual model of nursing quality was proposed (see Appendix H). In this model quality and safety outcomes in healthcare were seen as being impacted by nursing factors such as demographic variables, nursing educational preparation, and the QSEN core competencies. The QSEN core competencies were also considered as influencing nursing factors and educational preparation to impact quality

and safety outcomes in healthcare. This needs assessment survey acknowledges the provider specific technical and interpersonal QSEN core competency knowledge, skills, and attitudes can have in impacting quality care.

To enhance outcomes and ultimately quality, prior to implementation of any QSEN education strategies an assessment of other competing organizational structures and processes in which the educational interventions will be implemented is necessary. For example, questions to explore include: (a) will the organization have the human and material resources to support and sustain the implementation of agreed upon educational interventions? If so, to what extent? and (b) how will the intervention be implemented to best fit within the culture, subcultures, and characteristics of the organization utilizing a conceptual framework for implementation consistent with achieving the QSEN core competencies among all RN bedside providers in this setting?

Understanding and mitigating gaps in processes requires one to assess the current model of healthcare delivery among clinicians and between clinicians and patients/significant others. Implementing targeted or more broad-based educational interventions that address any or all of the QSEN core competencies will necessitate alignment of those interventions within the accepted model of healthcare delivery that demonstrates a pathway to enhanced quality and safety outcomes as described by Donabedian (2003).

### **Effectiveness, Feasibility, and Sustainability**

Resulting from this project, from an effectiveness perspective, the focus will be on the potential benefits educational interventions can have on improving patient care quality and safety. Aday et al. (2004) described effectiveness as “the results achieved in

the actual practice of healthcare with typical patients and providers” (p. 57). This project determined the level of knowledge, skills, and attitudes of the QSEN core competencies in newly hired RNs and RNs in staff leadership roles in order to inform the development and implementation of an educational intervention that will ultimately impact quality and safety outcomes.

The next step in the process is the development and implementation of a plan that will influence the health outcomes patients experience as a result of nursing’s competence to deliver appropriate care that is patient-centered, collaborative, evidence-based, safe, informed, and achieves quality standards. This project and its subsequent roll-out plan of action will impact the organization at the micro-level as it focuses on the patient and nurse connection within the larger healthcare institution. To the extent possible, any implemented intervention will need to influence the care delivery process in order to achieve clinical health improvements.

The feasibility of developing and implementing a sustainable educational strategy that meets the long-term goals of this organization will be dependent on several elements influenced by what Donabedian (2003) referred to as the condition or structure under which care is provided. In this case, it would be the nursing care provided by the QSEN competent RN. Educational interventions should take advantage of structures and processes already in place such as the new hire nursing orientation program, the nursing shared governance model, and the RN performance management process. To limit redundancies and costs associated with a broad-based implementation strategy, linking the QSEN core competencies into pre-established house-wide mandatory educational requirements should be explored. This process would capture all RN care providers and

could be coordinated with unit specific and organization-wide quality improvement initiatives.

Ultimately, any strategy used to effectively implement education interventions must balance cost with impact on quality and safety outcomes or a return on investment. This is why it is imperative that implementation strategies be evidence-based, innovative, cost effective, flexible, sustainable, and budget neutral to the extent possible. The costs associated with any educational intervention should be offset by better health outcomes, decreased failure to rescue and mortality, and improved patient satisfaction as measured by HCAHPS and/or other mandated assessment measures.

### **Implications for Advanced Nursing Practice**

RNs in advanced practice roles are in a unique position to lead healthcare transformation and to achieve robust and consistent levels of quality and safety outcomes. The findings of this survey highlight multiple opportunities for RNs in advanced practice roles to lead sustainable change and create a culture of quality and safety. One of the ways individuals in these roles can accomplish this is by influencing change through the translation of research and evidence-based practices of the QSEN core competencies to best fit within the organizational culture. This requires a thorough understanding of the QSEN core competencies, healthcare systems, safe patient care strategies, and the ability to work collaboratively with partners from other disciplines to promote quality and safety improvements at all levels of the organization.

Taking what has been learned from this specific project an RN in an advanced practice role could create innovative educational approaches that facilitate mastery of the QSEN competencies at the point of care. This would necessitate improving the education

and training of new nurses as well as the ongoing development of practicing bedside providers. Using acknowledged best-evidence the advanced practice nurse could imbed quality and safety initiatives within an organization's culture to sustain improvement and leverage long-term change. Sherwood (2012) stated, "the complex range and subtleties of the knowledge, skills, and attitudes essential to quality and safety improvements creates challenges in advancing practice, education, and research" (p. 327). Where better could the advanced practice nurse influence healthcare delivery than through practice improvements, educational transitions, and quality improvement priorities to implement innovative approaches that impact quality and safety initiatives?

An RN in an advanced practice role in this acute care setting could also partner with area schools of nursing using the outcomes of this project as an opportunity to influence the integration of the QSEN core competencies throughout nursing curricula. This relationship would assure better coordination of educational preparation with practice. Practice education partnerships should be explored and cultivated as an opportunity to redesign nursing education to better align with healthcare delivery models. This can be accomplished by transitioning to alternative pedagogical modalities that are interactive, engaging, and transformational. If nursing is to achieve sustainable breakthroughs in quality and safety outcomes at the point of care, integrating and emphasizing quality and safety education in the preparation and ongoing development of clinicians is critical (Triolo, 2012). More specifically, the findings of this project suggest a disconnect between staff knowledge and their perceived skill sets related to several QSEN core competencies as measured by the QulSKA. Focused energy should be made at determining a realistic threshold or RN understanding of these core competencies and

how best to facilitate care provider learning and application. If a healthcare setting expects the bedside provider to understand and apply many of the QI methods along with measurement tools and analysis processes, additional focus is needed on how these methods, tools, and processes fit into their work environment.

As stated previously, implementation of any educational intervention innovation addressing QSEN knowledge, skills, and attitudes will need to align with the organization's overall mission, vision, and strategic priorities. Any intervention will need to include broad-based organizational support and advocacy from all levels of management. A focus on training and support with meticulous attention given to monitoring the impact on patient care quality and safety outcomes is necessary.

The Doctor of Nursing Practice (DNP) prepared RN would serve in a pivotal role to positively effect change moving the findings of this project into a meaningful interventional strategy translating knowledge into practice and improving care delivery. Primary roles for which the DNP has been educated are leader, advocate, scholar, innovator, educator, and clinician. Each of these roles brings a unique set of competencies to effectively manage change in a complex healthcare environment.

As a leader, the DNP would be able to effectively manage the planning, implementation, and evaluation of a complex evidence-based project, such as this. Key to this work is a DNP's understanding of organizations and his/her ability to navigate systems. His/her ability to promote inter-professional collaboration and manage complexities would facilitate organizational transformation. The DNP, as leader, would demonstrate the capacity for self-awareness integrating supportive competencies such as: personal power; interpersonal communication; team building; negotiation skills; conflict



management; coaching; mentoring; and agent for change (Krejci & Malin, 2010) to effectively implement an innovative project of this magnitude.

The DNP in this healthcare setting would be expected to lead the development of a collaborative educational intervention that targets key knowledge, skills, and attitudes of the QSEN core competencies. Interventional strategies would be based on evidence-based practice using pedagogical tools that are engaging, innovative, and substantive.

The DNP at this level must be able to advocate for the nursing profession promoting professional competence to protect patients and improve quality and safety outcomes. The relevancy of advocacy would be reflected in the actions taken and solutions proposed that influence patient care decision making processes at the bedside by the RN care provider.

Although “educator” is not recognized as a key role of the DNP by the AACN; “the DNP is prepared with advanced skills and specialized knowledge in an identified area of nursing including translation of science into practice” (Butler, 2010, p. 170). As an educator, the DNP in this setting, would integrate the findings of this project into clinical practice improvement processes establishing relevancy at the bedside and at the systems level. It’s important that the DNP as educator and leader facilitate the translation of the QSEN core competencies into nursing’s practice role if healthcare delivery is going to effectively address the IOM (2003) recommendations. The DNP nurse should also use the role as a clinical practice partner to educate both current and future generations of nurses.

## **Facilitators and Barriers**

Another key determinant to effectively implementing any interventional strategy is to accentuate the facilitators and mitigate the barriers to the extent possible. For this project in this healthcare setting some of the facilitators are the organization's commitment to quality through their endorsement of a culture of safety practices; leadership support; relationship-centered care; nursing shared governance model; HCAHPS outcome reporting; and, strategic priorities. Some of the potential barriers to implementation and sustainability include: multiple competing organizational priorities; human and capital resources; appropriate skill mix and RN and Patient Care Associate (PCA) turnover; QSEN champion(s); organizational knowledge of the QSEN core competencies; and, infrastructure to support and sustain another important and critical initiative.

## **Limitations**

The use of a paper/pencil methodology to collect data from respondents was a limiting factor in participants' ability to collaborate on their answers on the questionnaire. That is, the paper/pencil process dissuaded collaboration in favor of individual effort. A computer based system may have encouraged collaboration on the knowledge portion of the questionnaire and could have also resulted in a lower response rate as the surveyor would have been dependent upon follow-through on the part of the identified participants.

The QulSKA questionnaire was a reliable tool to assess the knowledge, skills, and attitudes of newly hired RNs and RNs in staff leadership roles in this project ( $\alpha = .923$ ); however, the internal consistency of questions 1 through 32 using the KR20 was low

(KR20 = .517). This will require additional revisions to the knowledge items and further testing to assure a higher level of consistency.

As discussed by Dycus and McKeon (2009), the length of the tool could be considered a limiting factor to broad-based assessment of QSEN core competency needs of all RN bedside providers. One might consider focusing on staff knowledge initially as enhanced knowledge should impact perceived skills. Expanding this project to include additional staff RNs would provide the organization with a richer data set and additional information regarding the potential knowledge, skills, and attitude gaps among practicing RNs related to the QSEN core competencies. Perhaps targeting an assessment of medical/surgical nurses would be a first step in this process. As medical/surgical nurses in this setting make up the largest proportion of bedside providers, assessing their knowledge, skills, and attitudes would provide the organization with a broader level of assessment of nursing needs.

The time required to complete the questionnaire ranged from about 20 to 45 minutes. For the most part, adequate time was allotted within the venues used to collect data for this project. Moving forward, unless release time is approved for additional staff RNs to complete the QulSKA questionnaire at the unit level, the number of respondents could be minimal, leaving the nursing division with insufficient data from which to develop appropriate educational interventions.

Condensing the number of items on the survey tool could potentially increase the probability of additional respondents participating in the project. In looking at the QulSKA, and more specifically many of the skill items related to QI methodologies and terms, for the most part, ADN and BSN graduates, working in staff positions, may have

had only minimal exposure, and thus, limited proficiency. Many of the QI tools listed on the questionnaire might be more relevant for the role of a quality improvement specialist, clinical nurse specialist (CNS), or advanced practice nurse (APN). All three, by virtue of their roles in an acute care setting, should be expected to facilitate ADN and BSN understanding of QI data and tools, using this knowledge to inform clinical decision making and improve quality and safety outcomes. Although each QI item is unique, one might consider eliminating or combining similar items on the questionnaire to decrease the length of the tool.

Another limitation of this project was the small sample size of RNs in staff leadership roles. Of a possible pool of 60 respondents only 19 or 32% unique RNs completed the survey. The 19 respondents represented 100% of those RNs in staff leadership roles that attended at least one of four nursing shared governance council meetings during the data collection period, so the willingness to participate was present. The low attendance at meetings may be related to the timing of the survey, which was completed over two summer months that notoriously have high paid time off utilization by RN staff. A high percentage of RNs using vacation time coupled with unplanned sick leave and/or high census/acuity may have adversely impacted staffing. Subsequently, these issues could have negatively impacted the ability of the RN in a staff leadership role to leave his/her unit to attend scheduled nursing shared governance council meetings.

Over the previous year as part of a corporate initiative this healthcare organization has committed itself to decreasing serious safety events by 40%. Over 100 mandatory inservices were held prior to this needs assessment in which a variety of quality and safety tools were discussed. It is conceivable but unknown whether this work may have

had an impact on the survey responses of RNs in staff leadership roles. Although the material covered during the inservices did not include QulSKA topics, the intent of these inservices may have touched on many elements of the QSEN core competencies.

The large number of newly hired RNs with little to no nursing experience in combination with a majority of RNs educationally prepared at less than a BSN level may have been the reason behind lower QSEN knowledge scores. However, to assess this possibility, a larger sampling of BSN prepared graduates with little to no nursing experience to compare with the ADN graduates would be needed.

Additionally, the QulSKA questionnaire was completed by newly hired RNs on their final day of a two-week mandatory classroom orientation period. It is unknown what impact seat fatigue may have had on their performance on the knowledge scale. It is conceivable the newly hired RNs did not take their time and fully respond to the questionnaire as intended. In negotiating time with the institution's staff educators for administration of the QulSKA the "real-world" challenges of moving QSEN work to practice is illustrated by this situation where a less-than-optimal timeframe had to be utilized.

### **Recommendations**

When comparing the reported level of skills in the six QSEN core competencies both groups were more likely to rate their level of proficiency as novice/familiar (one to two on the six point Likert type scale) for items in the QI domain. Both newly hired RNs and RNs in staff leadership roles reported their level of proficiency higher (five to six on the six point Likert type scale) in the areas of teamwork and collaboration, patient-centered care, evidence-based practice, and informatics. Of note is the apparent

disconnect between the newly hired RNs' perceived level of skill in the informatics domain and their overall mean score of 64.9% on the informatics core competency knowledge questions on the QulSKA questionnaire. That is, newly hired RNs, on average, reported their skills in informatics higher than their mean informatics knowledge score demonstrated.

Responses from RNs in staff leadership roles indicated a perceived higher level of proficiency in three of the QSEN domains: teamwork and collaboration, patient-centered care, and evidence-based practice. These attributes may be impacted by their years of RN experience; unit of practice or practice environment; highest educational level attained; and/or, organizational, as well as unit culture and characteristics.

Additional education and training regarding evidence-based practice and quality improvement terms and methodologies should be a consideration for the RN bedside provider consistent with the RN role and overall organizational expectations. Realistically, unless the RN bedside provider is consistently immersed in quality improvement data related to his/her area of clinical specialty, gains in reported skill proficiency or expertise in this specific QSEN quality improvement domain could be limited.

Interventions targeting newly hired RNs may require the organization to commit to addressing QSEN core competency assessment and education as a formal ongoing component of each RN's professional development plan. Continuing education activities could target critical QSEN knowledge, skills, and attitudes that address strategic quality and safety initiatives. Processes could be established whereby broad-based as well as one-on-one and/or small group education modules are created that best meet the needs of

the unit, division, and organization. The newly hired RNs scored less than 70% on all of the QSEN core competencies, so the organization should determine a suitable priority upon which to build minimum expectations.

The organization may want to consider reorganizing the general nursing orientation program to better align with each of the QSEN core competencies: patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics. Aligning the care provider's orientation to incorporate the QSEN core competencies could provide a framework from which the organization introduces new employees to institutional quality and safety processes, initiatives, and expectations. Each aspect of the orientation program could target key knowledge, skills, and attitudes critical to meeting organization-wide success indicators. Barriers for successful implementation could include, but are not limited to, inadequate resources including staff who are not skilled and knowledgeable about QSEN; lack of dedicated staff to attend to the project; lack of leadership support; organizational predisposition and capacity for change; and, staff adoption.

Another option that could further support continuing education efforts might include matching newly hired RNs with seasoned unit RNs who understand and consistently demonstrate the QSEN core competencies. This suggests every unit/department have practicing bedside staff RNs that meet the predetermined QSEN core competency criteria. This would require the organization invest resources on the assessment and development of preceptors to enhance their understanding and demonstration of the knowledge, skills, and attitudes of the core competencies.

The organization could consider screening future RN applicants to better assess each candidate's level of understanding of the QSEN core competencies. This would require local and regional schools of nursing be more intentional and transparent at integrating the QSEN core competencies in their curricula and possibly validating these competencies to local employers. Considering that the majority of newly hired RNs and RNs in staff leadership roles were associate degree graduates, the organization is well positioned to demand better prepared graduates with substantive competence in each of the QSEN domains. As the organization is a major employer of RNs, schools of nursing wishing to accomplish high job placement rates will then want to graduate RNs competent in each of the QSEN domains. These RNs would then be given greater consideration for open positions within the organization. Their value and credibility as QSEN competent newly hired RNs would facilitate the organization's achievement of its strategic priorities and improve quality and safety outcomes.

An additional opportunity for this healthcare organization could include integrating the QSEN core competency knowledge, skills, and attitudes as a part of the RN performance management system (evaluation tool). The development of these points in the performance management tool would need to include RNs in staff leadership positions as well as education and nursing leadership. The tool should objectively measure RN performance based on the knowledge, skills, and attitudes of the QSEN core competencies. If the results of the RN's performance measures are aggregated, targeted interventions could be developed that are unit and nurse specific.

Although education in each of the QSEN domains is important the area of greatest need, as demonstrated in this project, falls within the area of quality improvement.



Depending on the organization's strategic priorities and access to appropriate, and as yet to be determined resources and field experts, the QSEN website could be used as a valuable resource to facilitate evidence-based interventional strategies along the teaching/learning continuum.

To facilitate newly hired graduate RN preparation in the knowledge domain of informatics, the organization should consider enhancing students' exposure to the electronic medical record during their clinical experiences. Area schools of nursing might consider investing in a generic electronic medical record that could be used as an educational tool to better prepare students for their clinical experiences. Fully executed simulation and lab activities could be documented in the electronic medical record as a component of the teaching/learning strategy.

In addition, a variety of teaching/learning strategies should be explored and further considered that best fit within the clinical environment; unit culture; organization priorities; staff accessibility and availability; leadership support; and, overall RN readiness. The teaching/learning strategies that could be deployed include: simulation (low to high-fidelity) activities; case-based scenarios; problem-based learning; online or blended learning; traditional lecture/discussion; brown-bag presentations; group activities; journal clubs; coaching/mentoring models; small group discussions; and/or, train the trainer.

### **Conclusions and Summary**

Newly hired RNs in this project were typically associate degree graduates with little to no RN experience and were about 10 years younger in age than RNs in staff leadership roles. The largest variance on the knowledge portion of the QulSKA was in

the informatics domain. RNs in staff leadership roles scored significantly higher ( $U = 450, p = .035$ ) on the knowledge core competency questions related to informatics ( $M = 80.9\%$ ,  $SD = 16.7$ ) when compared to newly hired RNs ( $M = 64.9\%$ ,  $SD = 27.6$ ). In this organization this difference may be related to the current use of the electronic medical record by RNs in the staff leadership role, and the limited use, experience, and/or exposure of newly hired RNs to informatics. Areas of unique need for newly hired RNs include informatics and evidence-based care. All RNs surveyed were less knowledgeable in evidence-based practice and quality improvement.

In this project associate degree graduates' scores trended lower on the knowledge portion of the QulSKA ( $M = 67.7\%$ ,  $SD = 9.2$ ) when compared to BSN graduates ( $M = 71.7\%$ ,  $SD = 9.96$ ). The range of scores on the knowledge portion of the QulSKA between groups was similar. That is, newly hired RN respondents' scores on average were 67.6% with a minimum score of 47% and a maximum of 84%, while RNs in staff leadership roles scored on average 72.1% with a minimum score of 50% and a maximum score of 88%. This indicates little to no difference in knowledge of the QSEN core competencies between new hires and RNs in staff leadership roles. This could be a reflection of their lack of initial preparation and ongoing development regarding the QSEN core competencies.

As evidenced by the project findings, newly hired RNs and RNs in staff leadership roles at this organization are not adequately prepared with the knowledge, skills, and attitudes of the QSEN core competencies to effectively impact and sustain patient care quality and safety outcomes. The educational needs of each group vary and appear to be related to years of experience and exposure to the topics of the QSEN

initiative during their formal education. Integrating a formalized educational intervention targeting like groups of practicing RNs could address the deficiencies noted.

The current published literature about QSEN has focused almost exclusively on preparing new graduates with the core competency knowledge, skills, and attitudes in each of the domains. The intent of this project was to broaden the thinking and acknowledge the potential gap between pre-licensure nurses and practicing RNs regarding knowledge, skills, and attitudes of the QSENs core competencies. The results of this survey mirror those reported by Dycus and McKeon (2009) emphasizing the need to more intentionally expand QSEN's work to include development of the bedside provider's competencies. If appropriately developed and implemented, this level of intervention could make a marked improvement in patient care quality and safety outcomes. Nursing by virtue of its numbers, sphere of influence, and presence in various healthcare settings has the unique opportunity to lead quality and safety improvements using QSEN as a framework for sustainable healthcare improvement.

## Appendix A

### QSEN Core Competencies

#### Patient-centered Care

Definition: “Recognize the patient or designee as the source and full partner in providing compassionate and coordinated care based on respect for patient’s preferences, values, and needs” (Cronenwett et al. 2007, p. 123).

Knowledge	Skills	Attitudes
<p>Integrate understanding of multiple dimensions of patient-centered care:</p> <ul style="list-style-type: none"> <li>• Patient, family, community preferences, values.</li> <li>• Coordination and integration of care.</li> <li>• Information, communication, and education.</li> <li>• Physical comfort and emotional support.</li> <li>• Involvement of family and friends.</li> <li>• Transition and continuity.</li> </ul> <p>Describe how diverse cultural, ethnic, and social backgrounds function as sources of patient, family, and community values.</p>	<p>Elicit patient values, preferences, and expressed needs as part of clinical interview, implementation of care plan, and evaluation of care.</p> <p>Communicate patient values, preferences, and expressed needs to other members of the healthcare team.</p> <p>Provide patient-centered care with sensitivity and respect for diversity of human experience.</p>	<p>Value seeing healthcare situations “through patients’ eyes.</p> <p>Respect and encourage individual expression of patient values, preferences, and expressed needs.</p> <p>Value the patient’s expertise with own health and symptoms.</p> <p>Seek learning opportunities with patients who represent all aspects of human diversity.</p> <p>Recognize personally held attitudes about working with patients from different ethnic, cultural, and social backgrounds.</p> <p>Willingly support patient-centered care for individuals and groups whose values differ from own.</p>
<p>Demonstrate comprehensive understanding of the concepts of pain and suffering, including physiologic models of pain and comfort.</p>	<p>Assess presence and extent of pain and suffering.</p> <p>Assess levels of physical and emotional comfort.</p>	<p>Recognize personally held values and beliefs about the management of pain or suffering.</p> <p>Appreciate the role of the</p>

	<p>Elicit expectations of patient and family for relief of pain, discomfort, or suffering.</p> <p>Initiate effective treatment to relieve pain and suffering in light of patient values, preferences, and expressed needs.</p>	<p>nurse in relief of all types and sources of pain or suffering.</p> <p>Recognize that patient expectations influence outcomes in management of pain or suffering.</p>
<p>Examine how the safety, quality, and cost-effectiveness of healthcare can be improved through the active involvement of patients and families.</p> <p>Examine common barriers to active involvement of patients in their own healthcare processes.</p> <p>Describe strategies to empower patients or families in all aspects of the healthcare process.</p>	<p>Remove barriers to presences of families and other designated surrogates based on patient preferences.</p> <p>Assess level of patient's decisional conflict and provide access to resources.</p> <p>Engage patients or designated surrogates that promote health, safety and well-being, and self-care management.</p>	<p>Value active partnership with patients or designated surrogates in planning, implementation, and evaluation of care.</p> <p>Respect patient preferences for degree of active engagement in care process.</p> <p>Respect patient's right to access to personal health records.</p>
<p>Explore ethical and legal implications of patient-centered care.</p> <p>Describe the limits and boundaries of therapeutic patient-centered care.</p>	<p>Recognize the boundaries of therapeutic relationships.</p> <p>Facilitate informed patient consent for care.</p>	<p>Acknowledge the tension that may exist between patient rights and the organizational responsibility for professional ethical care.</p> <p>Appreciate shared decision-making with empowered patients and families, even when conflicts occur.</p>
<p>Discuss principles of effective communication.</p> <p>Describe basic principles of consensus building and conflict resolution.</p> <p>Examine nursing roles in assuring coordination,</p>	<p>Assess own level of communication skill in encounters with patients and families.</p> <p>Participate in building consensus or resolving conflict in the context of patient care.</p>	<p>Value continuous improvement of own communication conflict resolution skills.</p>

integration, and continuity of care.	Communicate care provided and needed at each transition in care.	
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From: Cronenwett et al. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55, 122-131. doi:10.1016/j.outlook.2007.02.006.

## Appendix B

### QSEN Core Competencies

#### Teamwork and Collaboration

Definition: “Function effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care” (Cronenwett et al. 2007, p. 125).

Knowledge	Skills	Attitudes
Describe own strengths, limitations, and values in functioning as a member of a team.	<p>Demonstrate awareness of own strengths and limitations as a team member.</p> <p>Initiate plan for self-development as a team member.</p> <p>Act with integrity, consistency, and respect for differing views.</p>	<p>Acknowledge own potential to contribute to effective team functioning.</p> <p>Appreciate importance of intra- and inter-professional collaboration.</p>
<p>Describe scopes of practice and roles of healthcare team members.</p> <p>Describe strategies for identifying and managing overlaps in team member roles and accountabilities.</p> <p>Recognize contributions of other individuals and groups in helping patient/family achieve health goals.</p>	<p>Function competently within own scope of practice as a member of the healthcare team.</p> <p>Assume role of team member or leader based on the situation.</p> <p>Initiate requests for help when appropriate to situation.</p> <p>Clarify roles and accountabilities under conditions of potential overlap in team-member functioning.</p> <p>Integrate the contributions of others who play a role in helping patient/family achieve health goals.</p>	<p>Value the perspective and expertise of all healthcare team members.</p> <p>Respect the centrality of the patient/family as core members of any healthcare team.</p> <p>Respect the unique attributes that members bring to a team, including variations in professional orientations and accountabilities.</p>

<p>Analyze differences in communication style preferences among patients and families, nurses, and other members of the healthcare team.</p> <p>Describe impact of own communication style on others.</p> <p>Discuss effective strategies for communicating and resolving conflict.</p>	<p>Communicate with team members, adapting own style of communicating to needs of the team and situation.</p> <p>Demonstrate commitment to team goals.</p> <p>Solicit input from other team members to improve individual, as well as team, performance.</p> <p>Initiate actions to resolve conflict.</p>	<p>Value teamwork and the relationships upon which it is based.</p> <p>Value different styles of communication used by patients, families, and healthcare providers.</p> <p>Contribute to resolution of conflict and disagreement.</p>
<p>Describe examples of the impact of team functioning on safety and quality of care.</p> <p>Explain how authority gradients influence teamwork and patient safety.</p>	<p>Follow communication practices that minimize risks associated with handoffs among providers and across transitions in care.</p> <p>Assert own position/perspective in discussions about patient care</p> <p>Choose communication styles that diminish the risks associated with authority gradients among team members.</p>	<p>Appreciate the risks associated with handoffs among providers and across transitions in care.</p>
<p>Identify system barriers and facilitators of effective team functioning.</p> <p>Examine strategies for improving systems to support team functioning.</p>	<p>Participate in designing systems that support effective teamwork.</p>	<p>Value the influence of system solutions in achieving effective team functioning.</p>

From: Cronenwett et al. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55, 122-131. doi:10.1016/j.outlook.2007.02.006.



## Appendix C

### QSEN Core Competencies

#### Evidence-based Practice (EBP)

Definition: “Integrate best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal healthcare” (Cronenwett et al. 2007, p. 126).

Knowledge	Skills	Attitudes
<p>Demonstrate knowledge of basic scientific methods and processes.</p> <p>Describe EBP to include the components of research evidence, clinical expertise, and patient/family values.</p>	<p>Participate effectively in appropriate data collection and other research activities.</p> <p>Adhere to institutional Review Board (IRB) guidelines.</p> <p>Base individualized care plan on patient values, clinical expertise, and evidence.</p>	<p>Appreciate strengths and weaknesses of scientific bases for practice.</p> <p>Value the need for ethical conduct of research and quality improvement.</p> <p>Value the concept of EBP as integral to determining best clinical practice.</p>
<p>Differentiate clinical opinion from research and evidence summaries.</p> <p>Describe reliable sources for locating evidence reports and clinical practice guidelines.</p>	<p>Read original research and evidence reports related to area of practice.</p> <p>Locate evidence reports related to clinical practice topics and guidelines.</p>	<p>Appreciate the importance of regularly reading relevant professional journals.</p>
<p>Explain the role of evidence in determining best clinical practice.</p> <p>Describe how the strength and relevance of available evidence influences the choice of interventions in provision of patient-centered care.</p>	<p>Participate in structuring the work environment to facilitate integration of new evidence into standards of practice.</p> <p>Question rationale for routine approaches to care that result in less-than-desired outcomes or adverse events.</p>	<p>Value the need for continuous improvement in clinical practice based on new knowledge.</p>
<p>Discriminate between valid and invalid reasons for modifying evidence-based</p>	<p>Consult with clinical experts before deciding to deviate from evidence-</p>	<p>Acknowledge own limitations in knowledge and clinical expertise before</p>

clinical practice based on clinical expertise or patient/family preferences.	based protocols.	determining when to deviate from evidence-based best practices.
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From: Cronenwett et al. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55, 122-131. doi:10.1016/j.outlook.2007.02.006.

## Appendix D

### QSEN Core Competencies

#### Quality Improvement

Definition: “Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of healthcare systems” (Cronenwett et al. 2007, p. 127).

Knowledge	Skills	Attitudes
Describe strategies for learning about the outcomes of care in the setting in which one is engaged in clinical practice.	Seek information about outcomes of care for populations served in care setting.  Seek information about quality improvement projects in the care setting.	Appreciate that continuous quality improvement is an essential part of the daily work of all health professionals.
Recognize that nursing and other health professions students are parts of systems of care and care processes that affect outcomes for patients and families.  Give examples of the tension between professional autonomy and system functioning.	Use tools (such as flow charts, cause-effect diagrams) to make processes of care explicit.  Participate in a root cause analysis of a sentinel event.	Value own and others' contributions to outcomes of care in local care settings
Explain the importance of variation and measurement in assessing quality of care.	Use quality measures to understand performance.  Use tools (such as control charts and run charts) that are helpful for understanding variation.  Identify gaps between local and best practices.	Appreciates how unwanted variation affects care.  Value measurement and its role in good patient care.
Describe approaches for changing processes of care.	Design a small test of change in daily work (using an experiential learning method such as Plan-Do-Study-Act).	Value local change (in individual practice or team practice on a unit) and its role in creating joy in work.

	<p>Practice aligning the aims, measures, and changes involved in improving care.</p> <p>Use measures to evaluate the effect of change.</p>	<p>Appreciate the value of what individuals and teams can do to improve care.</p>
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From: Cronenwett et al. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55, 122-131. doi:10.1016/j.outlook.2007.02.006.

## Appendix E

### QSEN Core Competencies

#### Safety

Definition: “Minimize risk of harm to patients and providers through both system effectiveness and individual performance” (Cronenwett et al. 2007, p. 128).

Knowledge	Skills	Attitudes
<p>Examine human factors and other basic safety design principles as well as commonly used unsafe practices (such as work-arounds and dangerous abbreviations).</p> <p>Describe the benefits and limitations of selected safety-enhancing technologies (such as barcodes, Computer Provider Order Entry, medication pumps, and automatic alerts/alarms).</p> <p>Discuss effective strategies to reduce reliance on memory.</p>	<p>Demonstrate effective use of technology and standardized practices that support safety and quality.</p> <p>Demonstrate effective use of strategies to reduce risk of harm to self or others.</p> <p>Use appropriate strategies to reduce reliance on memory (such as forcing functions, checklists).</p>	<p>Value the contributions of standardization/reliability to safety.</p> <p>Appreciate the cognitive and physical limits of human performance.</p>
<p>Delineate general categories of errors and hazards in care.</p> <p>Describe factors that create a culture of safety (such as open communication strategies and organizational error reporting systems).</p>	<p>Communicate observations or concerns related to hazards and errors to patients, families, and the healthcare team.</p> <p>Use organizational error reporting systems for near-miss and error reporting.</p>	<p>Value own role in preventing errors.</p>
<p>Describe processes used in understanding causes of error and allocation of responsibility and accountability (such as root-cause analysis and failure mode effects analysis).</p>	<p>Participate appropriately in analyzing errors and designing system improvements.</p> <p>Engage in root-cause analysis rather than blaming</p>	<p>Value vigilance and monitoring (even of own performance of care activities) by patients, families, and other members of the healthcare team.</p>

	when errors or near misses occur.	
Discuss potential and actual impact of national patient safety resources, initiatives, and regulations.	Use national patient safety resources for own professional development and to focus attention on safety in care settings.	Value relationship between national safety campaigns and implementation in local practices and practice settings.

From: Cronenwett et al. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55, 122-131. doi:10.1016/j.outlook.2007.02.006.

## Appendix F

### QSEN Core Competencies

#### Informatics

Definition: “Use information and technology to communicate, manage knowledge, mitigate error, and support decision-making” (Cronenwett et al. 2007, p. 129).

Knowledge	Skills	Attitudes
Explain why information and technology skills are essential for safe patient care.	Seek education about how information is managed in care settings before providing care.  Apply technology and information management tools to support safe processes of care.	Appreciate the necessity for all health professionals to seek lifelong continuous learning of information technology skills.
Identify essential information that must be available in a common database to support patient care.  Contrast benefits and limitations of different communication technologies and their impact on safety and quality.	Navigate the electronic health record.  Document and plan patient care in an electronic health record.  Employ communication technologies to coordinate care for patients.	Value technologies that support clinical decision-making, error prevention, and care coordination.  Protect confidentiality of protected health information in electronic health records.
Describe examples of how technology and information management are related to the quality and safety of patient care.  Recognize the time, effort, and skill required for computers, databases, and other technologies to become reliable and effective tools for patient care.	Respond appropriately to clinical decision-making supports and alerts.  Use information management tools to monitor outcomes of care processes.  Use high quality electronic sources of healthcare information.	Value nurses’ involvement in design, selection, implementation, and evaluation of information technologies to support patient care.

From: Cronenwett et al. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55, 122-131. doi:10.1016/j.outlook.2007.02.006.



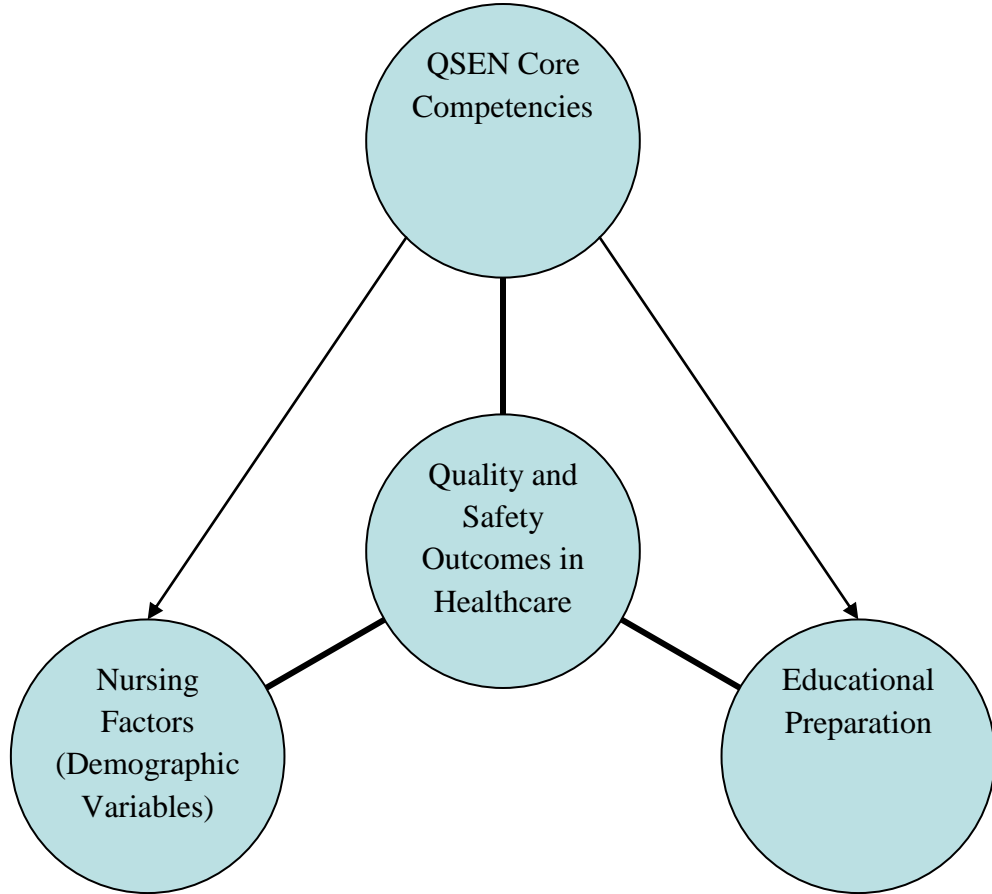
## Appendix G

### Donabedian and QSEN Definitions and Linkages

Components of Quality (Donabedian)	QSEN Core Competencies
<p><b>Efficacy</b> – The ability of the science and technology of health care to bring about improvements in health when used under the most favorable circumstances. QSEN Linkages: C, D, E, F</p>	<p>A. <b>Patient-centered Care</b> – Recognize the patient or designee as the source of control and full partner in providing compassionate and coordinated care based on respect for patient’s preferences, values, and needs.</p>
<p><b>Effectiveness</b> – The degree to which attainable improvements in health are, in fact, attained.  QSEN Linkages: A, C, D, E, F</p>	<p>B. <b>Teamwork and Collaboration</b> – Function effectively within nursing and inter-professional teams, fostering open communication, mutual respect, and shared decision-making to achieve quality patient care.</p>
<p><b>Efficiency</b> – The ability to lower the cost of care without diminishing attainable improvements in health.  QSEN Linkages: B, C, D, E, F</p>	<p>C. <b>Evidence-based Practice</b> – Integrate best current evidence with clinical expertise and patient/family preferences and values for delivery of optimal health care.</p>
<p><b>Optimality</b> – The balancing of improvements in health against the costs of such improvements.  QSEN Linkages: C, D, E, F</p>	<p>D. <b>Quality Improvement</b> – Use data to monitor the outcomes of care processes and use improvement methods to design and test changes to continuously improve the quality and safety of health care systems.</p>
<p><b>Acceptability</b> – Conformity to the wishes, desires, and expectations of patients and their families. QSEN Linkages: A, C, D, E, F</p>	<p>E. <b>Safety</b> – Minimizes risk of harm to patients and providers through both system effectiveness and individual performance.</p>
<p><b>Legitimacy</b> – Conformity to social preferences as expressed in ethical principles, values, norms, mores, laws, and regulations. QSEN Linkages: A, C, F</p>	<p>F. <b>Informatics</b> – Use information and technology to communicate, manage knowledge, mitigate error, and support decision making.</p>
<p><b>Equity</b> – Conformity to a principle that determines what is just and fair in the distribution of health care and its benefits among members of the population. QSEN Linkages: C, D, E, F</p>	
<p>Definitions from: Donabedian, A. (2003). p. 6.</p>	<p>From: Cronenwett, et al. (2007)</p>

Appendix H

Conceptual Model of Nursing Quality



## Appendix I

### Quality Skills, Knowledge, and Attitudes Questionnaire

(Permission obtained from P. Dycus on 11/15/11)

Age: \_\_\_\_\_ (in years)

Assigned Unit: \_\_\_\_\_

Initial Level of RN Nursing Education:  Associate Degree  Diploma  
 Bachelor of Science in Nursing  Master of Science in Nursing

Highest Level of RN Nursing Education:  Associate Degree  Diploma  
 Bachelor of Science in Nursing  Master of Science in Nursing

Years of RN Nursing Experience: \_\_\_\_\_

Have you had any previous quality improvement training?  Yes  No

If yes, please list: \_\_\_\_\_

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### Multiple Choice Questions

Please select the BEST answer to the following questions/statements:

1. Which of the following strategies can help nurses learn about the outcomes of care in their area of clinical practice?
  - a. Collecting data on infection rates
  - b. Monitoring staff satisfaction
  - c. Implementing an education plan
  - d. Discussing potential action plans with the surgeon
  
2. Understanding the source of practice variation is important because:
  - a. It determines the type of or action required
  - b. It identifies the root cause of the problem
  - c. All variation, regardless of source, must be eliminated to achieve quality
  - d. It is the first step to increasing variation
  
3. Which source provides the strongest level of support for evidence-based practice?
  - a. Meta analysis
  - b. Randomized control trials
  - c. Hospital policy
  - d. Opinion of respected authorities

4. Evidence-based practice is defined as:
  - a. Promoting the publication of research findings among practicing nurses
  - b. Dissemination of research findings at conferences
  - c. Collecting data from subjects using measurement devices
  - d. Integrating best research practices with clinical expertise and patient values
  
5. A reliable source for locating clinical practice guidelines for a new chemotherapy protocol is:
  - a. State Board of Nursing
  - b. Internet nursing blog
  - c. Nursing textbook
  - d. Oncology Nursing Society (ONS)
  
6. If you were considering discussing the use of a new medication (Medication X) with physicians for adult post-operative patients, what is your conclusion based on the studies listed below?
  - a. Ask the physician to try the new drug
  - b. Postpone asking the physicians to try the new drug until further studies are conducted
  - c. Call the pharmaceutical firm to get more information about the drug
  - d. Conduct your own study

Study	Design	Sample			Setting	Findings: Pain Relief
		Size	Age	Diagnosis		
Study A	Quasi-experimental	8	Peds	Post-op thoracotomy	Community hospital	Medication X more effective than Morphine
Study B	Quasi-experimental	13	Adult	Cancer-related chronic pain	Outpatient	Medication X more effective than Morphine
Study C	Randomized control trial	52	Peds	Trauma	Trauma-centers, multi-site	Morphine more effective than Medication X

7. All of the following contribute to increased patient safety EXCEPT:
  - a. Implementation of human factors processes in the design of medical devices and technology
  - b. Use of abbreviations for common medications
  - c. Systems and processes that limit or prevent workarounds
  - d. Computerized physician order entry (CPOE)
  
8. A potential drawback of using only automatic bed alarms to prevent falls is:
  - a. Not all nurses know how to use bed alarms
  - b. Other strategies to prevent falls may not be tried
  - c. Families may not like the bed alarms
  - d. There are no drawbacks to bed alarms

9. All of the following elements are important for creating and sustaining a culture of healthcare safety EXCEPT:
- Structure and systems that ensure an organization-wide awareness of patient safety performance gaps
  - Job descriptions that require direct accountability of leaders, managers, and frontline care-providers for closing performance gaps in patient safety
  - Leaders embrace a culture of safety and quality are openly discussed
  - Staff are reprimanded when they make 2 or more medication errors within a 6-month period
10. Actions immediately following a near-miss medication error indicating a culture of safety include:
- Congratulating the person that caught the error
  - Identifying how the error was detected
  - Reprimanding the person who made the error
  - Reporting the incident to the physician
11. Which of the following is an example of a culture of safety in a healthcare organization?
- No more than 50% of the staff are agency
  - Near misses are reported
  - Nurses routinely work double shifts
  - Most patient transfers occur during shift change
12. Recently an adult patient died as a result of an overdose of a medication administered intravenously. Which tool can be used to help understand the causes of the error as well as allocation of responsibility and accountability?
- Root cause analysis (RCA)
  - Failure Modes and Effects Analysis (FMEA)
  - Flow charting
  - Brainstorming
13. In which of the following scenarios is teamwork and patient safety enhanced?
- A nurse asks a colleague to decipher a poorly written medication order because she is afraid to call the ordering physician
  - The discharge planning team for a chronic obstructive pulmonary disease (COPD) patient is led by the patient's respiratory therapist
  - A doctor orders chest restraints for a patient because of litigation concerns despite the team's recommendation for 24 hour supervision without restraints
  - A supervisor insists that a medical nursing team assume care for a critically ill patient because there is nowhere else for the patient to be admitted

14. System facilitators to effective team functioning include all of the following EXCEPT:
- Holding meetings in the nursing break room
  - Scheduling patient coverage for team members at meeting time
  - Sending emails to team with their “to do’s” prior to the meeting
  - Training team leaders in communication
15. A team convenes to explore medication errors. An ineffective strategy to enhance team functioning would be to:
- Define the roles of all team members
  - Develop ground rules for communication
  - Include as many staff members as possible on the team
  - Ensure that the meeting starts and ends on time
16. Which of the following examples BEST describes how technology and information management improve quality and safety in patient care?
- A computerized physician order entry (CPOE) system that includes built in logic to check for oversights in drug selection and dosing
  - Sections in the electronic medical record for narrative discussion rather than drop down boxes or check boxes
  - Distinct and separate sections for nursing and medicine to avoid confusion
  - Identical data fields for all specialties
17. Which of the questions BEST informs the nurse of how a patient with chronic pain manages his/her comfort?
- “You appear comfortable – you aren’t in pain are you?”
  - “What is a tolerable level of pain for you?”
  - “Is there medicine left in your bottle or do you need another prescription?”
  - What medicine do you take to eliminate your pain?”
18. Which of the following are common barriers related to patients and families becoming actively involved in the patient’s health care processes?
- Cultural and religious beliefs
  - A paternalistic healthcare environment
  - A patient-centered care environment
  - Ask patients/families when they would like to be discharged
19. An effective strategy to empower patients and families in healthcare processes is to:
- Include patients and families in medical rounds
  - Invite patients to help other patients with similar diagnoses
  - Request family members to call their insurer for a list of covered services
  - Ask patient/families when they would like to be discharged

20. Which of the following tools is beneficial for understanding steps of a process (such as medication administration)?

- Run chart
- Control chart
- Flow chart
- Pareto chart

21. The following table shows 8 hospitals' ventilator associated pneumonia (VAP) rates per 1000 patient days for 2 consecutive years. The analysis of these data indicate that:

- There is a data collection error in 2003
- The average VAP rate in 2003 was greater than 2004
- There is greater variability for VAP rate among hospitals in 2003.
- Year 2003's performance for VAP is better than year 2004's

	VAP Rate per 1000 Patient Days	
	2003	2004
Hospital A	10	11
Hospital B	14	13
Hospital C	16	14
Hospital D	15	15
Hospital E	11	11
Hospital F	9	10
Hospital G	8	10
Hospital H	7	6
VAP Mean Rate	11.25	11.25
VAP Std. Deviation	3.37	2.8

22. Which of the following studies BEST measures patient outcomes?

- Nursing compliance with documentation of central line care
- Nursing compliance with the new medication policy
- Patient central line infection rate
- Frequency of crash cart logs documentation

23. Which of the following tools help understand process variation within a clinical process such as the difference in the interval from the time from order to the first dose of an antibiotic?

- Pareto chart
- Pie chart
- Control chart
- Flow chart

24. The nurse asks the wife of a patient to sign a consent form for a central line insertion. The wife informs the nurse that she does not understand the surgical procedure because no one has explained it to her. The nurse's BEST response is:
- Tell the patient/family not to worry-the surgeon does this particular procedure nearly every day
  - Inform the wife that the procedure is routine with rare complications before signing the consent
  - Explain the procedure to the mother before having the consent form signed
  - Request that the surgeon explain the procedure to the wife before obtaining consent for the procedure
25. When is it important to communicate to other healthcare providers the care that has been provided to a patient as well as the care that is needed by the patient?
- Only at shift-to-shift report
  - Only at transfer to another facility
  - During lunch or other breaks
  - Any time there is a transition of care of the patient
26. Standardized approaches to hand-communication between caregivers, such as SBARS:
- Are important because they provide an opportunity to ask and respond to questions
  - Are used mainly for lunch and other breaks to ensure that everything is communicated
  - Are not effective for interdisciplinary hand-offs because providers communicate differently
  - Are used to solve system failures associated with patient hand-offs

Please circle the correct answer – True or False

27. A good way to change a care process is to pilot the new process and evaluate the results before implementing changes in all areas/units of care.
- True                  False
28. Patient outcomes improve when healthcare providers know how to find, critically appraise, and incorporate evidence-based practice.
- True                  False
29. To be an effective member of a team, an individual must FIRST understand the team's strengths, limitations, and values.
- True                  False





40. Process mapping or flowcharting  
1 2 3 4 5 6

41. Quality improvement methodology such as Plan-Do-Check-Act of Six Sigma  
1 2 3 4 5 6

42. Collecting data from retrospective or concurrent chart or record review  
1 2 3 4 5 6

Graphical representation of data:

43. Run charts  
1 2 3 4 5 6

44. Control charts  
1 2 3 4 5 6

45. Histograms  
1 2 3 4 5 6

46. Pie charts  
1 2 3 4 5 6

47. Pareto charts  
1 2 3 4 5 6

Simple statistical analysis of data:

48. Measures of central tendency – mean, median, mode  
1 2 3 4 5 6

49. Standard deviation  
1 2 3 4 5 6

50. Normal (Gaussian distribution)  
1 2 3 4 5 6

More complex statistical analysis of data:

51. T-test  
1 2 3 4 5 6

52. Chi-square	1	2	3	4	5	6
53. ANOVA	1	2	3	4	5	6
54. Regression analysis	1	2	3	4	5	6
55. Literature searches for relevant evidence-based practice	1	2	3	4	5	6
56. Critical appraisal of research studies	1	2	3	4	5	6
57. Putting most current best practices or guidelines into my everyday clinical practice	1	2	3	4	5	6
58. Error reporting systems	1	2	3	4	5	6
59. Root cause analysis (RCA)	1	2	3	4	5	6
60. Failure Modes and Effects Analysis (FMEA)	1	2	3	4	5	6
61. Electronic Medical Record (EMR)	1	2	3	4	5	6
62. Computerized Provider Order Entry (CPOE)	1	2	3	4	5	6

Using the following scale circle the one response that best represents your perception:

Rating scale

1 – not important at all

2 – low importance

3 – moderate importance

4 – high importance

63. How important is it for nurses to participate in quality improvement projects?

1      2      3      4

64. How important is performance measurement to improving patient outcomes?  
1      2      3      4
65. How important is teamwork to improving patient outcomes and care?  
1      2      3      4
66. How important is using evidence-based practice to determine best clinical practice?  
1      2      3      4
67. How important is reading current professional literature/journals to remain current with issues in clinical practice?  
1      2      3      4
68. How important is standardization of processes and procedures to improving patient safety?  
1      2      3      4
69. How important is teamwork, including interdisciplinary collaboration, to improving patient outcomes?  
1      2      3      4
70. How important is it for nurses to be involved in the design, selection, implementation, and evaluation of information technologies to support patient care?  
1      2      3      4
71. How important is it to include Patient-centered Care concepts (respecting patients' unique values and beliefs, patients//families' active engagement in planning of care, patient/family empowerment) in developing a plan of care for each patient?  
1      2      3      4
72. How important is it to recognize that a patient's expectations regarding pain relief influence the success of the pain management plan?  
1      2      3      4
73. How important is it to include the patients and their families in the development of a pain management plan of care?  
1      2      3      4

## Appendix J

### Permission from Dycus and McKeon to Use the QulSKA Tool

Dennis Bertch <bertchd@mail.gvsu.edu> 11/7/11

to lmckeon

Dear Dr. McKeon:

I am currently enrolled in a DNP program at Grand Valley State University located in Allendale and Grand Rapids, Michigan. For my scholarly project I would like to focus on practicing nurses understanding of the knowledge, skills, and attitudes of the QSEN core competencies. My primary research question asks, do practicing acute-care, medical-surgical RNs demonstrate an understanding of the knowledge, skills, and attitudes of the QSEN core competencies. I am planning to use a Quasi-Experimental nonequivalent control group pretest posttest design to answer the research question.

Having read, with great interest, your 2009 article, \*Using QSEN to Measure Quality and Safety Knowledge, Skills, and Attitudes of Experienced Pediatric Oncology Nurses: An International Study\*, in Quality and Management in Health Care, I am requesting access to the QulSKA questionnaire you and Dr. Dycus developed. Subsequently, I am requesting permission to use the questionnaire for my project.

I would be happy to answer any questions you may have about my proposal. I thank you for your time and look forward to your response.

Sincerely,  
Dennis A. Bertch, RN, MSN  
Grand Valley State University  
DNP Student



McKeon, Leslie M <lmckeon@uthsc.edu> 11/7/11

to me

Hi Dennis,

I forwarded your request to Dr. Dycus, the primary author.

Dr. McKeon

**From:** Dennis Bertch [mailto:[bertchd@mail.gvsu.edu](mailto:bertchd@mail.gvsu.edu)]  
**Sent:** Monday, November 07, 2011 11:29 AM  
**To:** McKeon, Leslie M  
**Subject:** QulSKA Questionnaire



Dennis Bertch <[bertchd@mail.gvsu.edu](mailto:bertchd@mail.gvsu.edu)> 11/7/11

to Leslie

Thank you Dr. McKeon. I used you as the article provided your contact information.

Much appreciated!

On Tue, Nov 15, 2011 at 11:40 AM, Paula Dycus <[Paula.Dycus@lebonheur.org](mailto:Paula.Dycus@lebonheur.org)> wrote:

Hello Dennis,

Leslie McKeon forwarded your email regarding the QUIKA. I have attached a copy of the original survey and hope it helps you with your project.

Paula

[Paula Dycus, DNP, RN, CPHQ, NEA-BC](#)

[Administrative Director of Professional Practice & Research](#)

[Magnet Program Director](#)

[Le Bonheur Children's Hospital](#)

[50 N. Dunlap](#)

[Memphis, TN 38103](#)

[901-287-5983](#) (office) [901-287-6260](#) (fax)

Ranked as one of the nation's "Best Children's Hospitals" by *U.S. News & World Report*.

**From: Dennis Bertch**  
Date: Wednesday, November 16, 2011

Subject: QUISKA

To: Paula Dycus <[Paula.Dycus@lebonheur.org](mailto:Paula.Dycus@lebonheur.org)>

Thank you so much! I will be glad to share my findings with you and Dr. McKeon once I've completed my project. I am targeting December 2012.

This is very much appreciated.

Dennis

## Appendix K

### Human Research Review Committee at GVSU Endorsement

Please note that Grand Valley State University Human Research Review Committee has taken the following action on IRBNet:

Project Title: [348283-1] Quality and Safety Education in Newly Hired and Staff Leader  
Registered Nurses  
Principal Investigator: Dennis Bertch

Submission Type: New Project  
Date Submitted: June 19, 2012

Action: APPROVED  
Effective Date: July 12, 2012  
Review Type: Exempt Review

Should you have any questions you may contact Paul Reitemeier at [reitemep@gvsu.edu](mailto:reitemep@gvsu.edu).

Thank you,  
The IRBNet Support Team

[www.irbnet.org](http://www.irbnet.org)



## Appendix L

Institutional Review Board  
1521 Gull Road  
Kalamazoo, MI 49048  
(269) 226-7341

**BORGESS**  
Medical Center

July 19, 2012

Dennis Bertch, MSN, RN  
3430 Glengarry Avenue  
Kalamazoo MI 49004

Protocol: Quality and Safety Education in Newly Hired RNs and RNs in Staff Leadership Roles  
BMC IRB Reference No. 2012-1073

Dear Mr. Bertch,

As the Chairman of the Institutional Review Board (IRB) of Borgess Medical Center, I have received and reviewed the above-named protocol. According to Borgess Medical Center IRB Standard Operating Procedures (SOPs), Section 6.22, this protocol meets the qualifications for Expedited Review. The protocol meets our standards of research and I have approved the study for use in this institution. The use of an informed consent document is not required in this study (IRB SOPs Section 6.10, Projects Eligible for Waiver of the Entire Informed Consent Process in Non-Emergency Situations).

As you conduct your research, you are responsible for complying with all policies and procedures of the FDA, OHRP, HIPAA, Borgess Medical Center, and the Borgess Institutional Review Board. Per the Borgess Health policy "Research Approval Process" (BH.303), protocols must go through all appropriate research oversight committees (Research Financial Conflict of Interest, Research Billing Committee, etc.).

The approval is granted with the understanding that any changes in the protocol are promptly reported to the Committee; that changes in the approved protocol cannot be initiated without Committee review and approval unless there are immediate hazards to human subjects; and that all unanticipated or serious problems involving risks to human subjects are also promptly reported to the Committee.

Approval for this protocol is granted for a period of one year and will expire on July 16, 2013. The FDA and this Committee, require you submit in writing a Continuation Review Application by June 4, 2013. The protocol cannot continue after July 16, 2013 until re-approved by the Borgess IRB even if closed to patient enrollment. You must complete a Close Out Report if your protocol has been completed, terminated or if you are not renewing the protocol. We will determine if the research was carried out as planned, and that patient benefit outweighed the risk.

If you have any questions in this regard, please feel free to contact me.

Sincerely,

*Stephen Jefferson, MD*

Stephen Jefferson, MD, Chair  
Institutional Review Board

 ASCENSION  
HEALTH

## References

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