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EXAMINING HEALTH PROFESSIONAL STUDENTS' ATTITUDES ON INTERPROFESSIONAL EDUCATION

BY

SUZANNE CARR

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

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DOCTOR OF PHILOSOPHY DISSERTATION

OF

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Abstract

There is a growing need for healthcare teams to effectively collaborate and communicate to improve patient outcomes. The need to improve patient care has been well established and cited by the Institute of Medicine's (IOM) Committee on Quality Health Care in America landmark report, *To Err Is Human: Building a Safer Health System* (IOM, 1999; Kohn, Corrigan, & Donaldson, 2000). Health educational programs are known to be a gateway to changing behaviors of health professionals to impact practice and direct patient care. Interprofessional Education (IPE) has been identified as a viable mechanism to increase the collaboration and communication of health professionals in healthcare settings. The purpose of this study was to examine the potential impact of IPE on health professional students' attitudes and perceptions and to explore the utility of the Readiness for Interprofessional Learning Scale (RIPLS) in evaluating Interprofessional Educational programs. Kolb's Experiential Learning Theory (ELT) provided the framework for this study. ELT offers both a process for delivering IPE and a mechanism to maximize the learning of the health professional student. Health professional students (n=524) from five professions (Medicine, Nursing, Pharmacy, Physical Therapy, and Social Work) participated in a bi-annual IPE Program located at a private medical school in the Northeast. Sixty-nine paired samples completed both the pre-test and posttest of an adapted version of RIPLS and four open-ended questions. A mixed method research design was used to measure student attitudes and perceptions of the IPE experience. A paired-sample t test was used to compare pre-test and posttest scores of student attitudes toward the IPE experience. Data from four professions (Medicine, Nursing, Pharmacy, and Physical Therapy) pre-test and posttest scores showed significance in four subscales.

Results through contemporary content analysis indicated students reported strong confidence in communication with other professions, an increased knowledge of importance with teamwork and collaboration, learning professional roles, respecting other professional point of views, and improved communication skills after the IPE experience. Recommendations to continue IPE in the curriculum were positive. Future studies need to continue to explore IPE and their linkage to improve patient safety outcomes. IPE is shown to increase attitudes and value towards roles of other professional and increase knowledge of healthcare teams that could lead to change in patient safety and patient outcomes.

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Dedication

I would like to dedicate this work to my family for their endless support and dedication in helping me achieve my dream.

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Chapter 1: Introduction

There is a growing need for healthcare teams to effectively collaborate and communicate to improve patient outcomes. The need to improve patient care has been well established and cited by the Institute of Medicine's (IOM) Committee on Quality Health Care in America landmark report, *To Err Is Human: Building a Safer Health System* (IOM, 1999; Kohn, Corrigan, & Donaldson, 2000). The report emphasized that preventing death and injury due to medical errors requires dramatic, system-wide changes (Kohn et al., 2000). The major thrust of the report recommended that healthcare professionals and institutions form financial and regulatory incentives to create a safer health care system and a systematic way to integrate safety into the process of care (Donaldson, 2008). The four parts of the recommendations included creating a National Center for Patient Safety; Mandatory and Voluntary Reporting Systems; Increased Role of Consumers, Professionals, and Accreditation Groups; and Building a Culture of Safety. To focus on the aspect of patient safety of the IOM report, one category identified was to Train Concepts for Teams. This described the need for health professionals to work together in multidisciplinary teams. Donaldson (2008) described an effective interdisciplinary team as members coming to trust each other's judgments and expertise and attending to one another's safety concerns. The IOM (1999) committee suggested hospitals and training programs should establish interdisciplinary team training as an initiative to improve patient safety.

As the IOM's (1999) *To Err Is Human: Building a Safer Health System* report focused on patient safety, their 2001 report, *Crossing the quality chasm: A new health system for the 21st century*, focused more broadly on how the health system can be

reinvented to foster innovation and improve the delivery of care. The IOM committee recommended strategies and an action plan to provide a safer health system through the redesigning of the health care system and to improve preparation of the healthcare workforce. This focus of change provided more opportunities for interdisciplinary training. Interprofessional collaboration is essential to patient safety, information exchange and care coordination (IOM, 2001).

For several decades, the World Health Organization (WHO) has promoted the need for improved health professional education through the implementation of IPE programs (WHO; 1988, 2006, 2010). Health educational programs are known to be a gateway to changing behaviors of health professionals to impact practice and direct patient care. IPE has been identified as a viable mechanism to increase the collaboration and communication in health care settings.

In addition to the IOM and WHO recommendations, the Joint Commission (2010) identified communication as the top-contributing factor of medical errors. According to Leape and Berwick (2005), interprofessional communication between physicians and nurses is relevant to the organization of care delivery because communication issues may be one of the primary obstacles to systemic and sustainable patient safety improvement.

Research indicates that interprofessional collaborative practice reduces practice errors and improves quality of care and patient outcomes (Interprofessional Education Collaborative Expert Panel, 2011; IOM, 2010; WHO, 2010). The American Nurses Association's Scope and Standards of Practice recognizes that enhanced nursing professional development (NPD) includes a focus on "collaboration," which further relates to interdisciplinary teams and health related disciplines (Bradley & Benedict,

2009). This IPE approach has the potential to improve patient outcomes. The literature supports the need for further research in IPE to foster the improvement of patient outcomes. The *Future of Nursing: Focus on Education* report recommended the integration of IPE in curriculums (IOM, 2010). Quality and Safety Education for Nurses (QSEN) has embraced the IOM and WHO reports and recommended effective teaching approaches to ensure that future graduate nurses develop competencies in patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics (Cronenwett et al., 2007; IOM, 2010).

IPE encourages health professionals to develop a deeper understanding of each other's roles and responsibilities, which benefits the workplace environment overall. As reported in the Health Force Ontario (2007), these factors improve clinical efficiencies and patient/client outcomes. The basic assumptions of IPE depict changing the behaviors of the interprofessional participants and enhancing communication efforts among the professions to improve patient outcomes.

The use of simulation as an innovative teaching strategy continues to be widely used in health professional education programs. The National League of Nursing published a report called, *A Nursing Perspective on Simulation and Interprofessional Education (IPE): A Report from the National League for Nursing's Think Tank on Using Simulation as an Enabling Strategy for IPE*, which described the importance of simulation and IPE in health education (Willhaus, 2012). This report described barriers to Simulation-Based IPE and implementation strategies for a successful program. Willhaus, (2012) suggested, "Nursing think tank participants believe, simulation is a foundational component to bringing health professions educators together and allowing

IPE to be started early and throughout the educational continuum in order to provide true interprofessional learning opportunities" (p. 12).

Simulation learning is not limited to manakin practice scenarios. Simulation is categorized according to levels of fidelity, beginning with low fidelity at one end of the continuum and high fidelity at the other (Jeffries & Rogers, 2007). Through the use of low fidelity simulated activities such as standardized patient assessment, case-base scenarios and role-playing, the facilitation of developing knowledge application, accurate clinical judgment, and skill development can be achieved. The utilization of simulation as a teaching strategy within IPE programs has been recommended (Willhaus, 2012).

Theoretical Framework

Kolb's Experiential Learning Theory (ELT) can be used to guide simulation-based IPE (Poore, Cullen, & Schaar, 2014). This theoretical framework is the underpinning for this study. Kolb's ELT defines learning as "the process to which knowledge is created through the transformation of experience" (Poore et al., 2014, p. 244). Kolb's theory offers a foundation and a process for knowledge acquisition based on the needs of each individual learner (Poore et al., 2014). Poore et al.'s (2014) research was guided by Kolb's ELT to identify three key points towards IPE and simulation in health education: (a) effective communication and collaboration are essential of nursing practice; (b) simulation based IPE can be an effective teaching strategy for improving communication and collaboration among health profession students; and (c) the greater number of IPE activities students participate in, the greater progress they make in skill development related to communication and collaboration.

Nursing and healthcare research suggest social, behavioral, and Learning theories such as Kolb's are foundational to and have relevance for the health care environment and educational arena. ELT depicts a learning process within which knowledge is created through transformation of an experience (Kolb, 1984). Experiential learning is an effective teaching strategy. The rationale for the use of experiential education is based on the purpose for the learning experience. These experiences provide relevant goals and objectives that the health professional participants will learn throughout the interprofessional experience. Poore et al. states, "Kolb's Experiential Learning theory offers both a process for delivering IPE and a mechanism to maximize the learning of each individual student" (2014, p. 246). This theory also supports the components of designing and implementing IPE simulation activities.

Purpose of Research

The aim of this study was to examine the potential impact of IPE on health professional students' attitudes and perceptions towards other health professionals and to explore the utility of the Readiness for Interprofessional Learning Scale (RIPLS) in evaluating IPE programs in the United States. The two specific hypotheses were: (a) students will have an improved perception towards roles of other health professionals through IPE and simulation, and (b) students will have an increased value for Interprofessional Education through IPE and simulation.

This study was designed to answer the following research questions:

1. Does IPE impact students' attitudes towards the roles of other health professionals?

2. Does IPE change students' perceptions of interprofessional collaboration?

3. Does IPE affect students value for learning with other professionals?

In this study, health professional students from five professions (Medicine, Nursing, Pharmacy, Physical Therapy, and Social Work students) participated in a bi-annual IPE Program located at a private medical school in the Northeast. The program was comprised of simulated activities to include an Objective Structured Clinical Examination (OSCE) of a standardized patient, a case-based scenario, and a team-building exercise. Students voluntarily completed a pre-test and posttest utilizing the RIPLS questionnaire and four posttest open-ended questions. This questionnaire was designed to examine the impact of IPE on health professional students' attitudes and perceptions. Overall, the RIPLS is used to measure readiness of health care professional students to undertake shared learning activities (Parsell & Bligh, 1999). This measurement tool is known to be one of the most widely-used instruments in evaluating IPE programs.

Through a paired-sample t test, the pre-test and posttest scores were analyzed to evaluate changes in attitudes toward the IPE experience. The ordinal level of measurement for the RIPLS survey responses represented changes in attitudes for each of the four subscales (*Role & Responsibility, Negative Professional Identity, Positive Professional Identify and Teamwork & Collaboration*). The fours open-ended questions were analyzed using conventional content analysis.

The significance of this study is supported in the IPE and nursing literature. IPE is recognized as a strategy that can assist health professional students in developing the skills necessary for successful future collaboration in healthcare teams in order to ensure

quality patient care. The gap that exists in the IPE research is the lack of understanding the impact of IPE on healthcare outcomes. Although a number of IPE research studies have been conducted, this study represents a unique collaboration of five professions that included health professional students from Medicine, Nursing, Pharmacy, Physical Therapy, and Social Work from two universities and one college. This was the first time these five specific professions collaborated in an IPE simultaneously and were evaluated using RIPLS. IPE is a strategy recognized by health organizations to assist health professional students in developing the skills necessary for successful future collaboration in healthcare teams.

This chapter provided a brief introduction to the literature and theoretical underpinnings to support the relevance to IPE and simulation in this study. The aim of the research study, followed by the research questions to be answered, were presented. The significance of this research study was addressed. The following is an overview of the remaining chapters.

In chapter 2, a review of the literature on IPE and simulation provides a detailed description of the historical context and supportive research. The chapter examines the research for the relevance to IPE, simulation and practice. A review of various measurement tools in IPE and simulation are examined along with research implications. Chapter 3 focuses on the theoretical underpinnings of this study and the utilization of Kolbs's Experiential Learning theory. A detailed description of this theory and related research are explored. Chapter 4 describes the mixed method design of the study. A review of the research design, sample and setting, program description, measurement tool, and data analysis are discussed. The research findings are presented in chapter 5.

This chapter reports the quantitative data results from a paired-sample t test as well as a conventional content analysis allowing categories to emerge. The last chapter concludes with discussion of the findings and implications for nursing education, practice, and research.

Chapter 2: Literature Review

Interprofessional Education

Interprofessional Education (IPE) continues to be supported by national organizations as an essential component of the education of healthcare professionals. There is a growing consensus that the collaboration between healthcare professionals and students can impact learning. In addition to providing essential comprehension of IPE, simulation, as a component of IPE, provides an opportunity for students to engage in active learning strategies among health care professionals. This chapter explores the literature on IPE and its impact on health professional students' attitudes and perceptions towards other roles and collaboration among professionals. This chapter also reviews previous research focused on IPE. The IPE programs utilizing simulated activities are examined for relevance to this study.

According to the National Center for Interprofessional Education and Practice, the history of exploration of the need for health care providers to collaborate to impact practice began over 50 years ago. The leading national organizations have recognized and invested time in promoting an expanded understanding of IPE in practice and education (IOM, 2001, 2003, 2010; National Center for Interprofessional Education and Practice, n.d.). To further elaborate on the history of IPE, the following timeline was adapted from the Interprofessional Education and Collaborative Practice Presentation by the Sage Colleges School of Health Sciences Interprofessional Education Committee (2012) and the work of Professor Dewitt C. Baldwin (1996) to capture the evolving interests and trends of IIPE. The timeline is divided into decades with primary accomplishments listed for each time frame.

1900-1950

The work of Professor Dewitt C. Baldwin (1996) investigated Royer's (1978) historical notes revealing that, prior to 1900, India's mission hospitals sent out teams of physicians, nurses, and "auxiliaries" to provide health services to remote communities (Fendall, 1972; Robinson & Fandall, 1976). In 1910, Abraham Flexner, an acclaimed reformer of medical education, criticized the splintering of education for health care professionals, especially medical education. After the Progressive Era in the 1920s, the interests in IPE waned in the United States, but research continued in Canada. Royer's notes quoted the Dawson Report (1920) which advocated a "team approach" to health care and the establishment of "health centers" in Great Britain (Baldwin, 1996).

Baldwin (1996) also traced the development of interdisciplinary teams back to World War II. Teams were utilized in surgery, burns, rehabilitation, and long-term care. Martin Cherkasky is credited with the development of primary care interdisciplinary teams at the Montefiore Hospital, New York in 1948 (Cherkasky, 1949; Baldwin 1996). His efforts provided home care outreach services that included teams of physicians, social workers, and nurses to provide care within local communities.

1951-1979

The concept of teamwork in primary health care occurred during the 1960s. President Johnson's vision of the Great Society and the War on Poverty focused on giving the poor and underserved access to good health care in their communities. In the late 1960s, the Office of Economic Opportunity (OEO) provided funding to community health services throughout the country. The OEO sponsored "team seminars" in Washington, D.C. which focused on the development, training, and utilization of health

care teams (OEO, 1970).

In the 1970s, Laura Halsteadt, MD conducted the first systematic review of studies regarding the impact of team delivery of care in rehabilitation services (Baldwin, 1996). The recognition of IPE as a field of study was established through these efforts. There continued to be an increase in global concerns regarding the delivery of health care and the role of interprofessional teams in reducing safety errors. The UK and Canada assumed leadership roles in IPE (Baldwin, 1996).

The first IOM conference in 1972 called "Education for the Health Team" produced a report that discussed the importance of establishing substantive relationships between educational programs for the health professions (IOM, 1972). This report supported the concept of interdisciplinary education for health science students: an educational experience can be interdisciplinary at the level of the student, faculty, or both (Baldwin, 1996; IOM, 1972; Pellegrino, 1972). The IOM (1972) report also recognized the definition of Interdisciplinary as:

> "Students from more than one health profession taught by faculty from one health profession; students from one profession taught by faculty from more than one profession; and students from more than one health profession taught by faculty by faculty from more than one profession" (p. 6).

In 1978, the WHO identified IPE as an important component of primary health care. This global organization's initiative built upon the considerable progress that had been achieved in the area of IPE.

1980- 1989

In 1987, the Center for the Advancement of Interprofessional Education (CAIPE) was established in the UK. CAIPE is described as an independent "think tank" that collaborates with individuals, corporate, and student members to improve collaborative practice. The CAIPE (2002) initiative is to promote quality of care through health care professionals learning and working together to benefit patients and clients.

Another positive step for establishing support for IPE was the founding of the Journal of Interprofessional Care in 1986. This peer-reviewed journal continues to reinforce collaboration in education, practice, and research for health and social care. The research published in this journal disseminates information to the global IPE communities. Areas of practice covered include primary, community and hospital care, health education, and public health, and beyond health and social care into fields such as criminal justice and primary/elementary education (The Journal of Interprofessional Care, n.d.)

1990-1999

The Canadian Interprofessional Health Collaborative (CIHC) was established in the 1990s. This national organization continues to promote IPE, collaboration in healthcare practice, and patient-centered care. According to CIHC, their goals include sharing knowledge with policy makers, planners in the health and education systems, health professionals, and educators to ensure that all Canadian citizens benefit from healthcare practice and patient-centered care. CIHC organization also assists health providers, teams, and organizations with the resources and tools needed to apply an interprofessional, patient-centered, and collaborative approach to healthcare.

The IOM's (1999) *To Err Is Human: Building a Safer Health System* report called for a national effort to make health care safer. This report detailed the major concerns of preventable errors in medicine and strategy to improve quality and safety of care. One of the recommendations included the creation of the Center for Patient Safety within the Agency for Healthcare Research and Quality. The Center has multiple objectives for healthcare; e.g., to set the national goals for patient safety and track progress in meeting these goals. The Center identifies these goals and develops an annual progress report on patient safety. In addition, the Center helps to develop knowledge and understanding of errors in healthcare through the development of research and the provision of funding for Centers of Excellence. Lastly, the Center helps to evaluate methods for identification and prevention of errors. They further help with funding for the dissemination of knowledge and develop communication strategies to improve patient safety.

Another recommendation from the IOM's *To Err Is Human: Building a Safer Health System* (1999) report is that health care organizations and the professionals affiliated with them should make continually improved patient safety a declared and serious aim by establishing patient safety programs with defined executive responsibility. The following includes a description of Patient Safety Program objectives: to provide strong, clear, and visible attention to safety; to implement non-punitive systems for reporting and analyzing errors within their organizations; to incorporate well-understood safety principles such as standardizing and simplifying equipment, supplies, and processes; and to establish interdisciplinary team training programs for providers that incorporate proven methods of team training such as simulation (IOM, 1999). This recommendation impacted the IPE community to enhance initiatives in healthcare and

academic programs.

2000-2009

The IOM report *Crossing the Quality Chasm: A New Health Care System for the 21st Century* called for fundamental changes to the health care system to close the quality gap (IOM, 2001). The IOM identified six goals for improved delivery of patient care resulting in greater patient safety and attainment of positive health outcomes:

> (1) Safe: avoiding injuries to patients from the care that is intended to help them; (2) Effective: providing services based on scientific knowledge to all who could benefit, and refraining from providing services to those not likely to benefit; (3) Patient-centered: providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensures that patient values guide all clinical decisions; (4) Timely: reducing waits and sometimes-harmful delays for both recipients and providers of care; (5) Efficient: avoiding waste, including waste of equipment, supplies, ideas, and energy; (6) Equitable: providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status.

Included in these goals were recommendations for increased interdisciplinary collaboration to improve information exchange and coordination of patient care (IOM, 2001).

The next IOM *Health Professions Education: A Bridge to Quality* (2003) report recommended IPE as a strategy to improve communication, collaboration, and problem solving among health care teams. The report also recognized the importance of patient safety and outcomes addressing healthcare providers' collaboration and communication.

The IOM (2003) vision encompassed the view that "All health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches, and informatics" (p. 3). In other words, the report emphasizes the importance of interprofessional team collaboration as necessary for the achievement of quality outcomes for the improvement of health care. The need for health professionals to develop competencies and integrate interprofessional practice into educational programs gained momentum with the support of the IOM.

In 2005, the Robert Wood Johnson Foundation funded a multi-phase project to educate nursing students on patient safety and healthcare quality. This initiative was called Quality and Safety Education for Nurses (QSEN). The QSEN initiative promotes strategies that build and develop effective teaching approaches. These teaching approaches guide future graduates in developing competencies in patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics (Cronenwett et al., 2007; Cronenwett, Sherwood, & Gelmon, 2009a; Cronenwett et al., 2009b). The IOM's six aims are the foundation for QSEN's six competencies (QSEN, 2012a, 2012b).

The QSEN faculty have defined pre-licensure and graduate nursing quality and safety competencies for nursing. The proposed target of each competency was to develop the knowledge, skills, and attitudes in nursing pre-licensure programs. The following competencies included: Patient-Centered Care, Teamwork and Collaboration, Evidence Based Practice, Quality Improvement and Safety and Informatics. These competencies are emerging as foundational components of nursing programs.

In 2006, The WHO Study Group on Interprofessional Education and Collaborative Practice was developed. The WHO Study Group consists of top education, practice, and policy experts from across every region of the world. The members have formed teams on interprofessional education, collaborative practice, and system-level supportive structures. This group focused on an international environment assessment and evaluation of the current state of research and synthesizing the evidence on potential facilitators, incentives and levers for action that could be adopted as part of a global initiative for IPE and collaborative practice (WHO, 2006).

In 2009, a collaborative group was formed that included six national education associations of schools of the health professions. The Interprofessional Education Collaborative's (IPEC, 2011) focus was to promote and encourage interprofessional learning experiences to help prepare future health professionals for enhanced team-based care of patients and improved health outcomes (IPEC, 2011). In 2011, this collaborative group that represents higher education in allopathic and osteopathic medicine, dentistry, nursing, pharmacy, and public health created core competencies for interprofessional collaborative practice.

To highlight the global status of IPE, the WHO, *Framework for Action on Interprofessional Education and Collaborative Practice* (2010) report was published. The report was suggested as a framework for programs. This report identified the successful collaborative teamwork mechanisms and outlined a series of action items that policy-makers could apply within their local health system. "The Framework provides strategies and ideas to help health policy-makers implement the elements of interprofessional education and collaborative practice to benefit their own jurisdiction"

(p. 9).

Another recommendation to integrate interprofessional practice in educational curricula was from The *Future of Nursing Leading Change, Advancing Health* (IOM, 2010). This report called for the interprofessional team training to begin early when health professionals are students. Successful IPE can be achieved only through committed partnerships across professions (IOM, 2010). The report further elaborated on the importance of all nursing and medical students to be educated in various aspects of interprofessional collaboration. The components of IPE should include knowledge of professional roles and responsibilities, effective communication, conflict resolution, and shared decision-making among professionals. For students to engage in future collaboration, they should be exposed to working with other health professional students through the use of simulation as well as web-based training (IOM 2010).

In 2010, the American Nurses Association (ANA) and the co-publisher National Nursing Staff Development Organization revised the Nursing Scope and Standards to reflect the complex and rapidly developing factors that are influencing current and future practice (ANA, 2010). The revised Professional Development Scope and Standards recognized that enhanced nursing professional development includes "collaboration," which refers to interdisciplinary teams and health related disciplines (ANA, 2010).

The ANA (2010) has defined interdisciplinary education as a mechanism to increase collaboration among professional to encourage a greater understanding of the roles of each other's profession. Registered nurses and members of various professions exchange knowledge and ideas about how to deliver high quality health care, resulting in overlaps and constantly changing professional practice boundaries. A further description

of interprofessional team collaboration includes recognition of the expertise of others within and outside one's profession and referral to those providers when appropriate.

In 2011, the Interprofessional Education Collaborative (IPEC) released Core Competencies for Interprofessional Collaborative Practice. There are four domains (Values/Ethics for Interprofessional Practice, Roles/Responsibilities, Interprofessional Communication, and Teams and Teamwork) that head the 38 core competencies to provide integrated, high-quality care to patients within the nation's current, evolving health care system. IPEC (2011) identified principles that are needed for health professional schools to:

> (1) create a coordinated effort across the health professions to embed essential content in all health professions' education curricula; (2) guide professional and institutional curricular development in cooperation learning approaches and assessment strategies to achieve productive outcomes; (3) provide the foundation for a learning continuum in interprofessional competency development across the professions and the lifelong learning trajectory; (4) acknowledge that evaluation and research work will strengthen the scholarship in this area; (5) prompt dialogue to evaluate the "fit" between educationally identified core competencies for interprofessional collaborative practice and practice needs/ demands; (6) find opportunities to integrate essential interprofessional education content consistent with current accreditation expectations for each health profession's education program; (7) offer information to accreditors educational program accreditors of all health professions to use to identify common accreditation standards for interprofessional education, and to identify resources in institutional settings for

examples of implementation of those standards; and (8) inform professional licensing and credentialing bodies in defining potential testing content for interprofessional collaborative practice. These principles and core competencies help guide and strengthen curricula development at all health professional schools. (p. 7- 8)

Simulation

New teaching strategies using simulation are becoming more widely used in health education across professions and have been linked to positive outcomes. Health educational and simulation programs are a gateway to changing behaviors and strategies by nurses that impact practice and direct patient care. Hospitals have established continuing educational opportunities for nurses to advance their practice. These programs can focus on the critical thinking and actions of the nurse.

History of simulation. Throughout the literature, simulation was interpreted and scrutinized as a theory-based practice. Simulation was a topic of theoretical debate as early as the times of Plato and Aristotle. Across the continuum of philosophy, simulation was utilized in different professions. Simulation continues to evolve and impact education as an innovative strategy to engage the learner. Some philosophers suggested a new fundamental philosophy of science was needed to understand simulation (Naylor & Finger, 1967). This different ontological focus of simulation would include a new theoretical foundation and a validated model of simulation.

This brief overview of simulation will be followed by a philosophical perspective. Many resources define "Simulation" as a noun, meaning to pretend, imitate, to reproduce the conditions of a situation for training. Simulation in this study refers to activities or

events replicating clinical practice using scenarios, fidelity manikins, standardized patients, role playing, skills stations, and computer-based critical thinking simulations (Hayden, Jeffries, Kardong-Edgren, & Spencer, 2009; Roh, Lee, Chung, & Parks, 2013). Jeffries (2005) defines simulation as activities mimicking the reality of the clinical environment. Simulation provides a realistic environment for students to practice skills without risk to patients and then apply these skills in practice (Wilford & Doyle, 2006).

Simulation has been utilized across different professions. The origin of simulation appears to be in the profession of physics and mathematics. Other examples of professions include healthcare, military, and biology. Each has developed its own beliefs and distinctive rules regarding the impact of simulation and how it relates to the intended goals.

Overall, simulation was intended to provide an artificial world or learning environment for students; it was not meant to be an environment for participants to demonstrate perfect performances. The laboratory allowed simulation experiments of situations that occur in the real world to take place. This learning environment was conducted in a controlled environment, safe and neutral. Each different profession identified relevant objectives and goals. Simulations are often computer generated and alternated the degree of difficulty or circumstances.

The history of education has often used simulation activities such as role-playing and case studies to help develop critical thinking skills. These techniques are referred to as low fidelity simulation. Jeffries (2005) has described three key components in nursing simulation: the design, implementation, and evaluation phases. Jeffries' Simulation Model provides a foundation for simulation design in nursing curriculums and health

education programs. There are five concepts in Jeffries' framework: educational practice, the teacher, the student, the design of characteristics of the simulation, and the outcomes (Jeffries & Rogers, 2007). During the simulation process, a facilitator is commonly used, referring to the person who conducts the process of simulation. Chapter 3 further describes Jeffries' Simulation Model.

Types of simulations. Different types of simulations have been developed to meet learners' needs. These include the *Active Model Simulator*, the *Interactive Model Simulator* and the *Computer Simulation Model*. In the health care field, an example of an *active simulator* is a freestanding manikin that simulates heart sound, palpations, and imitates an electrocardiogram rhythm. Typically, these manikins are used in hospitals and health education classrooms. The *Interactive Model Simulator* responds to actions taken by the student. This two-dimensional computer program allows the student to make clinical judgments and errors in the care of a patient. The *Computer Simulation Model* uses software to depict a set of scientific techniques that produce results. Examples of computer modeling include a flight simulator to train pilots, forecasting models, and car crash accidents. Overall, this type of modeling imitates real life or hypothetical situations. In other words, certain types of simulators allow the health professional to engage in a real life situation and make critical decisions in the care of the patient.

Types of analysis. There are two types of analysis used to interpret simulation, *descriptive* and *prescriptive*. Naylor and Finger (1967) described an example of simulation using a descriptive and a prescriptive analysis. If faculty use a simulation model for descriptive analysis, they are interested in the behavior of the system being

simulated and so would attempt to produce a model which would predict behavior. The use of simulation models for prescriptive purpose involves predicting the behavior of the system being studied under different combinations of environmental conditions. Another example of this type of modeling is the need to think critically to imitate health professionals caring for acutely ill patients in an emergency situation. This type of simulation experiment can evaluate predicted behaviors of the healthcare professionals.

Seamless Care Model

The Seamless Care Model is the educational concept for this IPE program (MacDonnell, George, & Misto, 2012; MacDonnell, Jackson, Lavin, Cohen, & Cohen, 2011). The following is a detailed description of the original Seamless Care Model project (Seamless Care, 2008; Mann et al., 2009). The Seamless Care was a 33-month project that included pre-licensure health professional students from Dental Hygiene, Dentistry, Medicine, Nursing, and Pharmacy to voluntarily work together in interprofessional student teams. Mann et al.'s (2009) research described the instructional approaches used that directly reflected the underlying framework of seamless care, which included: (a) Active learning and experience in solving authentic problems, (b) Small-group collaborative practice experience and problem-solving, (c) Problem-based learning, (d) Opportunities for reflection and integration of learning, and (e) Cooperative learning. The Seamless Care interventions were important for the individual and group processes of learning these skills to demonstrate an assessment and development of a joint patient transition care plan. The cooperative learning process was the foundation for reflective practice (Mann et al, 2009).

By forming small groups to receive education throughout the project, the

Seamless Care approach engages students and preceptors to continue building on their knowledge and skills while working in interprofessional teams. Student objectives included collaboratively developing an interprofessional transition plan of care, setting goals with patient living with chronic illness, and monitoring the achievement of those goals. The student teams regularly conversed in person or via teleconference or further web-based communication. The teams also met regularly with the patient. Lastly, the preceptor guided and supported the student and student teams. The outcomes of the project included the recognition of challenges with the development of the interprofessional experience for the students and preceptors and the value of continuing such programs. Seamless Care continues to be a foundational framework on which multiple IPE programs are based. Interprofessional teams focus on developing knowledge and skills necessary to educate their patient improved outcomes.

The utilization of IPE and simulation in an academic setting is becoming more widely accepted by health care educators. The use of simulation within IPE has been identified as an effective teaching strategy in early co-education of students from different professions in the healthcare field (Baker et al., 2008; Dillon, Noble, & Kaplan, 2009; IOM, 2010). The following research studies depict educational programs that include IPE and the use of simulation to measure the effect of the experience on attitudes, confidence, and student perceptions. As previously reviewed, interprofessional collaborative practice reduces practice errors and improves quality of care and patient outcomes (IPEC Expert Panel, 2011; IOM, 2010; The Joint Commission, 2010; WHO, 2010). *The Joint Commission on Accreditation of Healthcare Organizations* sentinel events report demonstrated that 70% of preventable medical errors are due to

communication errors (Wagner, Liston, & Miller, 2011). Respect and trust between team members are enhanced when health care providers develop a deeper understanding of each other's roles and responsibilities which, in turn, benefits workplace cultures and staff morale (Suter et al., 2009). As reported in the Health Force Ontario (2007), teamwork improves clinical efficiencies and patient/client outcomes.

Simulation research. Communication skills to improve safety continue to be examined by health professionals. Wayman et al.'s (2007) research focused on simulation and measuring communication between nurses and families in regards to addressing medication errors. This was a pre- post intervention, quasi-experimental design that included two research questions: "Did participants increase their communication self-efficacy" and "Did the training evoke the participants' self-reported 'true' verbal and nonverbal skills." The participants were asked to assess their communication skills after the simulation training sessions. The simulation scenarios were created to educate nurses on enhancing and improving their abilities to communicate information. The convenience sampling of oncology nurses (n=16) participated in a 14 question pre-test and posttest self- assessment survey. Student responses of the self-assessment survey were from 0- 100 (100 as the maximum score). This self-assessment survey was developed for this study by the researcher. It evaluated nurses' abilities to communicate content that simulated adverse-event disclosure. Additional measures were used to assess verbal and nonverbal skills. The results of this study supported the need for further research to assess the impact of communication in healthcare.

Senette, O'Malley, and Hendrix (2012) also focused on communication. This

study was a pilot project using a quasi-experimental, two group posttest design. Nursing and paramedic students participated in IPE to evaluate simulation as a learning strategy that supported handoff communication and teamwork efforts. This project focused on measuring the collaboration, communication, and attitudes between professions. The instrument used to obtain collaboration scores was the Attitude Toward Collaboration Learning Scale (ATCLS). Findings supported the use of simulation exercises between participants. Both groups indicated an overall satisfaction with this experience. Through a qualitative analysis, results identified the positive perceptions of simulation with other professions.

In the evaluation of attitudes, IPE is seen as a helpful strategy that fosters collaboration while improving behaviors towards other health professionals. Hobgood et al. (2010) conducted a randomized control study evaluating attitude changes among medical and nursing students with interdisciplinary teamwork. This study consisted of student participation in a one-day interdisciplinary teamwork-training course. The participants were randomly assigned to one of four educational methods: didactic (control), audience response didactic, role-play, and human patient simulation. Student performance was assessed for teamwork attitudes, knowledge, and skills. After completion of the teamwork training, students completed a 36-item Collaborative Healthcare Interdisciplinary Relationship Planning test (CHIRP), a standardized patient evaluation of students' teamwork skills performance, and the Mayo High Performance Teamwork Scale (MHPTS). All participants demonstrated an improvement in knowledge, attitude, skills, and teamwork. When compared by educational methods, there was no significant difference in knowledge, attitude, skills, and teamwork.

Another study that focused on attitudes of health professionals was conducted by van Schaik, Plant, Diane, Tsang, and O'Sullivan (2011). This study examined a simulation-based interprofessional team-training program with health professionals. This program was based on pediatric emergencies and evaluated self-efficacy in resuscitation skills. Medical residents and nurses' self-efficacy was measured using a pre–post survey study design. Qualitative data was evaluated with open-ended questions. Themes that emerged included understanding of professional roles, hands on experience, and the value of debriefing after an emergency situation. Data suggested that the impact on self-efficacy among residents was limited. Results indicated an increase in self-confidence as the residency program advanced from 2006-2008. Nurse surveys revealed limited returned responses. A positive impact on nurses' self-efficacy was noted after participation in real code situations. Overall, the resuscitation program showed a positive effect on the culture of team collaboration as the norm. The data further suggested that the interprofessional training program was feasible and sustainable in the hospital setting.

Throughout this literature review, the terms *confidence* and *self-efficacy* are used interchangeably (Lundberg, 2008). *Confidence* is described as a type of attitude that indicates a person has a belief in oneself and the abilities to accomplish specific goals. This empirical evidence supports the relationship between attitudes and the performance of students in the clinical setting. A change in students' attitudes is often evaluated with the use of simulation learning. One of the major effects of simulation in nursing is the development of nurse's confidence in self-performance of skills (Goldenberg, Andrusyszyn, & Iwasiw, 2005; Cant & Cooper, 2010).

Goldenberg et al. (2005) conducted a study with undergraduate nursing students

participating in classroom simulation. This descriptive study investigated the effect of classroom simulation on a convenience sample of 22 third-year baccalaureate nursing students' self-efficacy in health teaching. The students completed a self-efficacy questionnaire before and after the simulation workshop sessions. The results indicated that the students' overall confidence scores increased significantly following the two sessions of role-playing case studies, suggesting more perceived self-confidence in performing health teaching.

In Brown and Chronister's (2009) comparative research study of senior nursing students, the effect of simulation activities on critical thinking and self-confidence in an electrocardiogram-nursing course were evaluated. The treatment group (n=70) received weekly simulation exposure in addition to lecture (500 minutes combined total), and the control group (n=70) received weekly lecture (400 minutes total didactic instruction). As reported, the results showed no significant differences in the critical thinking and self-confidence measures between the groups, except when controlled by semester level. In the data from the second semester of simulation, scores of critical thinking and self-confidence were significantly higher. The study also reported a pre- and post-simulation measure of self-confidence demonstrating statistically significant improvement following the simulation in the second semester.

Sinclair and Ferguson's (2009) study explored the effect of simulation learning in a nursing theory course on students' perceptions of self-efficacy, satisfaction, and effectiveness. While self-efficacy can be a challenge for students, they have often expressed concerns of anxiety regarding their abilities to apply learning to clinical practice. The findings suggested that nurses have reported improved self-efficacy in their

skill performance following the simulation experience.

Kameg, Howard, Clochesy, Mitchell, and Suresky (2010) compared the effectiveness of two educational delivery methods, traditional lecture and high fidelity human simulation. Senior nursing students' confidence was assessed after communicating with patients experiencing mental illness. Kameg et al. (2010) states, "Communication is a critical component of nursing education as well as a necessity in maintaining patient safety" (p. 315). The positive results support the use of simulation in enhancing undergraduate students' confidence in communicating with patients who are experiencing mental illness.

An example of an individual's capacity to perform a task was described in the research study conducted by Cardoza and Hood (2012). This study focused on comparing baccalaureate nursing students' self-efficacy before and after simulation. A convenience sample of 52 senior baccalaureate nursing students was separated into two groups. Self-efficacy was measured using the General Self-Efficacy (GSE) scale (Jerusalem & Schwarzer, 1995). Data identified senior baccalaureate nursing students having unrealistic self-assessments of their clinical knowledge and performance capabilities before simulation. A significant increase in self-efficacy in the groups emerged over time. Improved self-knowledge by both groups regarding the limitations and perceptions of their clinical abilities increased after seven weeks. This study demonstrated the need for students to engage in simulated clinical scenarios. Simulated scenarios can lead to identifying levels of nursing knowledge and clinical skills, while further enhancing behaviors to improve students' critical analysis and learning outcomes (Cardoza & Hood, 2012).

Related simulation research in comparing knowledge and satisfaction was conducted by Karong-Edgren, Lundstrom, and Bendel (2009). This research study compared student test scores and satisfaction outcomes when interacting with Vital Sim® and Simman®. The purpose of this study was to compare student knowledge and retention satisfaction scores between two fidelity levels of simulation manikins by using a paper and pencil test. This study employed an experimental 3x3 factorial with repeat measure design. One hundred and forty baccalaureate nursing students in a medical surgical course participated in this study as members of a convenience sample. Students were randomly selected to join three groups and three different levels of time on three campuses. They participated in a paper and pencil test that consisted of 15 multiple choice questions based on the AHA algorithm for ACS or from the selected medical surgical test bank. After the students participated in a 30-minute simulation scenario, satisfaction scores were measure by a faculty designed, seven-item Likert-type satisfaction questionnaire. The results indicate that there were no significant covariates and the simulator by time interaction was not significant ($p>0.5$) (Karong-Edgren et al., 2009). Overall, results indicated significance in knowledge and satisfaction scores between the pre-test and posttests. Faculty members further reported students' satisfaction with the simulation experience.

Interprofessional education research. Interprofessional teams involved in simulation continue to be a growing trend in health care education (Willhaus, 2012). There are combined efforts between medicine and nursing to engage in these programs to impact patient care. Other team dynamics have included Pharmacy, Nutrition, Physical Therapy, and Social Work. IPE is an avenue for changing attitudes of healthcare

professionals and enhancing patient centered care during training (Rodehorst, Wilhelm, & Jensen, 2005; Rose et al., 2009). This continues to impact patient care by involving members that collectively participate in the decision making regarding the patient. Bray, Schwartz, Weeks, and Kardong-Edgren (2009) surveyed non-university healthcare educators after a high fidelity simulation demonstration, and found that this group was interested in employing patient simulation in student learning as an educational tool. These findings support the use of high fidelity simulation in staff education in hospitals and other health care agencies. Incorporating interdisciplinary education with simulation in these settings would be a valuable addition to improving patient care (Bray et al., 2009).

The understanding and appreciation of the different roles of each profession by other healthcare professionals can impact practice. Lumague et al.'s (2006) research assessed health professional students (Medicine, Nursing, Occupational Therapy, Pharmacy, Physiotherapy, Social Work, and Speech Language Pathology) in an effort to increase interprofessional collaboration, improve communication skills, foster respect, and enhance knowledge of the different roles each discipline plays on the health care team. Over five weeks, students participated in interprofessional group sessions led by different health care professional leaders from the Stroke inpatient unit. The results indicated that all participants in the study recognized the importance of interprofessional teamwork in patient care and the need to be further educated on the roles of other disciplines. Student responses agreed that all health care education should include opportunities which enable them to develop the skills, behaviors, and attitudes needed for interprofessional collaboration.

MacDonald et al.'s (2010) examined and discussed the competency knowledge of the professional role of others and its associated behavioral indicators, especially as these relate to the IPE of nursing students. The identification of these competencies and their behavioral indicators served two purposes: first, to form the basis for the preparation of students, preceptors, and faculty for interprofessional practice; second, to develop a tool for assessing student performance in such practice. The authors suggested the importance of these key competencies was that behavioral indicators would contribute to the development of programs that include specific knowledge and skills related to interprofessional nursing education. This recommendation would enable educators to support and evaluate students in IPE experiences more efficiently and effectively. "Healthcare is a shared responsibility of many interrelated professions. Therefore, the focus of nursing programs and other health science professional programs should be on an interprofessional approach" (MacDonald et al., 2010, p. 242).

Gallagher, Cooper, and Durand (2010) completed an interprofessional project using volunteer students from Physician Assistant, Nursing, and Pharmacy programs. Students participated in projects at a Head Start site and completed surveys regarding attitudes of health team members before and after the project. Students completed a knowledge and attitudes survey. Paired t tests were used to determine whether significant changes occurred in attitudes or knowledge as a result of the interdisciplinary volunteers' experience. The data suggested significant increases in awareness of community resources, understanding of the strengths and skills of other members of the health care team, and experiences in working with other professions. Student attitudes toward a team approach to health care did not significantly change as a result of this

experience.

Another study also focused on the comprehension of the different roles of health professionals. Rodehorst et al. (2005) analyzed the efficacy of students from several disciplines working together to provide care to patients with asthma, and evaluated the interplay of overlapping roles in health care. Results indicated that interdisciplinary learning could clarify roles and enhance learning for students from different disciplines.

Interprofessional education can impact attitudes towards other professionals. Woodroffe, Spencer, Rooney, Le, and Allen (2012) utilized case-based scenarios and learning stations to enhance IPE. The Rural Interprofessional Program Emergency Retreat (RIPPER) was a pilot program run by the University of Tasmania's Department of Rural Health and Faculty of Health Science (Woodroffe et al. 2012). The format and educational design of the RIPPER program consisted of multiple learning stations using interprofessional case-based scenarios. The key principles of the scenarios included emergency health care, the natures of emergency care in a rural context, and encouragement of social views of health and illness. Student teams rotated through the learning stations/scenarios. Each learning station employed experiential and interactive educational strategies. One station utilized high fidelity simulation (Laerdal® Sim-Man), while the others focused on low fidelity simulation and role playing. In some scenarios that used role-playing, professional actors were used to portray patients. The use of coaching and script training was necessary to present a standardized patient. A positive shift in attitudes toward interprofessional teamwork was found, supported by a number of statements in response to the open-ended qualitative questions from Pharmacy, Nursing, and Medical students.

Bridges, Davidson, Odegard, Maki, and Tomkowiak's (2011) research focused on training curricula models of collaborative and interprofessional education. Training future health care providers to work in such teams will help facilitate this model resulting in improved healthcare outcomes for patients. The models in the study were a didactic program, a community-based experience, and an interprofessional-simulation experience. The study reported a common theme of the importance of helping students understand their own professional identities while gaining an understanding of other professionals' roles on the health care team. The authors summarized their report to include a recommendation for best practices such as the need for administrative support, interprofessional programmatic infrastructure, committed faculty, and the importance of recognition of student participation as key components in an IPE program.

Review of Measurement Tools

A review of the IPE research suggests various measurement instruments to examine behaviors of health care student. The following are examples of measures used to depict healthcare student behaviors relevant to this study. The Collaborative Practice Assessment Tool (CPAT) was specifically designed to measure health care team members' perceptions of working collaboratively. The purpose of developing and validating the CPAT survey instrument was to assist teams in identifying specific educational needs through assessment of their perceived degree of collaboration (Schroder et al., 2011). The CPAT was pilot tested by Schroder et al. (2011). The CPAT survey includes 56 items across nine domains and three open ended questions. The domains include mission and goal, relationships, leadership, role responsibilities and autonomy, communication, decision-making and conflict management, community

linkages and coordination, and perceived effectiveness and patient involvement. The seven-point Likert scale responses include Strongly Disagree, Mostly Disagree, Somewhat Disagree, Neither Agree nor Disagree, Somewhat Agree, Mostly Agree, and Strongly Agree. This measurement tool allows for flexibility and application across disciplines. After the first pilot testing attempts by Schroder et al. (2011) the results showed that factors measuring the eight aspects of collaborative practice had eigenvalues of roughly 3.0, explained approximately 50% of the variation in respondents' answers, and had Cronbach's α of between 0.70 and 0.90. The second pilot test further establish the validity and reliability of the instrument between 0.90 and 0.95. The researchers concluded that, as collaborative care develops both as a model of care provision and in its practical application throughout the healthcare system, the CPAT provides researchers and practitioners with a means of assessing levels of collaborative care across diverse healthcare settings in order to target and focus efforts aimed at improving practice and patient outcomes (2011).

The General Self-Efficacy (GSE) scale has been used to assess self-efficacy of IPE students (Jerusalem & Schwarzer, 1995). This scale is considered a structured self-reporting instrument. The GSE is a 10-item scale designed to assess optimistic self-beliefs. Participants use a four- point scale with 1=not at all true, 2=hardly true, 3=moderately true, and 4=exactly true. Responses are summed for a final score that range from 10-40. The higher score reflects students' greater belief in self-efficacy. This test requires 4 minutes to complete on average, according to the originators (Jerusalem & Schwarzer, 1995). The reliability has been established in 34 samples from 23 nations with Cronbach's values ranging from 0.76 to 0.90, with the majority in the high side of

the range (Rimm & Jerusalem, 1999; Luszczynska, Scholz, & Schwarzer, 2005). This range indicates that some of the research is reporting internal consistency coefficients. This scale is considered unidimensional, meaning it has a construct and content validity. The GSE scale will be at the interval level. Validity of the scale was confirmed by determining the relations between the GSE and other social cognitive variables (Luszczynska et al., 2005). This scale is widely used as a measurement instrument in education and applicable to the evaluation of nursing students and health professional.

The utilization of the Readiness for Interprofessional Learning Scale (RIPLS) was relevant to the aim of this study. The description of RIPLS is further described in Chapter 4. Nursing, Psychology, and the Health Science literature support the RIPLS use globally (Australia, Canada and UK) and in several regions of the United States (Northeast, Southwest, Southeast, Midwest, and West) to evaluate students' attitudes in IPE. The RIPLS represents the instrument needed to measure the attitudes of the health professional students towards IPE.

The following studies represent the use of the RIPLS questionnaire in evaluating student attitudes in IPE. Morison, Boohan, Moutray and Jenkins' (2004) study incorporated the RIPLS to evaluate IPE and health professional students. The purpose of this study was to focus on the development of prequalification IPE for Nursing and Medical students. The findings suggested the use of the RIPLS, in conjunction with open-ended sentences, was a suitable instrument for this exploratory study.

Solomon and Salfi's (2011) research evaluated IPE and communication skills with health care professionals. Ninety-six Pre-licensure students participated in a three-hour program, which was facilitated by faculty and included an interactive format. The

program focused on problem-based learning, cooperative learning, and standardized patients. The study further described the interactive format of student teams that interviewed a standardized patient and developed an interprofessional care plan. The RIPLS, Interprofessional Education Perception Scale(IEPS), measurement of satisfaction, focus groups, and individual interviews were used for measurement in the program evaluation. Results showed that students rated satisfaction highly with the communication skills session. Students were pleased with the clinical relevance of the experience, contribution of the faculty, and opportunities with students from other programs.

Blue and Zoller's (2012) study utilized the RIPLS and the IEPS to measure graduate students' perceptions on attitudes towards interprofessional collaboration. The researchers reported choosing the RIPLS and IEPS because the instrument has been widely utilized throughout the IPE literature.

Hertweck et al.'s (2012) focused their study on the attitudes of comparing Physician Assistant (PA) and other health care professional students' readiness attitudes towards IPE. This was the researchers' first step in implementing IPE throughout their curriculum. The RIPLS scale compared PA students with other health professional students. One hundred fifty-eight students from a small Northeastern university participated in this study. Results suggested PA students value interprofessional collaboration less than other health profession students. The authors noted gender was a factor in differences in readiness for IPE.

Hood et al.'s (2014) research focused on the students' professional identities and attitudes towards teamwork. Nursing and health care students with prior experience with

interprofessional learning formulated the population for this study. With a sample consisting of 741 undergraduate students from six disciplines, this cross sectional study utilized the RIPLS instrument to explore the views of student professional identity and teamwork. Each cohort completed the survey prior to participating in interprofessional clinical learning modules. Results showed that one-third of all students who had prior experience had a positive attitude in each of the RIPLS domains ($p < .05$). In summary, student attitudes were positive towards interprofessional learning and recommended earlier introduction to interprofessional learning.

Scherer, Myers, O'Conner, and Haskins' (2013) research focused on interprofessional simulation to foster collaboration between Nursing and Medical students. This quasi-experimental pilot study using a pre- and posttest design utilized the RIPLS and four other scales to explore the effects of IPE simulation with Medical and Nursing students compared to solely Nursing students on knowledge, confidence, and attitudes toward IPE. Other scales included a Knowledge Test, adapted by the examination testing by the American Heart Association cardiopulmonary resuscitation examination and the advance life support groups. The Confidence scale was a Likert scale. The fourth scale, Attitudes Toward Health Care Teams Scale, was an instrument measuring the self-reported attitude toward collective teamwork in health care groups (Scherer et al., 2013). Scherer et al.'s (2013) health professional students who had no prior experience with IPE and RIPLS scores had significantly higher scores on knowledge and the three RIPLS subscales: *Teamwork and Collaboration, Professional Identity,* and *Roles and Responsibilities* in comparison with students in the intraprofessional control group. This suggested the benefits of IPE and the need to

increase and implement IPE earlier throughout the curriculum prior to graduation of student programs.

Summary

Through the history and development of IPE and simulation, the importance of collaborative practice to reduce practice errors and improve quality of care and patient outcomes are evident. There are many studies that explored the effects of IPE and the use of simulation in health education. The impact of these teaching strategies continues to be utilized to enhance critical thinking, psychomotor skills, and communication. Research supports the need to further investigate health professionals' attitudes and perceptions to improve education and future practice.

Chapter 3: Theoretical Framework

Health education theories provide a common lens for research that can describe, explain, and predict Interprofessional Education (IPE) outcomes. Many theories have been suggested to guide understanding of IPE for professionals. Each offers insight for IPE and the adult learner. The following theories are examined for their application towards IPE and Adult Learners: Bandura's Social Learning Theory, Knowles' Adult Learning Theory, Jeffries Simulation Model, and Kolb's Experiential Learning Theory.

Bandura's Social Learning Theory

Bandura's Social Learning Theory (SLT) has particular relevance to adult learning that accounts for both the learner and the environment in which he/she operates. SLT emphasizes the importance of observing and modeling behaviors, attitudes, and emotional reaction to others (Bandura, 1977). Parcel and Baranowski (1981) described basic components of SLT and suggested ways for them to be utilized in planning and implementing health education. SLT is especially attractive to health educators because it approaches the explanation of human behavior in terms of a continuous interaction among cognitive, behavioral, and environment determinants (Parcel & Baranowski, 1981). Within the developmental stages of health education programs, SLT has been effective in influencing behavior change.

Bandura (1977) has identified three elements to the SLT: (1) People tend to model those they admire or most closely identify with; (2) Observational learning follows a process of rehearsal, modeling the behavior symbolically, and then acting on it; and (3) People tend to model behavior that results in outcomes they value. Modeling reduced both the burden and the hazards of direct trial-and-error learning by enabling people to

learn from example what they should do even before they attempt a given behavior (Bandura, 1977).

Bandura (1977) also outlined a four-step, largely internal process that directs social learning, which included an attentional phase, retention phase, reproduction phase, and motivational phase. Attentional phase is the observation of the role model. Retention phase involves the storage and retrieval of what was observed. Reproduction phase is where the learner copies the observed behavior. The last phase, the motivational phase, involves whether or not the learner is motivated to perform a certain type of behavior.

In general, understanding the learning process is helpful to the educator. SLT can be used singularly or with other learning theories to help the educators acquire new information and modify existing thoughts, feelings, and behaviors of the learner. The educator can model behavior and create opportunities for students to serve as models to each other. By incorporating learning activities, the educator provides opportunities for practice and collaborative group learning. The educator also strives to form a positive and supportive interpersonal relationship with every student. Braungart and Braungart (1997) stated that the social learning perspective is a simple theory to use, stressing the importance of effective role models who, by their example, demonstrate exactly what behavior is expected.

The strength of Bandura's SLT (1977) as a framework for educational programs is evident in many research studies. Social learning programs encourage behavior changes to take place, which can lead to a desirable outcome. IPE programs have strong foundations of observational learning, followed by motivation and reinforcement

interventions encouraging participants to model favorable behaviors and enhance decision-making skills.

Bandura (1977) proposed that the environment and internal events that influence perceptions and actions affect complex behaviors. In other words, people influence their environment, which in turn influences the way they behave. Simulation activities provide a practical environment to focus on intrinsic and extrinsic factors that can influence behaviors of the health professional.

SLT has been used as a framework for simulation educational programs (Sinclair & Ferguson, 2009). Sinclair and Ferguson's (2009) research explored the effects of simulation learning on students' perception of self-efficacy, satisfaction, and effectiveness. Qualitative data showed students reported that working with their peers during simulated learning activities was effective in promoting their learning. Nurses reported improved self-efficacy in their skill performance following the simulation experience.

Williams et al.'s (1993) examined a collaborative approach among health care professionals in the development of a preceptor program by using social learning theory. Through the evaluation of nursing student behaviors, the authors suggested that change can impact future nursing practice leading to better patient outcomes.

Knowles' Adult Learning Theory

The second theory widely used in IPE and simulation is Knowles' Adult Learning Theory (1990). This theory relates to concepts of adult learning that exist with five of Knowles assumptions: self-concept, experience, readiness, orientation, and motivation. Simulation is based on adults who are learning in an environment relevant and applicable

to their set of experiences. IPE and simulation scenarios are designed to have adult learners critically reflect on their experiences. According to Knowles (1990), this is an important element in fostering a positive effective learning experience. Campbell, Themessl-Huber, Mole, and Scarlett (2007) utilized Knowles Adult Learning Theory in their research when they assessed teaching strategies to challenge students' beliefs and values.

Jeffries Simulation Model

Another related framework associated with simulation and education is the Jeffries Simulation Model. The National League of Nursing has adopted this framework as the foundation of the development of simulation programs. Jeffries (2005) has described three key components in nursing simulation: the design, implementation, and evaluation phases. Jeffries Simulation Model (2005) provides a foundation for simulation design in nursing curricula and health education programs. This model has five concepts linked to this framework: educational practice, the teacher, the student, the design of characteristics of the simulation, and the outcomes (Jeffries & Rogers, 2007).

Jeffries' underlying assumptions depict a "how to" of planning, designing, and implementing simulation in a clinical setting (Jeffries & Rogers, 2007). For instance, the framework guides the simulation scenarios by creating and planning the events according to the needs of the education program or practice environment. This framework is essential in the organizational development of simulation education to improve the nurse's actions in providing care to patients. Another component of Jeffries Simulation Framework is nursing students connecting simulation within the nursing curriculum as well as student satisfaction with simulated situations.

Smith and Roehrs (2009) utilized Jeffries' design characteristics and included five variables: clear objectives and information, support during the simulation, a suitable problem to solve, time for guided reflection/feedback, and fidelity or realism of the experience. This framework directed the research needed to address the questions related to the outcomes and efficacy of the author's simulation-based education.

Kolb's Experiential Learning

Through a detailed examination of relevant theories to IPE and simulation, the theoretical framework of Kolb's Experiential Learning guided this study. This social theory is defined as a learning process in which knowledge is created through transformation of an experience (Kolb,1984). Kolb's ELT has been utilized in multiple disciplines as an approach to learning such as nursing, business and education (Baker et al., 2008; Lisko & O'Dell, 2010).

Interprofessional Education is built on social and experiential learning (Reeves et al., 2007). Kolb (1984) suggested that immediate or concrete experiences lead to observations and reflection. These are relevant goals and objectives that the participants will learn throughout an interprofessional experience. This theory also supports the components of designing, implementing, and debriefing of simulation. Throughout the simulation experience, students interact with each other and the environment while exploring beliefs and ideas (Poore et al., 2014). Kolb (1984) suggested that learning is a process through which simulation can affect how individuals develop and employ knowledge they gain through experiential learning cycle.

Assumptions of Kolb's Experiential Learning Theory. Kolb's ELT identifies learning styles of each individual learner. ELT has two assumptions to guide the learner:

(1) the learner can adapt and change their knowledge, skill, and attitude through experiential learning; and (2) learning continues to evolve after the completion of the learning cycle to a more complex level (Davies & Gidman, 2011). This completion directs the learner to another set of experiences, which in turn directs him or her to another cycle of learning (Poore et al., 2014). The learner's knowledge is focused between personal and social knowledge.

The following section provides some background information to explain Kolb's earlier work. Kolb's theory pulls from the original work of experiential learning from the scholars Dewey, Lewin, and Piaget (Kolb, 1984). In 1970, David Kolb and Ron Fry developed the Experiential Learning Model (ELM). ELM consists of four learning elements: (1) concrete experience, (2) observation of and reflection on that experience, (3) formation of abstract concepts based upon the reflection, (4) testing the new concept, and (5) repeat (Kolb, 1984).

Kolb's learning styles model gave rise to the Kolb's Learning Style Inventory (LSI) and Experiential Learning Theory (ELT) (Kolb, 1976, 1984). His Learning Style Inventory (LSI) was based on the notion that learning styles can be described in two continuums. The focus of LSI is to determine the learning styles of an individual. The model works on two levels or continua, active experimentation-reflective observation and abstract conceptualization-concrete experience (Kolb, 1976, 1984). The ELT was a model of learning that utilized role experience in the learning process (Kolb, 1984). This theory further emphasizes the combination of experience, perception, cognition, and behavior as a perspective on learning (Kolb, 1984). The following describes the components of Kolb's Learning Cycle, Learning Styles, and phases of the Kolb's

Learning Cycle.

Kolb and Kolb (2005) described the four-stage learning cycle representing how a learner approaches a task or experience as consisting of the concrete experience, the reflective observation, the abstract conceptualization, and active experimentation. Concrete Experience (CE) represents the emotion or feeling towards an experience. Reflective Observation (RO) represents the action of watching others and reflecting on what happens in the experience. Abstract Conceptualization (AC) describes the emotion of thinking or analyzing of new information. Lastly, Active Experimentation (AE) is the action of doing or what Kolb describes as "jumping straight in" (2005, p.2).

Kolb and Kolb (2009) identified six propositions of ELT that, when combined with Kolb's learning cycle, generate knowledge through transformation of experience. The propositions are: Learning is a process, All learning is relearning, Learning is a dialectic process, Learning is holistic and integrative, Learning results from interaction between person and environment, and Learning is a process of creating knowledge (Kolb, 1984).

In addition to contributing to understanding the process for experiential learning, the following describes Kolb's four learning styles, to which each has a combination of learning preferences (Kolb & Kolb, 2005). The first is the Converger (active experimentation-abstract conceptualization), which represents the learning style of solving problems to practical issues that involve technical tasks and social issues. The second learning style is the Accommodator (concrete experience- reflective observation) or the hands-on style of a learner that prefers to take a practical, experiential team approach to completing a task. The third style is the Assimilator (abstract

conceptualization- reflective observation) or the logical approach learner that focuses on the ideas and abstract concepts of the learning situation. Lastly, the Diverger (concrete experience-reflective observation) learning style is described as the watching rather than the doing action of a task. This is the "gathering of information to solve problems, preferably in groups" (Kolb & Kolb, 2005, p. 5). The learning cycle represents a student-centered focus that enhances active learning such as reflection to increase critical thinking skills. Kolb (1984) suggested that the learner, as a reflective practitioner, watches, listens, and views issues from different points of view and discovers meaning in the learning material.

Kolb's three stages of a person's development improve as he or she matures through the development stages as illustrated in Table 1 (Kolb & Kolb, 2005). The development stages are identified as Acquisition, Specialization, and Integration. Kolb (1984) further explained these stages as (1) Acquisition stage occurs from birth to adolescence, and is where basic abilities and cognitive structures develop; (2) Specialization occurs from the beginning of formal schooling through the early work and personal experiences of adulthood; and (3) Integration occurs in midcareer and later life, where learning is expressed through work and personal life bringing security and achievement (Kolb, 1984, pp. 143-144). Kolb's ELT proposes a foundation and process for acquiring knowledge based on the learners needs. The utilization of ELT framework provides an effective strategy of development for learning programs, such as IPE and Simulation.

Poore et al. (2014) recommended Kolb's ELT to guide simulation-based IPE to improve communication and collaboration with health professional students. The authors

found that utilizing Kolb's theory provided a foundation and process for the individual learner who participates in simulation.

Simulation continues to be an innovative component of health education programs. The implementation of IPE is an innovative strategy for changing behaviors of health professional students to impact practice and direct patient care. These programs can focus on the critical thinking and actions of the student. Kolb's ELT is described as a learning process. Poore et al.'s (2014) research operationalized Kolb's ELT for Simulation-Based IPE. The use of this theory represents simulation as the concrete experience of the learner. The debriefing phase of simulation or Kolb's RO provides the student with the opportunity to engage in conversation to explore others ideas regarding the experience. The phase of abstract conceptualization represents the learners' IPE experience and the new ideas generated during the simulation (Morse, 2012). Morse (2012) described Kolb's active experimentation phase as the learner testing new knowledge and applying it to other experiences, such as simulation or clinical experiences. Kolb's model facilitates learning through the application of the preferred style of the learner (Poore et al., 2014). Kolb's ELT continues to increase its utility throughout IPE and Simulation programs.

Central to IPE is the relevance to various theoretical frameworks. The utilization of Kolb's ELT in conjunction with IPE and simulation continues to impact the educational research of health care professionals and students to improve future practice. Incorporating this theoretical framework provides a foundational component, which can lead to a credible evaluation of IPE programs.

Chapter 4: Methodology

This study utilized mixed methods to explore interdisciplinary health students' readiness, attitudes, value, and understanding of interprofessional roles. Furthermore, the utility of the Readiness for Interprofessional Learning Scale (RIPLS) was evaluated by using a descriptive analysis and a paired-sample t test. This study examined the potential impact of Interprofessional Education (IPE) on health professional students' attitudes and perceptions. In addition to the RIPLS questionnaire, evaluation of the IPE program was conducted by using a qualitative method of three-open ended questions intended to reveal a greater understanding of the IPE students attitudes on role and interprofessional collaboration.

Research Questions

This descriptive study was designed to answer the following research questions:

1. Does IPE impact students' attitudes towards the roles of other professionals?
2. Does IPE change students' perceptions of interprofessional collaboration?
3. Does IPE affect student's value for learning with other professionals?

Research Design

The study design was a pretest-posttest descriptive design utilizing a 15- item quantitative survey (Appendix I) and 4- item qualitative open-ended questionnaire (Appendix J). This project explored use of the RIPLS instrument to examine the potential impact of IPE on health professional students' attitudes towards the professional roles and students' perceptions of interprofessional collaboration for their learning with other professions. With approval of the participating universities and college's and their Institutional Review Boards (IRB) (Appendix A), a detailed description of the study was

sent via email to each profession's professor to introduce the study (Appendix E). This included the pre-test and posttest Survey Monkey® link to the RIPLS questionnaire and consent form (Appendix F). Professors were instructed by the researcher to forward the invitation to the students before and after the IPE program. Students were assured that their participation was voluntary and that they would not be penalized for non-participation in the study.

Students who elected to participate completed a RIPLS survey via Survey Monkey®. To ensure anonymity and consistency, immediately before and after the IPE experience, students provided the first three letters of their mother's maiden name and the first three digits of their childhood street address. Demographic questions included profession, prior IPE experience, and prior completion of the RIPLS survey. Demographic variables were chosen to examine descriptive information relevant to the study. Qualitative items on the post-test included four open-ended questions:

> 1. In one or two sentences, please describe the impact of this IPE on your confidence level in communicating with other disciplines?
>
> 2. How has your participation in this IPE changed your understanding of other health disciplines roles?
>
> 3a. What was the most helpful thing you learned with this IPE?
>
> 3b. Would you recommend Interprofessional Education to other members of your discipline? (Appendix J)

Sample and Setting

A convenience sample (n=524) of health professional students (Medical, Nursing, Pharmacy, Physical Therapy, and Social Work) from a state university, a state college, and the medical school of a private university in the Northeast participated in a mandatory, bi-annual IPE program.

The sample consisted of 121 second-year medical students, 120 senior nursing students from two different programs, 120 fifth-year Doctorate in Pharmacy students, 37 second-year Physical Therapy students and 126 graduate Social Work students. Faculty randomly assigned students into one of the 17 equally blended interprofessional teams. Each team had 5-7 members. Three breakout sessions labeled by color (Green, Red, and Blue) were conducted. An attempt was made to have an equal representation of students from each profession. Students were given an assigned color group at the time of check-in. Throughout the program, students rotated throughout the breakout rooms, also referred to as "Academies," to complete the simulated activities.

Description of the IPE Program

Health professional students participated in a bi-annual IPE Program located at a private medical school in the Northeast. In an effort to provide IPE across professions, the IPE Program Model was developed jointly by faculty from Nursing, Medicine, Pharmacy, and Social Work programs in Rhode Island (MacDonnell et al., 2012; MacDonnell et al., 2011). Based on the educational concept of "Seamless Care," the framework established a foundation for multiple health educational IPE programs nationally and internationally (MacDonnell et al., 2012). "Seamless Care" was a project funded by Health Canada to develop students' interprofessional patient-centered collaborative skills through experiential learning (Mann, et al., 2009) and is described in the literature review section of this study.

Students participated in a half-day (4-hour) mandatory IPE experience. This included a morning and afternoon session. Simulated learning activities included an Objective Structured Clinical Examination (OSCE) of a standardized patient (Appendix

K & M), a case-based scenario (Appendix I), and a team building exercise. Each breakout session was approximately 30-50 minutes in duration. All students followed an agenda they received during check-in (Appendix G & H). Following check-in, students reported to their assigned "Academies" for an introduction, breakfast, and a brief orientation to the IPE. Program facilitators provided students with IPE program objectives that explained the importance of interprofessional teams in health care and described the roles of nurses, pharmacists, physicians, physical therapists, and social workers in health care in working as a team to problem solve a non-medical situation. Emphasis was placed on devising a care plan for a complicated patient and implementing care for a patient. A detailed description of the program follows.

Initial breakout sessions focused on an OSCE of a patient diagnosed with pneumonia (Appendix K & M). The OSCE was originally designed as a form of performance-based testing used to measure candidates' clinical competence. IPE programs currently use this strategy to observe and evaluate health care students who conduct a simulated patient interview, perform a physical examination, and treat standardized patients who present with a medical problem.

Next, students arrived to the patient rooms as a team to begin discussions for a plan of action for a patient complaining of a cough. Prior to the start of this first session, students received a packet of patient information. Upon entering the room, the team was expected to conduct an interview and assess the patient while collectively gathering information. After the assessment phase, the team discussed plan of care and discharge strategies. At the conclusion of this session, a debriefing phase was held and led by a faculty member representing one of the participating professions.

A case-based scenario was the format for the second breakout session. Case-based scenarios continue to be an educational strategy to enhance IPE. Scenario for this session focused on a recurrent admission of a patient from the Emergency Department, named "The Complicated Patient" (Appendix I). Each student received a packet of information that included patient information of demographics, history, and physical and group discussion questions. Students collectively participated in a team discussion for 30 minutes. Students were encouraged to participate in their designated teams to further discuss a detailed plan of action according to a set of discussion questions. Each reported a problem list and a projected plan of action according to their role. A debriefing phase concluded the session to elaborate on the findings and further discuss each professions action plan.

In the last breakout session, student teams participated in a team building exercise consisting of building a spaghetti tower. This 30-minute exercise encouraged teams to experience a lesson in collaboration, innovation, and creativity. Team participants were challenged to practice teamwork skills by working together to build the tallest tower. Student teams were instructed to build a freestanding structure using 20 sticks of spaghetti, one yard of tape, one yard of string, and one marshmallow. Learning objectives for this experience were: (1) to complete a task, (2) to demonstrate effective communication, and (3) to practice creative thinking and problem solving. Students received a detailed instructional sheet at the beginning of the session. Each group was instructed to develop a detailed overall design concept for the tower. Teams were encouraged to pick a team leader, collaborate on a design, and listen to each member's best thinking and recommendations. Prior to beginning to build, each team was

instructed to come to a consensus on the design, and each team leader needed to assign specific tasks to each member. Completed structures were compared and among groups to determine the tallest structure. Each group described their process of communication. Students elaborated on creative thinking ideas and problem solving strategies used to complete the activity in the time allotted. A debriefing phase concluded the session to discuss the teams experience in collaboration, innovation, and creativity.

Instrumentation

Based on a thorough review of IPE, an adapted version of RIPLS was used to examine the potential impact of IPE on health professional students' attitudes and perceptions (Appendix I). The RIPLS is used to measure readiness of health care professional students to undertake shared learning activities (Parsell & Bligh, 1999). Because it attempts to allow for flexibility and application across professions, this instrument is widely used in evaluating IPE programs. Parsell and Bligh (1999) were the original developers of the RIPLS to evaluate student attitudes and perceptions towards IPE. Originally the scale consisted of three-factor subscales, including *Teamwork and Collaboration*, *Professional Identity*, and *Professional Role and Responsibility*. The *Teamwork and Collaboration* subscale measured student attitudes on learning with other professionals. *Professional Identity* relates to learning experiences and communication with other professional students. The *Role and Responsibility* subscale refers to the students own role and those of other student from other health professionals.

McFadyen et al. (2005) adapted the original version to reflect four subscales. This was based on further testing to improve reliability of the instrument for use with undergraduate health-care students. The subscale, *Professional Identity*, was split into

two subscales of *Positive Professional Identity* and *Negative Professional Identity*. This Likert scale ranged from strongly disagree (1) to strongly agree (5). *Teamwork and Collaboration* was measured using items 1-9. *Negative Professional Identity* subscale items consisted of questions 10 thru 12. *Positive Professional Identity* subscale items were questions 14-16. *Roles and Responsibility* were questions 17-19. Original internal consistency of the scale was reported as 0.90 (Parsell & Bligh, 1999). Parsell and Bligh reported Cronbach alpha at 0.88 for factor 1, 0.63 for factor 2, and 0.32 for factor 3 (1999). McFadyen et al. (2005) reported internal consistency based on the adaptive version as follows: *Teamwork and Collaboration* .79/.88, *Negative Professional Identity* .60/.76, *Positive Professional Identity* .76/.81, and *Roles and Responsibilities* .40/.89.

The relevance of RIPLS to Kolb and IPE is evident in the design of the scale. The developers of the RIPLS scale incorporated elements of adult learning theories and social and psychological theories in the design, development, and implementation of shared learning initiatives (Parsell & Bligh, 1999). Parsell and Bligh (1999) have identified four key dimensions that relate to the outcomes of interprofessional learning. These dimensions arise from characteristics and practical application of the theories. The first dimension is the relationships between different professional groups (values and beliefs people hold); second, the collaboration and teamwork (knowledge and skills needed); third, the roles and responsibilities (what people actually do); and, fourth, the benefits to patients, professional practice, and personal growth (what actually happens). The purpose of this scale was to rate the desires outcomes of shared learning; or, in other words, to assess the readiness of health care students that engage in shared learning activities (Parsell & Bligh, 1999).

Data Analysis

Quantitative data was collected using the RIPLS (Appendix I). Data was analyzed using the IBM SPSS statistical software, version 21. Descriptive statistics analyzed the pre-test and posttest RIPLS results of student subjects. This ordinal scale measured univariate means, standard deviations, frequencies, and percentages. Change score analysis determined the differences between paired pre-test and posttests of the heath professional students. Subjects were also asked if the RIPLS was completed prior to this IPE experience and if they participated in any prior experiences. ANOVA was used to assess the difference in mean scores for each subscale of the RIPLS. These methods are appropriate when testing the differences between group means. ANOVA tests for significance ($p=0.05$) in the potential effect of the IPE program on attitudes.

Further analysis was conducted using a paired-sample t test to determine significant differences between the pre-test and posttest of the RIPLS survey. For this study, the ordinal level of measurement of the RIPLS survey response categories were Strongly agree, Agree, Undecided, Disagree, and Strongly Disagree.

Ethical Considerations

Approval was obtained from the universities and college's IRB prior to conducting this study. The timeline for the study included dissertation proposal approval from the author's dissertation committee, IRB application for exemption, and data collection in October 2013 (Appendix A). Permission was granted by Survey Monkey® to utilize this service as a platform in collecting data. There was little to no risks to the subjects throughout this project. Students were required to attend the IPE program within the curriculum separate and apart from this study. Students were asked to voluntarily

participate in this study through completion of the survey. This was an anonymous survey. Anonymity was protected with the only identifiers being the student's first three letters of mother's maiden name and first three digits of a childhood address. Subjects were also asked to identify to which of the five professions of Medical, Nursing, Pharmacy, Physical Therapy, and Social Work, they belonged. This investigator shared no responsibility for student grading.

Qualitative Data Analysis

Qualitative data included four open-ended questions. Content analysis was performed to determine common categories after participating in the IPE program. The first question, *Describe your confidence level in communicating with other disciplines*?, was designed to evaluate student's confidence levels in communication with other health professional students. The second question, *How has your participation in this IPE changed your understanding of roles of the other health disciplines?*, was designed to explore the student's understanding role of other professionals after the IPE experience. The third question involved two parts. The first part, *What was the most helpful thing you learned with this IPE?*, was designed to gain insight into student's evaluation of the IPE experience. The last question, *Would you recommend Interprofessional Education to other members of your discipline?*, explored students' attitudes towards future IPE for their profession.

Through the method of content analysis, the questions were further evaluated to answer the qualitative research questions of this study. Content analysis is described as a research methodology that examines words or phrases within a wide range of texts. As analysis and interpretation continued, the researcher and qualitative expert examined the

data and began to identify categories in an attempt to draw whatever conclusions and generalizations were possible. Content analysis is considered to be a widely used qualitative research technique. There are three approaches to the application of content analysis: conventional, directed, or summative. Each approach is used to interpret meaning from the content of text data.

Hsieh and Shannon's (2005) described the different methods of conducting a content analysis on qualitative data. In conventional content analysis, coding categories are derived directly from the text data. With a directed approach, analysis starts with a theory or relevant research findings as guidance for initial codes. A summative content analysis involves counting and comparisons, usually of keywords or content, followed by the interpretation of the underlying context.

Qualitative research needs to demonstrate trustworthiness of the data by accurately reflecting the experience of the participants and not of the researcher. The participants' actual responses can potentially lead to supporting the quantitative finding of the study and further answer the research questions of this study. For the purpose of this study, the researcher and qualitative expert conducted a conventional content analysis of the data. The analysis conducted is an attempt to achieve credibility for this study.

Hsieh and Shannon's (2005) article presented a detailed description of the approach to conventional content analysis. The following section addresses the process of conducting a qualitative analysis through the approach of Conventional content analysis for this study. Conventional content analysis is generally used with a study design, which aims to describe a phenomenon. Researchers allow for categories and names for categories to emerge from the data (Hsieh & Shannon, 2005). Hsieh and

Shannon (2005) described the process of data analysis as follows:

> Data analysis starts with reading all data repeatedly to achieve immersion and obtain a sense of the whole (Tesch, 1990). Then, data are read word by word to derive codes (Miles & Huberman, 1994; Morgan, 1993; Morse & Field, 1995) by first highlighting the exact words from the text that appear to capture key thoughts or concepts. Next, the researcher approaches the text by making notes of his or her first impressions, thoughts, and initial analysis. As this process continues, labels for codes emerge that are reflective of more than one key thought. These often come directly from the text and are then become the initial coding scheme. Codes then are sorted into categories based on how different codes are related and linked. These emergent categories are used to organize and group codes into meaningful clusters (Coffey&Atkinson, 1996; Patton, 2002). Ideally, the numbers of clusters are between 10 and 15 to keep clusters broad enough to sort a large number of codes (Morse & Field, 1995). Depending on the relationships between subcategories, researchers can combine or organize this larger number of subcategories into a smaller number of categories. A tree diagram can be developed to help in organizing these categories into a hierarchical structure (Morse & Field, 1995). Next, definitions for each category, subcategory, and code are developed. To prepare for reporting the findings, exemplars for each code and category are identified from the data. Depending on the purpose of the study, researchers might decide to identify the relationship between categories and subcategories further based on their concurrence, antecedents, or consequences (Morse & Field, 1995). (p. 1279)

Hsieh and Shannon (2005) described an advantage and challenge to the conventional approach to content analysis. An advantage is gaining direct information from study participants without imposing preconceived categories or theoretical perspectives. The challenge is failing to develop a complete understanding of the context; or, in other words, failing to identify key categories. Hsieh and Shannon (2005) referenced the following:

> Lincoln and Guba (1985) described this as credibility within the naturalistic paradigm of trustworthiness or internal validity within a paradigm of reliability and validity. Credibility can be established through activities such as peer debriefing, prolonged engagement, persistent observation, triangulation, negative case analysis, referential adequacy, and member checks (Lincoln & Guba, 1985; Manning, 1997). (p. 1280)

Poole and Folger (1981) described a coding scheme as a translation device that organizes data into categories. A coding scheme includes the process and rules of data analysis that are systematic, logical, and scientific (Hsieh & Shannon, 2005). The development of a good coding scheme is central to trustworthiness of content analysis (Folger, Hewes, & Poole, 1984). In summary, the type of approach to content analysis used can provide a universal language for health researchers and strengthen the method's scientific base (Hsieh & Shannon, 2005).

Chapter 5: Results

This study was designed to examine the potential impact of Interprofessional Education (IPE) on health professional students' attitudes and perceptions and to explore the utility of the Readiness for Interprofessional Learning Scale (RIPLS) in evaluating IPE programs. The study was guided by three research questions. The first question examined the change in students' attitudes towards the roles of other professionals before and after participation in an IPE experience. The second question examined students' perceptions of interprofessional collaboration. The third question examined the change in their value for learning with other professionals before and after the participation in an IPE experience. It was hypothesized that students would have an improved perception towards roles of other professional and an increased value of IPE following this experience.

In October 2013, a sample of 524 health professional students participated in a bi-annual IPE Program located at a private medical school in the Northeast. Students voluntarily consented to participate in the completion of the RIPLS questionnaire and open-ended survey items before and after the IPE program. Demographic variables included profession, prior IPE experience, and prior completion of the RIPLS survey. Of the 524 IPE student participants, 121 were from Medicine, 120 from Nursing (from two nursing programs), 120 from Pharmacy, 37 Physical Therapy, and 126 from Social Work. All were recruited to complete a pre-test and posttest RIPLS survey to evaluate their IPE experience. Student subjects from the Social Work profession only participated in the open-ended questions and elected to not participate in the RIPLS questionnaire data collection due to over exposure to this measurement scale. This eliminated a

significant threat to the internal validity of the study. Quantitative analysis was conducted using SPSS Version 21.0. Qualitative data was analyzed using the conventional content analysis method through coding categories that were derived directly from the text data.

Quantitative Analysis

Among the health professional sample of 524 students, 164 subjects completed the pre-test and 115 completed the posttest survey. The response rate was as follows: 17% (n=28) of Medical students completed the pre-test survey and 20% (n=24) completed the posttest survey. For the Nursing profession, 31% (n=52) completed the pre-test survey and 27% (n=32) completed the posttest survey. Thirty-three percent (n=55) of Pharmacy students completed the pre-test survey and 30% (n=35) completed the posttest survey. Among the Physical Therapy students, 17% (n=28) completed the pre-test survey and 21% (n=24) completed the posttest survey. Paired sample subjects that completed both pre-test and posttest surveys were 69 or 13% of the total sample. The paired sample size with no missing values guided further statistical analysis, limiting the strength of inferential methods.

Ninety-nine percent of students (N=164) who completed the pre-test reported no exposure to the RIPLS prior to the IPE experience. Students reported having previous introduction to IPE, 30 or 18.29% (n=164) of the students, 11 or 16% (n=69) from the paired sample, as illustrated in Table 3. From the paired sample, 1 Medical, 7 Nursing, 1 Pharmacy, 2 Physical Therapy, and 4 Social Work students reported having previous IPE experience. Students described the previous IPE experience as simulation workshops over the course of their curriculum and hospital rotations. ANOVA results (n=69)

showed an increase in mean scores in three out of four subscales: *Teamwork and Collaboration, Negative and Positive Professional Identity* and no change in *Roles and Responsibility*. There were no significant differences between the pre-test posttest mean scores.

The paired-sample t test showed an increase in three out of the four subscales: *Teamwork and Collaboration* pre-test M 41.08, SD 3.77 and posttest M 42.24, SD 3.63 (p=.002); *Negative Professional Identity* pre-test M 12.65, SD 1.76 and posttest M 13.29, SD 1.90 (.002); *Positive Professional Identity* pre-test M 17.00, SD 2.12 and posttest M 18.28, SD 1.91 (p=.000); *Roles and Responsibility* pre-test M 5.07, SD 1.32 and posttest M 4.61, SD 1.51 (p=.007). The data suggests students had a significant increase in attitudes towards *Teamwork and Collaboration* and *Negative and Positive Professional Identity* subscales. The *Role and Responsibility* subscale reported a significant decrease in attitude changes.

Qualitative Analysis

After completion of the program as well as the post RIPLS questionnaire, 132 students from all five professions (Medical, Nursing, Pharmacy, Physical Therapy, and Social Work) completed the four open-ended qualitative questions via Survey Monkey®. Participants were encouraged to write in one or two sentences, the answer to the following four questions:

1. Describe your confidence level in communicating with other disciplines.
2. How has your participation in this IPE changed your understanding of roles of the other health disciplines?
3. What was the most helpful thing you learned with this IPE?

4. Would you recommend IPE to other members of your discipline?

Student responses were analyzed by using the conventional content analysis evaluation through coding categories derived directly from the text data (Hsieh & Shannon, 2005). The researcher and qualitative expert analyzed students' responses to the questions and categories were identified.

Analysis for Question 1. Participants (n=132) responded to Question 1, *Describe your confidence level in communicating with other disciplines*. Students described their confidence level in communicating with other professionals by using words such as "comfortable," "being confident," "very confident," or "having increased confidence." 82% or 78 participants indicated that they felt improved confidence working with students from other health professions. Nursing Examples of student responses are: "*After this IPE, I have raised my confidence level in communicating with other disciplines," "I feel very confident communicating with people of other disciplines," "My confidence level could be better working with other disciplines," "This activity helped to boost my confidence in working with others," "I enjoy communicating with people in other disciplines, and feel confident doing so,"* and *"I feel more confident communicating with other disciplines after this IPE."*

Most participants described themselves as confident or highly confident in communicating with other professionals after the IPE program. (Table 3). Highly confident was coded for comments that included "pretty high," "high confidence," "strongly confident," and "very confident." Comments that were identified as Confident often stated "confident" with no qualifiers. 17.8 % or 17 students identified having a Fair level of confidence and stated that their confidence level was "okay" or "fair." Most

Interprofessional students who responded to question one reported being Confident or Highly Confident in communicating with other professionals after the IPE. One Medical student who was identified as High Confidence stated:

> *"Pretty high. After attending the IPE workshop, it became clear that the healthcare hierarchy is in place, even at the student level. So being a medical student lends itselft to having more confidence as a leader and communicator. I think that spending more time getting to know and understand other members of the healthcare team would improve that relationship greatly".*

Nursing students categorized as High Confidence stated, "*I am very confident and not hesitant to speak up. I was very confident in my skills working with the team at (X) university.*" One Social Work student stated,

> *"I felt very confident and comfortable. Initially, I was a 2 (1 being low and 10 being high) I am easily intimidated by other disciplines, especially if it involved medical students of any kind. They use a lot of jargon that I am unfamiliar with, but that is their specialty! I am in my own discipline and have an array of jargon they have heard before, but may not understand like I do. So as I was interacting with my group through the several activities, and providing my input on social concerns that should be addressed, my voice was being heard and accepted. My confidence increase to nearly an 8.5".*

Comments categorized as Confident among Pharm D students included:

> *"I was very nervous but realized that I know more than I think. I was confident with the other students and felt comfortable asking them for recommendations on the areas I was uncomfortable with. I was also confident in saying I didn't know*

and answer and looking it up to ensure that patient got the best recommendation".

And another Pharm D student responded, *"I feel confident communicating with other disciplines. It allows for better outcome for the patient."*

A student was identified as Fair level of confidence if the student used the terms such as "not so confident," "okay," "fair," or "could be better." Examples of comments with Fair level of confidence included a Medical student who stated, *"I feel relatively okay with communicating with other disciplines*. I would like to talk more with those in other professions whenever possible." One Physical Therapy student stated, *"Okay, as a physical therapist, I felt overlooked at times. I definitely had to speak up for myself and my profession."* Another response reported a sense of confusion regarding the program itself and the participant's responsibilities within the program: *"I felt like I was so conscious of trying to not tell others what to do and not step on toes that I didn't know where I fit in the overall structure of care."* Overall, the responses indicated achieving greater confidence levels with the IPE experience.

Analysis for Question 2. The second question (n=132), *How has your participation in this IPE changed your understanding of roles of other health disciplines*? Overall, participants responded having a better understanding of roles as a result of the IPE experience. Students used words and phrases such as "greater appreciation," "a better understanding," "having a greater respect for," and "how important collaboration is in healthcare."

Students in each profession commented on the importance of each of the other professions as well as learning the importance of other health professional roles. One

response was, *"I didn't realize that social workers had so much of an impact in the care of the patient….", " This IPE has made me realize that most other health disciplines do not know/understand what PTs are capable of doing and helped me learn about other professions."* One Medical student commented, *"I gained a greater appreciating of how important pharmacists and social workers are."* One Nursing student stated, *"I thoroughly enjoyed it. I was impressed with how many resources the social workers were aware of and how the pharmacy students knew everything about every drug."* One PharmD student stated, *"I am more appreciative of the nurses and social workers."* A Physical Therapy student stated, *"I hold a greater respect for all the other disciplines that were at the IPE training. They are and will be an integral part of the patient care in my future work."* A Social Work student commented, *"I am happy to see Dr/Interns learning the cooperative and collaborative practice. Doctors collaborating with nurses, social workers and pharmacy is beneficial to the patient and reduces repeat of questions and procedures."* Two of the social work students commented that the IPE experience "wasn't helpful" or "learned very little, I already had a strong understanding." In each of the other professions a small number of students (7) reported that they experienced no change.

Analysis for Question 3. Question 3 (n=130) asked, *What was the most helpful thing you learned at IPE?* The categories identified from the responses were *Teamwork and Collaboration*, *Increased Knowledge of Roles/Expertise*, *Respect for Other Health Professionals*, and *Communication*.

Teamwork and collaboration. The most frequent response from the participants in Medicine, Nursing, Pharmacy, and Social Work was related to the importance of

collaboration and teamwork. A Nursing student stated, "you need all the members of the team present to create a holistic plan of care for the patient. Every professional has valuable contributions to patient care." One Medical student stated that "I am not solely responsible for every aspect of my patient's care. That other health care workers contribute to the diagnosis and treatment of the patient." Another health professional student in Pharmacy stated, *"With this IPE, the most helpful think I learned was how to collaborate with members of the other health disciplines and how each member brings something different to the table.*" Unlike the other health professionals, the Physical Therapy participants' most frequent response was "*to advocate for self/PT role." "Learning how to work with one another for the wellbeing of the patient"* exemplified this theme. Students reported learning about *"collaboration with other team members*" after the IPE experience. Other responses categorized as teamwork included: *"Clinical team work is required for the best patient outcomes"* and *"I learned how important it is to have a comprehensive interprofessional team and how important clear communication with them can be."*

Increased knowledge of roles/ expertise. The second most frequent response was related to learning about the expertise/role of other disciplines. The Medical students expressed their discovery that pharmacists play an important role in the health care team. Medical students' comments regarding pharmacists included, *"I learned to ask a pharmacist before I prescribe medications. They know much more than we do."* One Medical student described *"a new found respect for pharmacists,"* and another, *"I don't have to do this alone. Someone will double check the drugs I prescribe."*

Students commented on the importance of role from this IPE experience. They

reported: *"The most helpful thing I learned was that the other professions represented were also unaware of what all of the disciplines had to offer," "My knowledge of what Pharmacist and Social Workers do,"* and *"Social Work is vital to an effective team."* Some responses addressed the increased knowledge of the schooling needed for the disciplines; for instance: *"More about the Physical Therapy schooling,"* and *"Learning a little bit more about the schooling process for other professions."*

Respect. Participants also elaborated on the need to respect other disciplines. Most students reported a need to respect other professionals' point of view. One stated, *"I learned to not disregard other professional opinions, and that we all view the same problem, but approach it from different perspectives."* Another example of respecting other disciplines in the student responses was: *"Finding ways to encourage participation by everyone in the group."* One student further elaborated on the need to value each other's professions by responding, *"That we all complement each other and I am valued as a pharmacist."*

Communication. Some students described the importance of communication with other disciplines. Responses included: *"Communication is everything, and not one profession has all the answers"* and *"It is vital that there is communication between various parts of the health care system. There is too much disconnect right now."* The majority of the communication-related category express a sense of importance in IPE; for instance: *"how important it is to effectively communicate with other disciplines and to advocate for my profession so other disciplines know how to best use my skills"*.

Analysis for Question 4. Question 4 asked *Would you recommend IPE to others?* The participants answered overwhelmingly "yes" with only one (1) "no" from a

social work participant.

An answer was categorized as Strongly/Absolutely yes if participants used the same words or if they bolded or placed exclamation marks with their "yes" answer. 84.6% or 110 (n=130) students responded favorably to recommending IPE to others. One Medical student responded, *"Absolutely! Doctors are not superhuman and omniscient. They need support from nurses, pharmacists, and social workers to manage patient care."* Others responded with such comments such as "*It was a great experience on collaborative approach"* and *"The IPE session at (X) University was a very beneficial experience."* The no response by the Social Work student was "*if they would like to go into the social work field in a medical setting or work with older populations, then yes, but beyond that, not particularly."*

Profession and experience of the students shape attitudes toward IPE. The findings from both quantitative and qualitative data suggested that the majority of students' attitudes towards interprofessional learning were positive and students were willing to engage in IPE. Overall, a majority of participants in all professions displayed a positive response to having an increased confidence level in communication, an improved understanding of roles, and a stronger sense of value towards IPE. The next chapter will address a discussion of the study's results, limitations, and future research and educational direction for IPE.

Chapter 6: Discussion

Interprofessional Education (IPE) is an important strategy that can assist health professional students in developing the skills necessary for successful future collaboration in healthcare teams in order to ensure quality patient care. National organizations recognized that interprofessional collaborative practice reduces practice errors and improves quality of care and patient outcomes (IPEC Expert Panel, 2011; IOM, 2010; The Joint Commission, 2010; WHO, 2010). This study provided support for IPE using simulation to enhance health professionals in communication, role awareness, and confidence to work in interprofessional teams.

The utilization of simulation in academic settings can enhance interprofessional education. As previously stated, the IOM's *Health Professions Education: Bridge to Quality* (2003) report and *Future of Nursing: Leading Change, Advancing Health* (2010) report recommended the need for interprofessional practice to be integrated into health professional educational curriculums. Simulation provided a safe environment for this IPE experience. This study examined the potential impact of IPE on health professional students' attitudes and perceptions and the utility of the Readiness for Interprofessional Learning Scale (RIPLS) in IPE.

Quantitative Analysis

Prior exposure to IPE. In this study, the students reported little to no exposure (1%) to the RIPLS pre-test prior to the IPE experience. In addition, 30 or 18.29% (n=164) and 11 or 16% (n=69) of the paired sample students reported a previous introduction to IPE. The data suggested the paired sample had positive attitudes toward three of the subscales: *Teamwork and Collaboration, Negative and Positive Professional*

Identities. The subscale *Roles and Responsibility* had no changes from the pre-test and posttest responses, which may be related to the number of questions in the subscale or the small sample size. Due to the small paired sample size (n=11), no further analysis was completed. The study by Hood et al. (2014) reported one-third of all students (n=741) who had prior experience of interprofessional learning held more positive attitudes in each of four attitude domains ($p < .05$). In contrast, Scherer et al.'s (2013) health professional students (n=107) had no prior experience with IPE and RIPLS scores had significantly higher scores on knowledge and the three RIPLS subscales-- *Teamwork and Collaboration*, *Professional Identity*, and *Roles and Responsibilities*--in comparison with students in the intraprofessional control group. This suggests the benefits of IPE and the need to increase IPE earlier throughout the curriculum prior to student's graduation. If the sample of students with prior experience were larger, this study could have shed light on the contradictions between Hood et al.'s (2014) and Scherer et al.'s (2013) findings.

Paired-sample t test. The paired t test data analysis showed significant changes in all four subscales: *Teamwork and Collaboration*, *Negative Professional Identity*, *Positive Professional Identity*, and *Roles and Responsibility*. Lindqvist et al. (2005) found students from interdisciplinary groups developed more positive attitudes towards the different health professions than students in single discipline education. This suggests the importance of working with others and also understanding roles in healthcare improve attitudes. Solomon and Salfi's (2011) data also suggested significant satisfaction with communication and with the opportunity to collaborate with other programs. Similar to the findings in other studies, students in this study showed positive attitude changes after participation in the IPE experience (2011).

Overall, this study identified positive attitudes for IPE among health professional students. This is consistent with the research of Rose et al. (2009), who reported that 70% of health professional students reported a positive view of attitudes after an IPE program. Van Schaik et al. (2011), in examining a simulation-based IPE team training program with health professionals, also found a positive impact on medical residents and nurses' self-efficacy after participation in a real code situation and an overall positive effect on the culture of team collaboration. Woodroffe et al.'s (2012) research further reported a positive shift in attitudes toward interprofessional teamwork in student response to the open-ended qualitative questions from Pharmacy, Nursing, and Medical students. In contrast, Gallagher et al. (2010) reported student attitudes toward a team approach to health care did not significantly change as a result of this experience.

Qualitative Analysis

The next section will discuss the qualitative finding through the lens of conventional content analysis. The qualitative open-ended questions were analyzed and several categories emerged. Students reported feeling comfortable learning with students from other professions and found value in the IPE experience.

Confidence. Students reported strong or confident in communication with other professionals. These findings concur with van Schaik et al.'s (2011) survey that focused on a simulation-based interprofessional team-training program with health professionals using open-ended questions. Their themes revealed an increase in understanding of professional roles, hands on experience, and the value of debriefing. The survey results indicated an increase in self-confidence, attitude and a positive impact on self-efficacy (Schaik et al., 2011).

Additional research studies revealed an increase in confidence in Nursing students after the participation of simulation experiences. Goldenberg et al.'s (2005) research on undergraduate Nursing students who participated in classroom simulation also found that the students' overall confidence scores increased significantly following the sessions of role-playing case studies. Brown and Chronister's (2009) research on Nursing students also reported a post-simulation measure of self-confidence with statistically significant improvement. Kameg et al. (2010) found that senior Nursing students' confidence was enhanced in communicating with patients who are experiencing mental illness after the simulation experience. Cardoza and Hood (2012) also found that baccalaureate Nursing students' self-efficacy had a significance increase after simulation.

A few students in this study expressed feelings of being less confident and nervous going into the program, but this changed to confident after the IPE. This was also found by Sinclair and Ferguson (2009), who reported that nurses expressed concerns over anxiety regarding their abilities to apply learning to clinical practice; however, after the simulation experience, nurses reported improved self-efficacy in their skill performance.

The common categories that emerged throughout the student responses included: *Teamwork/Collaboration, Increased Knowledge of Role/ Expertise, Respect,* and *Communication.* The IOM (2003) report concurs with the student opinions to further validate the need to increase communication by using IPE.

Teamwork/Collaboration. The student responses in this study indicated the increased knowledge of importance with teamwork and collaboration. Lumague et al.'s (2006) findings also suggest that students reported that all health care education should

include opportunities enabling them to develop the skills, behaviors, and attitudes needed for interprofessional collaboration. Woodroffe et al.'s (2012) research concurs with positive attitudes towards team learning and enhanced learning and benefits of IPE.

Increased knowledge of role/ expertise. The qualitative findings in this study indicated that learning professional roles were understood after the IPE experience. This was also found by Gallagher et al. (2010) on an interdisciplinary project using volunteer students from Physician Assistants, Nursing, and Pharmacy programs. The authors suggested students have an increase in understanding of strengths and skills of other members of the health care team and gained experience in working with other disciplines. Rodehorst et al.'s (2005) findings concur with Gallagher et al. (2010), and this study identified that interdisciplinary learning can clarify roles and enhance learning for students from different disciplines. The heath professional students in this study, as well as Lumague et al.'s (2006) study, indicated that all participants recognized the importance of interprofessional teamwork in patient care and the need to be further educated on the roles of other disciplines. Bridges et al. (2011) reported a common theme in their research on the importance in helping students to understand their own professional identity while gaining an understanding of other professional's roles on the health care team. This was particularly evident with the Physical Therapy students in this study.

Respect. Most of the 132 health professional students who answered the four open-ended qualitative questions reported a need to respect other professionals' points of view. Lumague et al.'s (2006) findings also suggest IPE fosters respect and enhances knowledge of the different roles each discipline plays on the health care team. Suter et al.

(2009) also suggested enhancement of respect and trust between team members when healthcare providers develop a deeper understanding of each other's roles and responsibilities that, in turn, benefit workplace cultures and staff morale.

Communication. The health professional students in this study reported predominately improved communication skills. This coincides with the research of Wayman et al. (2007), who focused on simulation and measuring communication between nurses and families in regards to addressing medication errors. Their pilot study (n=16) showed statistically significant increases in nurses' communication self-efficacy to carry out medical disclosure. The Senette et al. (2012) research participants in IPE used simulation to support handoff communication and teamwork efforts. Their responses were positive for collaboration, satisfaction, and intention-to-act with the handoff communication.

Recommendation for IPE. Another aspect of the value question explored the students' feelings towards recommending IPE to other members of their profession. Most student responses indicated a positive expression of "Yes" to "Absolutely." Some students indicated a response of "definitely" to "highly recommending IPE." This concurs with the research of Baker et al. (2008); Dillon, Noble, and Kaplan (2009); and IOM (2010), who recognized the use of simulation and IPE as an effective teaching strategy in early co-education of students from different professions in the healthcare field. Interprofessional activities can and should be an essential part of nursing and allied health professional educational curriculums (Titzer, Swenty, & Hoehn, 2012). The review of the Interprofessional literature supports the need to further develop programs and examine the impact of IPE on health professional students. The findings from this

study provide additional support for using simulation and IPE as teaching modalities. Because most participants stated that they would recommend IPE to others, health professional education should consider a combination of IPE and simulation education.

Limitations

One limitation of this study was that the health professional students were mandated to participate in the program. The number of participants could potentially be affected if the IPE program was deemed voluntary. Students, however, voluntarily answered the pretest and posttest RIPLS questionnaire and four open-ended questions. There potentially could be a change in student responses if the questionnaire was mandatory as part of the IPE experience. This study used a convenient sampling method that increased the potential risk of sampling bias. The issue of overall sample size and paired sample size may have contributed to the lack of differences across professions.

Another limitation to this study was an omitted question from the McFadyen et al. (2005) adaptive version of the RIPLS questionnaire used for this study. Question 15 was omitted based on inconsistency in the questionnaire delivered to the students. The statistical analysis of the *Positive Professional Identity* subscale reflected the omitted question.

Lastly, the level of education of the participants could impact variance in the responses in this study. The Medical students had at least completed six years post-high school. The Nursing students were in the last semester of a baccalaureate-nursing program, which is at least four years post-high school. Doctorate in Pharmacy students had completed at least five years post-high school. The Physical Therapy students had completed at least six years post-high school. The Social Work students had completed

at least six years post-high school. Overall, the Nursing cohort was the only profession not in a graduate level of education.

Future Direction

Implications for education. Interprofessional education is essential for students to develop the skills necessary for successful collaboration in health care teams to ensure quality patient care. As IPE programs expand, simulation designed to promote teamwork and collaboration needs to be evaluated with regard to both short- and long-term effects, in particular the impact on practice in the clinical setting (Scherer et al., 2013). The findings of Hertweck et al.'s (2012) concur with the need to examine the impact of students' attitudes and perceptions towards IPE and the roles of other professionals and suggests more IPE is needed to enhance collaboration and safe practice. The knowledge of the professional role of others had been identified as a significant element in IPE and the potential to improve healthcare outcomes through communication and collaboration. Additional didactic material, i.e. Core Competencies for Interprofessional Collaborative Practice, prior to IPE for faculty and students can be an important element to the success of IPE programs.

Implications for practice. Because of the importance of quality care outcomes and the recognition that collaborative practice improves these outcomes, IPE should be a high priority for healthcare institutions. There is a need for more rigorous IPE research to demonstrate evidence of the impact of IPE on professional practice or health care outcomes. The healthcare institutions and agencies that offer clinical placements to a variety of health care professionals could enrich the learning environment by incorporating IPE into their settings. The importance of continuing to foster the

relationship with our practice partners.

Implication for research. There are a number of IPE studies in the past years; however, most of this research does not measure the impact on patient safety. There is a need to further evaluate the relationship between IPE programs and better patient outcomes and to continue to explore students' prior exposure to IPE and the impact on attitudes of health professional students. Further evaluation of the implications and control for the level of education of health professional students (i.e., undergraduate versus graduate), along with a focus on understanding the use of IPE in relation to resources, is also needed.

In this study, an IPE program was used to help educate health professional students in gaining knowledge and value towards the roles of other professionals and learning the importance of collaboration in healthcare teams. The importance of this work is clear and in line with IOM recommendations, IPEC Expert Panel, WHO, and the ANA Professional Development Scope and Standards. This study will benefit the future of IPE research and the awareness of what is needed to conduct a successful IPE program to improve patient safety.

Interprofessional collaborative practice is essential for communication in our healthcare system. Because interprofessional collaboration practice reduces errors and improves quality of care and patient outcomes, it is essential that we fully integrate this practice in all health professional programs at the student level and again at the practice level. Why would we not initiate a practice that improves communication and could avoid up to 70% of medical errors?

Table 1.

Kolb's Learning Styles

Learning Styles	Learner Preferences
Diverging Learner	• Learn best through concrete experience and reflective observation • Learners prefer to work in groups and participate in generating ideas
Assimilating Learner	• Learn best through reflective observation and abstract conceptualization • Learners are most interested in abstract concepts and have the ability to put information into a concise logical format
Converging Learner	• Learn best through abstract conceptualization and active experimentation • Learners are problem solvers who prefer technical tasks to social issues
Accommodating Learner	• Learn best through concrete experience and active experimentation • Learners prefer hands-on experience.

Source: Kolb, (1984).

Table 2.

Propositions of Kolb's Experiential Learning Theory

Learning is a process	Engaging students in an active experience enriches their learning.
All learning is relearning	Relearning is the best expedited using a process that offers students the opportunity to examine their beliefs and ideas and integrate them with new ideas that are more advanced.
Learning is a dialectic process	Students shift between the varying modes of reflection, action, feeling, and thinking.
Learning is holistic and integrative	Learning takes into account the whole person, including how they think, feel, perceive, and behave when solving problems and making decisions.
Learning results from interactions between person and environment	Learners process the possibilities of an experience based on their lived experience.
Learning is the process of creating knowledge	Social knowledge is generated based on personal knowledge of the student.

Source: Kolb (1984).

Table 3.

RIPLS Scores Using McFadyen Scoring by Previous IPE at Baseline

RIPLS Scales	Baseline IPE: Yes (n=11) Mean	Yes (n=11) SD	No (n=58) Mean	No (n=58) SD	F-test statistic	F-test (df_1, df_2)	*p-value for IPE**
Baseline							
Teamwork and Collaboration Subscale	40.10	3.07	41.16	3.86	0.677	(1, 64)	*0.414*
Negative Professional Identity Subscale	12.64	1.86	12.66	1.75	0.001	(1, 67)	*0.974*
Positive Professional Identity Subscale	16.64	1.29	17.12	2.25	0.477	(1, 67)	*0.492*
Roles and Responsibilities Subscale	5.18	1.47	5.07	1.29	0.066	(1, 66)	*0.798*
Total RIPLS Score	74.70	4.27	75.87	6.77	0.278	(1, 63)	*0.600*
Post							
Teamwork and Collaboration Subscale	40.60	3.41	42.69	3.56	2.957	(1, 63)	*0.090*
Negative Professional Identity Subscale	13.18	1.54	13.31	1.98	0.042	(1, 67)	*0.839*
Positive Professional Identity Subscale	17.80	1.99	18.37	1.91	0.748	(1, 65)	*0.390*
Roles and Responsibilities Subscale	5.18	1.66	4.49	1.45	1.989	(1, 66)	*0.163*
Total RIPLS Score	75.89	4.83	78.68	6.41	1.546	(1, 60)	*0.219*
Change (post-pre)							
Change in Teamwork and Collaboration	-0.11	3.69	1.38	2.60	2.226	(1, 60)	*0.141*
Change in Negative Professional Identity	0.55	1.69	0.66	1.65	0.041	(1, 67)	*0.841*
Change in Positive Professional Identity	1.20	2.04	1.30	1.67	0.028	(1, 65)	*0.869*
Change in Roles and Responsibilities	0.00	1.79	-0.55	1.26	1.528	(1, 65)	*0.221*
Change in Total RIPLS Scale	0.75	5.39	2.78	4.54	1.322	(1, 57)	*0.255*

*- p-value obtained from ANOVA F-test for IPE

Table 4.

RIPLS Paired Sample T-Test (n=69)

RIPLS Scales	Pre		Post		Paired Differences						
							95% CI				
	mean	sd	mean	sd	mean	sd	Lower	Upper	t	df	p-value
RIPLS - Teamwork and Collaboration Subscale (McFadyen)	41.08	3.77	42.24	3.63	-1.16	2.79	-1.87	-0.45	-3.272	61	.002
RIPLS - Negative Professional Identity Subscale (McFadyen)	12.65	1.76	13.29	1.90	-0.64	1.64	-1.03	-0.24	-3.221	68	.002
RIPLS - Positive Professional Identity Subscale (McFadyen)	17.00	2.12	18.28	1.91	-1.28	1.71	-1.70	-0.87	-6.134	66	.000
RIPLS - Roles and Responsibilities Subscale (McFadyen)	5.07	1.32	4.61	1.51	0.46	1.36	0.13	0.80	2.778	66	.007
RIPLS - Total Score (McFadyen)	75.56	6.39	78.07	6.34	-2.51	4.67	-3.72	-1.29	-4.129	58	.000

Table 5.

Post IPE Program: Confidence in Communication

Confidence	**Medical Student**	**Nursing Student**	**PharmD Student**	**Physical Therapy Student**	**Social Work Student**	**Total (%) responding**
High Level Confidence	4(23.5%)	5 (31.2%)	10 (40%)	8 (38%)	7 (43.7%)	34 (35.8%)
Confident	6(35.3%)	10(62.5%)	12 (48%)	9 (41%)	7(43.7%)	44(46.3%)
Fair Level Confidence	7 (41%)	1 (0.6%)	3 (0.8%)	4 (19%)	2 (12.5%)	17(17.8%)
Total Responding	17	16	25	21	16	95
No Response	8	16	10	3	1	38
Group Size	24	32	35	24	17	132 (100%)

Table 6.

Post IPE Program: Question 4: Student responses to recommending IPE to others.

Response	**Medicine**	**Nursing**	**Pharmacy**	**Physical Therapy**	**Social Work**
Absolutely/strongly Yes	7	8	11	6	7
Yes	13	14	20	17	7
No	0	0	0	0	1
No Answer	3	10	4	2	0
Number in Group	23	32	35	25	15

Appendix A

IRB Approval Letter

Generated on IRBNet

THE
UNIVERSITY
OF RHODE ISLAND
DIVISION OF RESEARCH
AND ECONOMIC
DEVELOPMENT
OFFICE OF RESEARCH COMPLIANCE
70 Lower College Road, Suite 2, Kingston, RI 02881 USA
p: 401.874.4328 f: 401.874.4814 uri.edu/research/tro/compliance

DATE: October 25, 2013

TO: Diane Martins, PhD,
RN FROM: University of
Rhode Island IRB

STUDY TITLE: [523689-2] Examining Health Professional Student's Attitudes on Interprofessional Education
IRB REFERENCE #: HU1314-041
SUBMISSION TYPE: Revision

ACTION: DETERMINATION OF
EXEMPT STATUS DECISION DATE: October 25,
2013

REVIEW CATEGORY: Exemption category # *2*

Thank you for your submission of Revision materials for this research study. University of Rhode Island IRB has determined this project falls into the EXEMPT REVIEW category according to federal regulations. Per university policy, the project has been given an administrative review by either the IRB Chair or the Director of Compliance. Approval is valid for the duration of the project.

No changes to procedures involving human subjects may be made without prior review and approval. You must promptly notify the Office of Research Compliance of any problems that occur during the course of your work.

If you have any questions, please contact us by email at compliance@ds.uri.edu. Please include your study title and reference number in all correspondence with this office.
study title and reference number in all correspondence with this office.

Appendix B

Support Letter

BROWN
Alpert Medical School

September 19, 2013

Suzanne Carr
University of Rhode Island

Dear Suzanne,

As the Director of both the 2nd year curriculum at the Warren Alpert Medical School of Brown University and the Director of the new Primary Care-Population Medicine program, I write to you with support for your research on interprofessional education. Interprofessional education is integral to the training of all health professionals, especially in the era of health care reform, and it is important that we study what works (and what does not work) in this arena.

Annually, the medical school hosts health professional students from the University of Rhode Island and Rhode Island College to participate in two workshops. These workshops are well received and have been recognized at the national level. The research you conduct will help us further assess the effectiveness of this training.

In summary, I support your research and am happy to answer any questions you or others may have.

Sincerely,

Paul George MD MHPE
Director 2nd year curriculum
Director Primary Care-Population Medicine program
The Warren Alpert Medical School of Brown University
222 Richmond Street, Providence RI 02912

Appendix C

Support Letter

RHODE ISLAND
COLLEGE

School of Nursing

October 23, 2013

Suzanne Carr
College of Nursing
University of Rhode Island
Kingston, RI

Dear Suzanne,

I am writing to support your doctoral study on inter-professional education. Educating all health care professionals to work as a team is essential to improve the quality and safety of health care in this era of health care reform. Your research has the potential to inform best practices in inter-professional education and contribute to more effective education for health care professionals in the future.

Nursing students from Rhode Island College are participating in the inter-professional workshops that are the focus of your research. I wholeheartedly support your efforts to study the workshops' effectiveness.

Sincerely,

Jane Williams, PhD, RN
Dean

Providence, RI 02908-1996
(401) 456-8013
TTY/TDD via RI Relay: 711

Appendix D

August 28, 2013

Re: Permission to Conduct Research Using SurveyMonkey

To whom it may concern:

SurveyMonkey Inc.
www.surveymonkey.com

For questions, email:
support@surveymonkey.com

This letter is being produced in response to a request by a student at your institution who wishes to conduct a survey using SurveyMonkey in order to support their research. The student has indicated that they
require a letter from SurveyMonkey granting them permission to do this. Please accept this letter as evidence of such permission. Students are permitted to conduct research via the SurveyMonkey platform
provided that they abide by our Terms of Use, a copy of which is available on our website.

SurveyMonkey is a self-serve survey platform on which our users can, by themselves, create, deploy and analyze surveys through an online interface. We have users in many different industries who use surveys for many different purposes. One of our most common use cases is students and other types of researchers using our online tools to conduct academic research.

If you have any questions about this letter, please contact us at the email address above.

Sincerely,

SurveyMonkey Inc.

Appendix E

Invitation to Purposed Study

THE UNIVERSITY OF RHODE ISLAND COLLEGE OF NURSING

THINK BIG WE DO

39 Butterfield Road, White Hall, Kingston, RI 02881 p: 401-874-2766 f: 401-874-3811
www.uri.edu/nursing

DETAILED DESCRIPTION OF PROPOSED STUDY Examining Health Professional Student's Attitudes on Interprofessional Education

Dear Student:

My name is Suzanne Carr, a doctoral student at the University of Rhode Island, College of Nursing. I am in the process of conducting a study on the Interprofessional Education Program (IPE) that you are about to participate in at The Albert Brown Medical School, Brown University. Interprofessional Education (IPE) is a strategy that can assist students in developing the skills necessary for successful future collaboration in healthcare teams in order to ensure quality patient care. I am interested in your opinion, pre and post the IPE program. Your Professor will provide you with a survey monkey link to complete a 19 item Likert scale and three open ended questions. This will take approximately 15 minutes of your time. Please read the detailed Informed Consent after accessing the survey monkey link.

Thank you for your consideration. Respectfully,

Suzanne Carr, PhD (c), RN Assistant Clinical Professor University of Rhode Island College of Nursing

401-874-5313 scarr@uri.edu
Diane Martins, PhD, RN Professor
University of Rhode Island
College of Nursing
401-874-2766
DCmartins@uri.edu

The University of Rhode Island is an equal opportunity employer committed to the principles of affirmative action

Appendix F

Informed Consent

39 Butterfield Road, White Hall, Kingston, RI 02881 p: 401-874-2766 f: 401-874-3811 www.uri.edu/nursing

Informed Consent

Examining Health Professional Student's Attitudes on Interprofessional Education

Dear Participants,

You have been invited to take part in the research study described below.
The purpose for this research study is to examine the attitudes of health and social care students and professionals towards interprofessional learning.

Before and after your collaboration experience, you will be asked to voluntarily and anonymously complete; The Readiness for Interprofessional Learning Scale (RIPLS) and three written response questions via survey monkey.

This research has been reviewed according to University of Rhode Island IRB procedures for research involving human subjects.

If you decide to take part in this study, the survey will be provided to you via survey monkey that will take approximately 15 minutes.

Your part in this study is anonymous. Your responses will be confidential and we do not collect identifying information such as your name, email address or IP address. That means that your answers to all questions are private. No one else can know if you participated in this study and no one else can find out what your answers were. Scientific reports will be based on group data and will not identify you or any individual as being in this study. All data is stored in a password protected electronic format.

YOU MUST BE AT LEAST 18 YEARS OLD to be in this research project.

Although there are no direct benefits of the study, your answers will nurture

additional
research ideas in promoting IPE programs to enhance professional collaborations and safe practice. The decision to participate in this research study is up to you. You do not have to participate and you can refuse to answer any question. There will be no penalty if you choose to not participate in this study. Choosing not to participate will not affect your grade in the workshop.

Participation in this study is not expected to be harmful or injurious to you. However, if this study causes you any injury, you should write or call Suzanne Carr and Diane Martins at the University of Rhode Island at (401) 874-2766.

If you have other concerns about this study or if you have questions about your rights as a research participant, you may contact the University of Rhode Island's Vice President for Research, 70 Lower College Road, Suite 2, URI, Kingston, RI, (401) 874-4328.

If these questions are upsetting and you want to talk, please use the phone numbers below: Diane Martins 401-874-2766 and Suzanne Carr 401-874-5313

ELECTRONIC CONSENT: Please select your choice

below. Clicking on the "agree" button below indicates that:

- you have ready the above information
- you voluntarily agree to participate
- you are at least 18 years of age

If you do not wish to participate in the research study, please decline participation by clicking on the "disagree" button.

Thank you, Diane Martins and Suzanne Carr

Appendix G

Interdisciplinary Workshop Agenda

October 30, 2013: Morning Session

Objectives:

1. Explain the important of interprofessional teams in health care
2. Describe the roles of nurses, pharmacists, physicians, physical therapists and social workers in health care
3. Work as a team to:
   Problem solve a non-medical situation
   Devise a care plan for a complicated patient
   Care for a patient

Schedule

8:00am to 8:30am: Introductions, breakfast and brief orientation to interdisciplinary workshop (Assigned Academy Room)

8:30am to 9:30am: Breakout Session 1

Green Group: Standardized patient session (Clinical Suites)
Red Group: Building a Tower (Room 275)
Blue Group: The Complicated Patient (Room 270)

9:45am to 10:45am: Breakout Session 2

Green Group: The Complicated Patient (Room 270)
Red Group: Standardized patient session (Clinical Suites)
Blue Group: Building a Tower (Room 275)

11am to 12pm: Breakout Session 3

Green Group: Building a Tower (Room 270)
Red Group: The Complicated Patient (Room 270)
Blue Group: Standardized patient session (Clinical Suites)

Appendix H

Interdisciplinary Workshop Agenda

October 30, 2013: Afternoon Session

Objectives:

1. Explain the important of interprofessional teams in health care
2. Describe the roles of nurses, pharmacists, physicians, physical therapists and social workers in health care
3. Work as a team to:
   Problem solve a non-medical situation
   Devise a care plan for a complicated patient
   Care for a patient

Schedule

1:00pm to 1:30pm: Introductions, breakfast and brief orientation to interdisciplinary workshop (Assigned Academy Room)

1:30pm to 2:30pm: Breakout Session 1

Green Group: Standardized patient session (Clinical Suites)
Red Group: Building a Tower (Room 275)
Blue Group: The Complicated Patient (Room 270)

2:45pm to 3:45pm: Breakout Session 2

Green Group: The Complicated Patient (Room 270)
Red Group: Standardized patient session (Clinical Suites)
Blue Group: Building a Tower (Room 275)

4:00pm to 5:00pm: Breakout Session 3

Green Group: Building a Tower (Room 270)
Red Group: The Complicated Patient (Room 270)
Blue Group: Standardized patient session (Clinical Suites)

Appendix I

Readiness for Interprofessional Learning Scale (RIPLS) Questionnaire

The purpose of this questionnaire is to examine the attitude of health and social care students and professionals towards interprofessional learning.

Your name: (develop your own 'personal code' by using the following formula):

First 3 letters from your mother's maiden name: ☐ ☐ ☐

First 3 **Numbers of your childhood street address**: ☐ ☐ ☐

Your discipline: _____

Have you completed the RIPLS questionnaire before? ☐ Yes ☐ No

If you answered yes to the previous question please indicate how long ago you last completed the questionnaire:

☐ 1 – 3 months ☐ 3 – 6 months ☐ 6 – 12 months

☐ 1 – 2 years ☐ 2-3 years ☐ 3+ years

Have you had previous experience of interprofessional teaching? ☐ Yes ☐ No

If you answered yes to the previous question please give a very brief statement of what this IPE teaching was and any impact it may have had.

_____
_____
_____
_____

Please complete the following questionnaire.

	Strongly agree	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**

1.	Learning with other students / professionals will make me a more effective member of a health and social care team					
2.	Patients would ultimately benefit if health and social care students / professionals worked together					
3.	Shared learning with other health and social care students students / professionals will increase my ability to understand clinical problems					
4.	Communications skills should be learned with other health and social care students students / professionals					
5.	Team-working skills are vital for all health and social care students students / professionals to learn					
6.	Shared learning will help me to understand my own professional limitations					
7.	Learning between health and social care students students before qualification and for professionals after qualification would improve working relationships after qualification / collaborative practice.					
8.	Shared learning will help me think positively about other health and social care professionals					

9.	For small-group learning to work, students / professionals need to respect and trust each other					
10.	I don't want to waste time learning with other health and social care students / professionals					
11.	It is not necessary for undergraduate / postgraduate health and social care students / professionals to learn together					
12.	Clinical problem solving can only be learnt effectively with students / professionals from my own school / organisation					
13.	Shared learning with other health and social care professionals will help me to communicate better with patients and other professionals					
14.	I would welcome the opportunity to work on small group projects with other health and social care students / professionals					
15.	I would welcome the opportunity to share some generic lectures, tutorials or workshops with other health and social care students / professionals					
16.	Shared learning and practice will help me clarify the nature of patients' or clients' problems					

17.	Shared learning before and after qualification will help me become a better team worker					
18.	I am not sure what my professional role will be / is					
19.	I have to acquire much more knowledge and skill than other students / professionals in my own faculty / organisation					

If you have any further comments regarding interprofessional education please enter them in the box below

Appendix J

In one or two sentences, please answer the following three questions:

1. Describe your confidence level in communicating with other disciplines?

2. How has your participation in this IPE changed your understanding of roles of the other health disciplines?

3a.What was the most helpful thing you learned with this IPE?

3b.Would you recommend Interprofessional Education to other members of your discipline?

Appendix K

ALPERT MEDICAL SCHOOL OF BROWN UNIVERSITY

Author's Name:
Paul George, MD

Institution:
Alpert Medical School of Brown University

Date:
Fall 2013

Anticipated time:
30 minutes

Pneumonia

Summary of Case

The patient is a 45-year-old male (or female; gender is not important) who presents to the Emergency Department with four days of increasing shortness of breath, fever and cough productive of yellowish sputum.

Students will be asked (in teams comprised of at least one medical student, one nursing student and one pharmacy student) to work the patient up (history, physical examination, laboratory data and x-ray); make the diagnosis of pneumonia and come up with a treatment plan for the patient.

Description of Patient

Mr. Jones (gender, ethnicity and age can vary in this case based on the availability of standardized patients) is a 45-year-old male. The patient is dressed in a hospital gown (having already been placed in a room by ancillary staff in the Emergency Department). The patient has lived in Rhode Island for the last twenty-five years (the patient is originally from Massachusetts but moved here after attending college at the University of Rhode Island). The patient is a marketing executive at a local company and has worked there for the last ten years. The patient lives in the Elmwood section of Cranston. The patient is married and has three children (all boys, ages 15, 13 and 7). The patient does not smoke (never has); occasionally drinks red wine with dinner (once or twice per week; all CAGE questions are negative if asked) and does not use recreational drugs.

The patient looks somewhat uncomfortable – he appears to be in tripod position to aid with taking deep breaths. He also coughs occasionally through the patient encounter.

History of Present Illness

The patient was in his usual state of health until approximately three weeks ago when he came down with flu like symptoms (at that time, he had fever with body aches and an

occasional headache). The patient states the symptoms lasted about three days and then they gradually improved. However, four days ago, the patient states that he developed a fever (up to 103.3 at home) along with shortness of breath and a cough productive of yellowish sputum. The patient states that he has worsened each day. He had called his primary care physician earlier in the day and described his symptoms and the PCP referred the patient to the ED for a workup. The patient states he also been having chills and night sweats. The patient also states that he has been wheezing occasionally over the last four days as well.

On review of systems, the patient denies any visual changes, conjunctivitis, ear pain, congestion, rhinorrhea, throat pain, chest pain, palpitations, abdominal pain, nausea, vomiting, diarrhea, constipation, dysuria, hematuria, melena or bright red blood per rectum.

Past Medical History

Hypertension
Hyperlipidemia

Past Surgical History

None

Medications

Lisinopril 10mg by mouth once daily
Simvastatin 40mg by mouth once daily
Aspirin 81mg by mouth once daily
Multivitamin by mouth once daily

Allergies

Penicillin (The patient developed urticaria and throat tightness after using as a child)

Social History

The patient lives with his spouse in the Elmwood section of Cranston. They are in a monogamous relationship. He has lived in the same house for the last twenty years. He has three children (age 15, 13 and 7 – all boys). The patient does not smoke (never has); occasionally drinks red wine with dinner (once or twice per week; all CAGE questions are negative if asked) and does not use recreational drugs. He exercises about three times per week (elliptical machine mostly at the local YMCA). He is a marketing executive for a company in Providence and has worked there for ten years. There are no occupational exposures. The patient has had no recent foreign travel. He goes to church on a weekly basis.

Family History

The patient's mother is sixty-three years old. She is a retired school teacher. She has a history of hypertension which is controlled on medication and osteoporosis for which she takes calcium, Vitamin D and Alendronate.

The patient's father is also sixty-three years old. He is a former smoker and suffers from chronic obstructive pulmonary disease (he quit smoking about five years ago). He otherwise has no health problems.

The patient's children are all healthy except the seven year old has asthma.

The patient has two siblings (a brother and a sister) who are both healthy and both live in Massachusetts.

Patient Concerns

The patient is concerned because he has never been this sick before. He is nervous that he will miss work (he has a big deadline coming up in trying to secure a new client for his company). He is also worried about not being able to coach his youngest son's soccer match this upcoming weekend.

Patient Behavior

The patient is pleasant and friendly throughout the patient encounter although he is clearly having some respiratory distress. The patient will answer questions but will progressively become more uncomfortable the more he has to talk.

Issues Explored with the Case

The main issue to explore with this case is the ability of the nursing student, medical student and pharmacy student to work together effectively as a team. Of particular interest is how the students negotiate roles (for example, does the nursing student assume the lead in taking vitals and getting some of the patient history versus the medical student doing a physical examination and chest radiograph results versus the pharmacy student analyzing the patient's medicine list and developing an appropriate treatment plan or is the effort put forth disjointed and haphazard).

Other issues to explore with this case – do the students who have worked together in the small group settings first (on the PBL cases) work together better than students who have not had an opportunity to work together on a separate project first.

Finally, can students come up with a diagnosis of pneumonia for this patient (based on history and chest radiograph findings mainly) and a proper therapeutic plan.

Props Needed for Case

Students should be asked (if they have them) to bring their stethoscopes to class. An online chest radiograph will be provided. A blood pressure cuff along with a clock should be in each room (to take blood pressure and pulse respectively). The patient should be dressed in a hospital gown.

Opening Scenario

Mr./Mrs. Jones presents to the Emergency Room with increasing shortness of breath, cough and fever.

Tasks

As a team (please be sure that all team members contribute to the following):

Take the patient's vital signs (including temperature and pulse oximeter).

Take a focused history and perform a lung examination. Interpret the chest x-ray and laboratory data on this patient.

Describe to the patient the diagnosis and treatment plan (you may confer about the diagnosis and treatment outside of the room first if the team wishes).

Appendix L

ALPERT MEDICAL SCHOOL OF BROWN UNIVERSITY

Author's Name:
Paul George, MD

Institution:
Alpert Medical School of Brown University

Date:
Fall 2013

Anticipated time:
30 minutes

Interprofessional Education Workshop: Readmission Scenario

Tony is a 68-year-old man, originally from the Azores, who has been admitted to a local hospital ten times over the last one year. He has been admitted for a variety of different reasons, including a urinary tract infection (he has an indwelling Foley catheter), uncontrolled diabetes mellitus, gastrointestinal bleeding, recurrent falls, a chronic obstructive pulmonary disease exacerbation, acute renal failure and pneumonia.

Tony's medical problems including diabetes mellitus (he does not regularly check his blood sugars), chronic renal insufficiency, benign prostatic hypertrophy, hypertension, chronic obstructive pulmonary disease, atrial fibrillation and recurrent falls. He notes that since his last fall, he has right knee pain (an x-ray done in the hospital was negative) and this impairs his ability to ambulate.

Tony's medications include:

- Warfarin 10mg by mouth daily
- Aspirin 81mg by mouth daily
- Clopidogrel 75mg by mouth daily
- Terazosin 10mg by mouth daily
- Isosorbide Mononitrate 20mg by mouth twice daily
- Metformin 1000mg by mouth twice daily
- Glipizide 10mg by mouth twice daily
- Insulin glargine 20 units at night
- Tamsulosin 0.4mg by mouth daily
- Carvedilol 25mg three times by mouth daily
- Albuterol MDI 2 puffs for wheeze when needed

Tony lives alone. He does not smoke or drink alcohol. He does not drive. He goes to the local grocery store once or twice a month to stock up on food. He lives in a two story house. There are throw rugs throughout. He does not exercise much. He receives a check for $500 per month from Social Security. He has no other income. He has no family. He lives in senior housing in Central Falls. His apartment is infested with bed bugs, but his landlord refuses to hire an exterminator.

Tony visits his primary care physician (PCP) every six months and usually spends about fifteen minutes with his PCP. He otherwise has little to no contact with his physician's office. His last blood pressure at that visit was 96/52. The rest of his exam was unremarkable. He does however admit to feeling sad about living alone and not getting out much. He does not remember the last time he had labwork done.

Your assignment is to design a care plan for Tony that improves his health and prevents him from being hospitalized as often as he currently is. Consider the medical, nursing, pharmacy, social work and physical therapy aspects to his care.

Problems Relating to:	**Potential Solutions**
Medicine:	
Nursing:	
Pharmacy:	
Physical Therapy:	

Social Work:	

Facilitator guide:

Medicine: The patient is admitted about once per month to the hospital but is only seeing his PCP every 6 months. He needs to be seen more frequently (initially every 6 weeks until his medical problems are under control, but no less frequently than every 3 months). He needs more frequent monitor of his labwork (for example, when was the patient's last HgBA1C or cholesterol checked). Additionally, his blood pressure is low but he is on at least three blood pressure lowering medications (Isosorbide/Carvedilol/Terazosin). One or more of these medications should be stopped.

Questions to consider:

Is the physician utilizing a team to take care of this patient? Could a nurse care manager call the patient to check on the patient's blood sugars more regularly? Could a pharmacist help manage the multiple medications the patient is on. Could a social worker help with what seems like limited financial resources? Could the physical therapist help with the patient's mobility (or lack thereof)?

Pharmacy: The patient is on multiple medications that could be causing more harm. For example, the case tells us the patient was admitted with acute renal failure and has chronic kidney disease, yet he is still on Metformin. The patient is also on both a sulfonylurea and insulin (increasing the risk of hypoglycemia). He is on Warfarin/Aspirin/Clopidogrel. The case gives us no indication the patient has an indication for all three and he was admitted for a gastrointestinal bleed in the past. He is on two medications for benign prostatic hypertrophy (with one of these potentially causing falls).

Nursing: There are multiple avenues for nursing to get involved in this case. As mentioned previously, a nurse care manager could call the patient frequently (every week) to track his blood sugars and report those sugars to a physician for adjustment of the insulin dose. A home care nurse could visit the patient and conduct a home safety evaluation (the patient lives on two floors and yet has limited mobility; he has multiple

throw rugs throughout the house that he could be tripping on). Based on the results of this, the nurse could make suggestions for the patient to prevent the falls. A home care nurse could also help the patient manage his medications if he is having difficulty doing so. Finally, it is possible that the patient is confused on discharge from the hospital about post-discharge instructions. A nurse could help him with this as well.

Social Work: There are also multiple avenues for a Social Work to get involved in this case. The patient is on multiple medications. Is he able to afford them? If not, could the social worker help in obtaining the medications? Are there other community resources the social worker could help the patient obtain? Is he getting SNAP for example (he is living on only $500 per month). Are there other social supports the patient has such as neighbors, friends, clergy, etc? Could the social worker help the patient find more suitable housing (or at least advocate for the patient with the landlord regarding the bedbugs)? Finally, could the social worker discuss the patient's mood and screen for depression or other mental illness (reporting the findings back to the physician and potentially also offering therapy to the patient)?

Physical Therapy: The physical therapist has many opportunities to work with the healthcare team to improve this patient's quality of life. He is having knee pain and issues with balance and falls. In addition to a full musculoskeletal exam of the knee, screening the visual, sensory, and vestibular systems (particularly as they relate to DM and fall history) is warranted.

Consider environmental factors in relationship to his fall history. A physical therapist could assess home safety and access, in addition to transportation needs (are recommendations for adaptive equipment and home modifications indicated? Footwear? Orthoses?). What is the therapist's role in educating the healthcare team on fall prevention for this individual?

Given the patient's cardiovascular and pulmonary status, would an endurance, or strengthening, program be valuable? Energy conservation? Paced breathing? Assess posture and candidacy for pulmonary rehab. Consider patient education on wellness and prevention (i.e. bronchial hygiene, timing exercise/activity with medication, meals, time of day). Discuss need for pelvic floor training exercises. Could the physical therapist design and monitor a safe exercise program- particularly given his history of hypoglycemia, hypotension/HTN, and a-fib? How might this patient's psychosocial needs be addressed through exercise prescription?

Appendix M

OSCE Standardized Patient – Interprofessional Education Debriefing

After students conclude their standardized patient case, please give the students feedback (the case itself should take no more than 50 minutes, leaving at least 10 minutes for feedback).

During the feedback session, please focus on the following:

1. Overall gestalt: How did the team function together? What did the team do well together as a team? What were some aspects that could be improved upon if they worked together again?

2. Did each team member take on a particular role? If so, were the roles what you would have expected (i.e. the nursing student taking vitals or the medical students interpreting the chest x-ray)? Why or why not?

In addition, for each encounter, we'll ask you to note whether or not the teams did the following (you can also use these questions to stimulate further conversation if time allows):

1. Were all team members present for the encounter?

2. Did all team members participate in the conversation?

3. Did the team members introduce themselves to the patient?

4. Did the patient participate in the conversation?

5. Did the entire team interview the patient to father further information?

6. Did the patient feely volunteer information?

7. Did the team inform the patient about his/her condition?

8. Was the care plan clearly explained to the patient?

9. Did the team reassure/encourage the patient?

10. Did the team develop a specific role for the patient as part of the care plan?

11. Was the computer used at any point during the encounter?

12. Did someone on the team ask permission before touching the patient to perform an examination?

13. Did anyone on the team sit attempt to be eye level with the patient?

14. Did the team teach the patient during this encounter?

15. Did probing/expansion occur during this observation (i.e. the team probed further into the patient's social history)?

16. Did correcting occur during this observation (i.e. the patient felt empowered to correct the team if they synthesized information wrong)?

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