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Professional Development and Self-Efficacy of Nurses Who Care for Patients Requiring Biocontainment

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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2017

Abstract

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MSN, Pace University, 1986

BSN, William Paterson University, 1981

AAS, Bergen Community College, 1976

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

Increasing global occurrences of highly infectious, easily transmissible diseases unfamiliar to nurses affect the learning environment and the required skill set for professional nurses. The global threat of Ebola Virus Disease and other high-risk diseases requiring biocontainment necessitates competency in the management of complex patient needs, while ensuring safety measures that prevent spread of the potentially fatal disease. Guided by Bandura's social cognitive theory, this quantitative correlational study addressed the relationships between nurses' professional characteristics and their perceived self-efficacy when providing care to highly infectious patients requiring biocontainment. A full census of 92 nurses was used to recruit participants from eligible nurses for this study. Participants anonymously completed a cross-sectional electronic survey consisting of the Nursing Care Self-Efficacy Scale (NCSES) and questions related to the nurses' professional practice characteristics. Data analysis included descriptive statistics, correlations, and multiple linear regression. Results showed that the number of biocontainment drills and a higher level of formal education were significantly correlated with a higher total NCSES score. Years of nursing significantly predicted a higher total NCSES score. Results support the establishment of prerequisites criteria for learner participation in biocontainment training and the inclusion of multiple drill within the education design. Findings from this study may inform positive social change through educational enhancements that support the development of professional self-efficacy and competency in skill performance for nurses who care for patients with highly contagious diseases requiring biocontainment.

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Dedication

To my mother and father, Gennaro (John) and Alvira (Helen) Occhiuzzo, whose unconditional love, support, and encouragement provided for my education and lifelong learning. Dad, thank you for your hard work and labor that provided the means for a college education. Mom, thank you for encouraging me to be the best that I can be and never stop learning. Together, you will always be the wind beneath my wings.

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I am grateful for my family and loved ones, Walden University faculty members, colleagues, friends, my pastor, and church members who provided support in many forms along my journey to obtaining a doctoral degree. I thank God for every remembrance of you.

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Section 1: The Problem

Foreign medical teams in third world countries are charged with providing medical care and treatment for patients with easily transmissible infections that are highly lethal and for which in many cases there is no vaccine and no specific therapy (Ragazzoni et al., 2015). Because of the global threat of the spread of Ebola Virus Disease (EVD) and other high-risk diseases requiring biocontainment, U.S. nurses need effective education and training to fill the same requirements of foreign medical teams (Ragazzoni et al., 2015). In one medical center in the Northeast region of the United States, nurses reported they felt unprepared to effectively care for patients with EVD or other high-risk diseases requiring biocontainment (U.S. acute care medical center, personal communication, October 17, 2014). According to Bandura (1986, 1997), high self-efficacy beliefs lead to improved performance of any given activity. Although care of the patient requiring biocontainment is a high-risk competency, it has also proven to be low frequency in terms of occurrence in the clinical practice setting. A lack of self-efficacy may exist in nurses who do not have frequent opportunities to apply the knowledge and skills to their practice (Bandura, 1997).

Empirical data are not available to identify the professional practice self-efficacy levels of nurses caring for patients requiring biocontainment and whether there is a significant correlation to select characteristics. Select characteristics are number and frequency of participation in simulated drills for biocontainment, number of times in the past 2 years the nurse has participated in the care of a patient requiring biocontainment in the clinical setting, years of experience as a professional nurse, highest nursing and/or

nonnursing degree, type of life support certification, and presence of specialty certification in nursing. In this study, I sought to determine whether there is a statistically significant correlation between nurses' professional practice self-efficacy in caring for patients requiring biocontainment and the select characteristics. It was necessary to investigate the correlation between professional practice self-efficacy and select characteristics given its significance to professional development of nurses caring for patients requiring biocontainment.

Definition of the Problem

The problem in the local professional learning environment was lack of understanding of the relationship between nurses' professional practice self-efficacy in rendering care to patients requiring biocontainment and select characteristics. Professional nurses in the United States continue to witness the dramatic evolution of their role as innovative strategies and methods for health care delivery are developed and implemented to meet the challenges of a changing health care environment (Benner, Sutphen, Leonard, & Day, 2010; Doherty, 2009). Nurse educators are faced with opportunities and challenges brought about by globalization and technology that affect adult learning (Merriam, Caffarella, & Baumgartner, 2007). Increasing global occurrences of highly contagious and lethal diseases and related treatment strategies unfamiliar to nurses in the United States have an effect on learning environments and the required skill competencies for professional nurses (Senior, 2014).

One example of a global occurrence of a high-risk disease unfamiliar to U.S. nurses is the outbreak of EVD in West Africa that was realized in 2014. As a World

Health Organization (WHO) Level 3 Public Health Emergency of International Concern, the EVD outbreak was unprecedented in its devastating effects on citizens worldwide and its high risk to nurses and other health care providers (WHO, 2014). EVD is a highly contagious virus that has the potential to result in death for the individual who has contracted the disease. The WHO (2014) reported that previous EVD outbreaks resulted in an average 50% fatality rate. The WHO also reported that in 2014 more than 240 health care workers contracted EVD in Guinea, Liberia, Nigeria, and Sierra Leone, and more than 120 succumbed to the disease.

Factors that contributed to transmission of the disease to health care providers included improper use of the equipment and safety protocols (WHO, 2014). The potential of improperly putting on protective equipment and improperly managing the biocontained environment is a risk not experienced by most nurses. During the fall of 2014, two registered nurses contracted EVD after caring for a patient with EVD in Texas due to the lack of proper protective procedures, training, and use of personal protective equipment (Dawson & Carpenter, 2015).

In the fall of 2014, a U.S. northeastern acute care medical center was one of three health care organizations in its state to be appointed by the governor to provide care for patients with EVD and other highly contagious, life-threatening diseases requiring biocontainment. In an effort to meet the demands of this and other ongoing similar public health care needs, the medical center embarked on an organization-wide strategic readiness plan, which included training and education for nurses (U. S. acute care medical center, personal communication, October 17, 2014). To meet the needs of

patients requiring biocontainment, nurses needed to acquire several high-level skills that are beyond the experience base of most nurses not familiar with public health emergencies arising from infectious outbreaks (Rigazzoni et al., 2015). Although the threat of infection is high risk, it is considered low frequency. Few patients present to the clinical setting with potential or confirmed EVD or other highly contagious, life-threatening diseases requiring biocontainment. To protect all health care providers and citizens, each patient with suspected EVD is treated as if he or she has the disease until tests rule out the diagnosis of the disease requiring biocontainment.

Self-efficacy is a multifaceted concept that is foundational to nursing education. Self-efficacy, commonly defined as having a belief in the ability to succeed, occurs when the individual rises to the challenge of a difficult task and is motivated intrinsically (Bandura, 1993; Boswell, 2012). Nursing researchers have established a link between self-efficacy and acquisition of clinical skills (Bambini, Washburn, & Perkins, 2009; Kuiper, Murdock, & Grant, 2010; Wagner, Bear, & Sander, 2009), and some researchers have identified the potential benefits of interventions to promote self-efficacy within the educational setting (Robb, 2012; Sitzman & Ely, 2011).

Given the high risk for contracting the disease if care is not performed according to exact safety procedures and protocol, and the low frequency of opportunities to practice in the clinical setting on actual patients, simulation training is the preferred instructional method. Simulation training is a form of learner-centered instruction that actively engages the learner in social learning activities, hands-on skills performance, and problem solving (Smith, 2010). The educational design includes simulated scenarios that

mimic real-life clinical situations. Although the use of simulation training is becoming popular in academic nursing programs, the use of simulation in professional practice environments is still emerging (Hensel, Kathman, Hendricks, & Ball, 2012).

According to Piscotty, Grobbel, and Tzeng (2011), simulation is a means to improve the learner's confidence regarding quality and safety competencies. This method provides a realistic and effective opportunity to develop experience in performing skills that are necessary for infection control and management of patients with potentially lethal diseases (Ragazzoni et al., 2015). Although some research has indicated positive relationships between nurses' self-efficacy and clinical simulation, little is known about the correlation between the nurses' level of self-efficacy in the professional practice setting and the use of simulation as a method in biocontainment training (Jarzemsky & McGrath, 2008).

What was not known in the local learning environment was whether there was a correlation between nurses' reported professional practice self-efficacy in caring for patients requiring biocontainment and select characteristics. Select characteristics are number and frequency of participation in simulated drills for biocontainment, number of times in the past 2 years the nurse has participated in the care of a patient in the clinical setting requiring biocontainment, years of experience as a professional nurse, highest nursing and/or nonnursing degree, type of life support certification, and presence of specialty certification in nursing. It was necessary to investigate the relationship between self-efficacy and select characteristics in light of the significance to nursing education and training for the professional nurse practicing in the clinical setting.

Rationale

Evidence of the Problem at the Local Level

In the fall of 2014, the northeastern acute care medical center was one of several health care organizations to be appointed by the governor to provide biocontainment and care for patients with viral hemorrhagic fevers, in particular EVD (O'Brien, 2014). The medical center is designated as a trauma center, which has an existing biocontainment unit that accommodates two patients. There was a concern on the part of the acute care center's administrators, educators, and nurses regarding the lack of knowledge, education, and training for the response team that was designated to safely care for patients with suspected or confirmed EVD and minimize the risk of contracting the highly contagious, lethal disease (U.S. acute care medical center, personal communication, October 17, 2014). Nurses reported that they felt unprepared to effectively care for patients with EVD or other high-risk diseases requiring biocontainment (U.S. acute care medical center, personal communication, October 17, 2014).

Challenges identified included lack of knowledge regarding donning and doffing protective personal equipment (PPE), lack of knowledge regarding safe methods for removing gross contaminants, and lack of overall training of nurses and other health care providers potentially exposed to EVD or other highly contagious, lethal diseases (Dawson & Carpenter, 2015). The response to the governor's directive included a need to provide effective education and training for health care providers by equipping them with

the information and specialized skills necessary to care for the patient, contain the disease, and maintain safety in a high-risk environment (O'Brien, 2014).

To meet the demands of this or similar future health care crises, the acute care center embarked on an organization-wide readiness plan to prepare for the care of patients requiring biocontainment (U.S. acute care medical center, personal communication, October 17, 2014). The strategic readiness plan included robust education and training for nurses who serve as members of the response team. Prerequisites for team membership and training are vague and are based on willingness to volunteer or a directive from supervisory personnel to train additional nurses.

Evidence of the Problem from the Professional Literature

The literature indicated attributes that are innate to the learner, such as self-confidence, which is a part of self-efficacy (Jeffries & Rogers, 2012). According to Jefferies (2016), participant attributes affect the simulation learning experience. Specific to the nurse caring for patients with highly contagious lethal diseases requiring biocontainment, there was a lack of information in the literature as to whether there is a correlation between professional practice self-efficacy in rendering biocontainment care and characteristics of the nurse such as number and frequency of participation in simulated drills for biocontainment, number of times in the past 2 years the nurse has participated in the care of a patient in the clinical setting requiring biocontainment, years of experience as a professional nurse, highest nursing and/or nonnursing degree, type of life support certification, and presence of specialty certification in nursing.

Although self-efficacy has been incorporated into the training of many professions such as aeronautics and military training, the literature indicated that minimal research had been conducted using this concept in the clinical education of professional nurses (Townsend & Scanlan, 2011). To meet the needs of the patient requiring biocontainment, it is paramount that health care providers acquire several operational-level skills that are beyond the experience base of most health care practitioners not familiar with public health emergencies arising from infectious outbreaks (Rigazzoni et al., 2015). Performance that demonstrates strict adherence to safety protocols and procedures that minimize contamination from and spread of the highly contagious and lethal disease is important in the provision of care for the biocontained patient.

Bandura (1986, 1997) explained that high self-efficacy beliefs lead to improved performance of any given activity. Sadi and Uyar (2013) found that successful learners possess a high level of self-efficacy and knowledge, rather than one or the other. According to Cornock (2011), it is paramount for professional nurses to maintain competency in required skills to safely deliver effective care to patients. Professional nurses who use skills infrequently may experience stress and role ambiguity, resulting in poor performance (Cranford, 2013). In 2015, there were few cases of suspected or confirmed EVD in the United States. According to the CDC (2015), since the fall of 2014 four patients were diagnosed with EVD in the United States, 11 U.S. patients were treated in this country, and there was one fatality. Therefore, few opportunities exist in the clinical setting for nurses to maintain the high-risk skill set necessary to care for patients with EVD or other diseases requiring biocontainment. However, at any moment

a patient requiring biocontainment may arrive in any medical facility in the United States, justifying the need to have a trained team of health care professionals ready at all times.

The acute care center's response team members (primarily nurses) were trained in the skills necessary for the delivery of safe care, such as the application of personal protective equipment, through the use of simulation. Simulation training allows for practice in a safe environment, offers the opportunity for multiple representations of one's self, and provides opportunities for gaining experience that is rare in the real world (Bennett & Bell, 2010). This type of training strategy provides learners with experiences that allow for deliberate practice in concert with focused learning objectives and immediate feedback about their performance prior to performance in the clinical setting (Okuda et al., 2009). There remained a lack of clear understanding of the relationship between nurses' perception of professional practice self-efficacy and select characteristics in the provision of safe, effective care for patients requiring biocontainment (Center & Adams, 2013; Christian & Krumwiede, 2013; Fadale, Tucker, Dungan, & Sabol, 2014; Franklin & Lee, 2014; Welsh, 2014).

Purpose of the Study

The purpose of this study was to examine the correlation between nurses' level of professional practice self-efficacy in caring for patients requiring biocontainment and select characteristics, namely number and frequency of participation in simulated drills for biocontainment, number of times in the past 2 years the nurse has participated in the care of a patient in the clinical setting requiring biocontainment, years of experience as a professional nurse, highest nursing and/or nonnursing degree, type of life support

certification, and presence of specialty certification in nursing. There was a concern on the part of the acute care center's administrators, educators, and nurses regarding the lack of knowledge, education, and training for the response team that was designated to safely care for patients with suspected or confirmed EVD while minimizing the risk of contracting the highly contagious, lethal disease (U.S. acute care medical center, personal communication, October 17, 2014). Nurses reported that they felt unprepared to effectively care for patients with EVD or other high-risk diseases requiring biocontainment (U.S. acute care medical center, personal communication, October 17, 2014). Findings from the study provided insights into nurses' perceptions regarding self-efficacy, which in turn allowed for the development of prerequisite criteria for biocontainment training. Enhancement of methodologies and learning experiences in the biocontainment education and training program may promote professional practice self-efficacy and overall clinical competence (Bandura, 1986, 1997).

Definitions

The following definitions were used in this study:

Advanced life support training: An interprofessional course that teaches the knowledge, skills, and attitudes necessary to sustain the life following cardiac arrest (Perkins et al., 2012).

Biocontainment: The containment of extremely pathogenic organisms (such as viruses) usually by isolation facilities to prevent their accidental release and spread (Merriam-Webster, 2015). Highly contagious patients, whether infected from an act of bioterrorism or an infectious disease, are cared for in a high-level isolation unit equipped

with critical infection-control features and meticulous practices aimed at containing the infectious agent (Kortepeter et al., 2008).

Certification: A designated credential that signifies meeting predetermined criteria for a particular level of knowledge and skills in a specialized area of nursing practice (Knudson, 2013).

Ebola Virus Disease (EVD): According to the Center for Disease Control and Prevention (CDC; 2015), Ebola Virus Disease, previously known as Ebola hemorrhagic fever, is a rare and deadly disease caused by infection with one of the Ebola virus strains. It is spread through direct contact with blood and body fluids of a person infected with Ebola virus, or through objects contaminated with the virus, such as needles or soiled linens (CDC, 2015).

Self-confidence: An individual's recognition of his or her own abilities; feelings of well-being from deepening positive emotions (Kukulu, Korukcu, Ozdemir, Bezci, & Calik, 2012).

Self-efficacy: A characteristic of human personality and a predictor of behavior (Coolen, Loeffen, & Draaisma, 2010; Townsend & Scanlon, 2011). According to Bandura (1977), self-efficacy is a person's judgement of his or her ability to accomplish specific tasks or objectives.

Simulation training: A type of learner-centered education method that allows the participant to experience real-life scenarios in a safe environment (King & Reising, 2011). Simulation training offers the opportunity for multiple representations of one's self and provides opportunities for gaining experiences that are minimally available in the

physical world (Bennett & Bell, 2010). Through practice and feedback, participants learn to solve problems prior to delivering care to patients in the clinical setting (Moule, 2011).

Significance

The international and local medical, nursing, and other health specialty communities, and national, state, and local government agencies including the CDC, health care providers, hospital administrators, educators, and global citizens are concerned about effective education and training to ensure adequate safety measures that prevent the spread of EVD and other highly infectious and lethal diseases (Ragazzoni et al., 2015). The intent of this study was to provide evidence to inform best practices for the education of professional nurses in the care of patients who require biocontainment. This study was unique because it addressed an area of higher education that had been minimally researched and is of great concern to the health and well-being of citizens across the world (Burkle, 2014; WHO, 2014).

The results of this study provided insights into the relationship between nurses' professional practice self-efficacy in the provision of care for biocontained patients and specified professional practice characteristics. Insights from this study may aid hospital administrators and educators in establishing an effective educational framework for a program of study that promotes professional practice self-efficacy and equips the professional nurse with essential cognitive and psychomotor skills necessary for the provision of safe and effective care in a high-risk environment (Beyea & Kobokovich, 2004; Center & Adams, 2013; Durham & Alden, 2008; Franklin & Lee, 2014; Nunn, 2004). Additional insights may be gained as to the necessary prerequisites for learner

participation in the education plan. Data and information from this project study may inform future studies that help to identify educational best practices.

Guiding/Research Questions

The current study addressed the possible correlation between nurses' professional practice self-efficacy in rendering care for patients requiring biocontainment and selected characteristics such as participation in simulation training for biocontainment. The following research questions (RQs) and hypotheses guided this project study:

RQ1: What are the descriptive statistics for the following characteristics of nurses who participate in biocontainment training: years of experience as a professional nurse, number of simulated drills for biocontainment in which nurse has participated, number of times in the past 2 years that the nurse participated in the care of an actual patient requiring biocontainment, the self-efficacy score as measured by the Nursing Care Self-Efficacy Scale, highest nursing and/or nonnursing degree, level of life support certifications, frequency of participation in simulated drills for biocontainment, and presence of a specialty certification.

RQ2: What is the relationship between the reported level of nurses' professional practice self-efficacy and the number of simulated drills completed?

H_o2: There is no statistically significant relationship between the reported level of nurses' professional practice self-efficacy and the number of simulated drills completed.

H_a2: There is a statistically significant relationship between the reported level of nurses' professional practice self-efficacy and the number of drills completed.

RQ3: What is the relationship between the reported level of nurses' professional practice self-efficacy and the frequency of simulated drills completed?

H_o3: There is no statistically significant relationship between the reported level of nurses' professional practice self-efficacy and the frequency of simulated drills completed.

H_a3: There is a statistically significant relationship between the reported level of nurses' professional practice self-efficacy and the frequency of drills completed.

RQ4: What is the relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and years of professional practice?

H_o4: There is no statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and years of professional practice.

H_a4: There is a statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and years of professional practice.

RQ5: What is the relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the highest nursing and/or nonnursing degree obtained?

H_o5: There is no statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the highest nursing and/or nonnursing degree obtained.

H_a5: There is a statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the highest nursing and/or nonnursing degree obtained.

RQ6: Are there significant differences between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and type of life support certification?

H_o6: There are no statistically significant differences between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and type of life support certification.

H_a6: There are statistically significant differences between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and type of life support certification.

RQ7: What is the relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and presence of specialty certification?

H_o7: There is no statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and presence of specialty certification.

H_a7: There is a statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and presence of specialty certification.

RQ8: What is the relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the number of times caring for a patient in the clinical setting in the past 2 years?

H_o8: There is no statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the number of times caring for a patient in the clinical setting in the past 2 years.

H_a8: There is a statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the number of times caring for a patient in the clinical setting in the past 2 years.

RQ9: Do the nursing professional development independent variables of years of experience as a professional nurse, number of simulated drills for biocontainment in which nurse has participated, number of times in the past 2 years that the nurse participated in the care of an actual patient requiring biocontainment, highest nursing and/or nonnursing degree, level of life support certifications, frequency of participation in simulated drills for biocontainment, and presence of a specialty certification predict the dependent variable of self-efficacy in biocontainment nursing?

H_o9: The nursing professional development independent variables of years of experience as a professional nurse, number of simulated drills for biocontainment in which nurse has participated, number of times in the past 2 years that the nurse participated in the care of an actual patient requiring biocontainment, highest nursing and/or nonnursing degree, level of life support certifications, frequency of participation in

simulated drills for biocontainment, and presence of a specialty certification do not predict the dependent variable of self-efficacy in biocontainment nursing.

H_a9: The nursing professional independent development variables of years of experience as a professional nurse, number of simulated drills for biocontainment in which nurse has participated, number of times in the past 2 years that the nurse participated in the care of an actual patient requiring biocontainment, highest nursing and/or nonnursing degree, level of life support certifications, frequency of participation in simulated drills for biocontainment, and presence of a specialty certification predict the dependent variable of self-efficacy in biocontainment nursing.

Review of the Literature

The professional practice self-efficacy levels and select characteristics of nurse learners may be related to their ability to competently deliver care to the highly infectious patient requiring biocontainment. In recent years, new global influences such as the threat of highly contagious, potentially lethal infectious diseases and mandates from professional organizations have provided reasons for professional nurses to continue to advance their professional preparation (Winslow, DeGuzman, Kulbok, & Jackson, 2014). The American Nurses Credentialing Center (2014), the Institute for Medicine (2011), and recent research in the field of professional nurse education (Kutney-Lee, Sloane, & Aiken, 2013) focused on nurses' formal education and continued professional development in light of changing health care environments and needs. During the 2014 global outbreak of the EVD epidemic, nurses expressed fear of being inadequately

prepared to deliver safe, competent care to patients requiring biocontainment (U.S. acute care medical center, personal communication, October 17, 2014).

Although self-efficacy has been considered in the training of many professions, the literature indicated minimal research focusing on self-efficacy in nursing education. Further, there has been minimal research on professional practice self-efficacy levels of nurses who practice in high-risk clinical situations involving infectious diseases. Empirical data are not available on professional practice self-efficacy levels of nurses caring for patients requiring biocontainment for highly infectious and potentially lethal diseases, and whether there is a correlation between nurses' professional practice self-efficacy levels and select characteristics such as years of experience as a professional nurse, highest nursing and/or nonnursing degree, and number and frequency of participation in simulation training and drills for biocontainment.

I conducted a literature search using electronic databases and Google Scholar employing search terms and phrases with and without the Boolean operator *and*. Search terms and phrases included *self-efficacy*, *self-confidence*, *nursing self-efficacy*, *professional practice self-efficacy*, *social learning theory*, *social cognitive theory*, *simulation*, *simulation training*, *simulation in nursing*, *medical simulation training*, *biocontainment*, *certification in nursing*, *specialty certification in nursing*, *competency*, and *Ebola Virus Disease*. I also performed a parallel query of Academic Search Complete, Cumulative Index to Nursing and Allied Health Literature (CINAHL) Plus with Full Text, Education Resources Information Center (ERIC), MEDLINE with Full Text, EBSCO, and ProQuest.

The following review of the literature is based on evidence from selected professional journal articles, papers, documents, and textbooks. To demonstrate saturation of the literature, I included primary source articles and studies as well as dissertations from nursing and other health care specialties, and education related to self-efficacy and self-confidence. Articles reviewed were limited to the English language from peer-reviewed journals published from 2012 through 2016. Older studies and seminal references were used if pertinent to the project study topic.

Theoretical Framework

According to Meleis (2012), theoretical thinking is essential to the development of nursing science and professional activities. Theories are important because they define and describe phenomena and assist in clarifying relationships so that strategies can be developed based on theoretical thinking (Jeffries, 2016). Self-efficacy, self-confidence, and competent performance are foundational to professional nursing practice (Tyler et al., 2012), and professional nurses must be competent in a variety of complex skills necessary to achieve patient care, practice, and career goals (Welsh, 2014). Bandura's social cognitive theory (SCT) was the theoretical framework for the current study. This framework provided the structure of support for the selection of variables, the overall study design, and the interpretation of findings.

SCT provided a theoretical basis for examining the relationship between the self-efficacy of nurses and select characteristics of nurses who train and care for patients requiring biocontainment. Bandura (1986) recognized self-efficacy that is situation specific. Situation specific self-efficacy is the basis for the construct of role or career

efficacy (Bandura, 1986). Self-efficacy, a key component of SCT, provides encouragement for nurse educators to address their learners' professional practice self-efficacy beliefs in the design of effective educational experiences that engage the learner.

Social Cognitive Theory (SCT)

SCT is used to explain the main causes for human behavior and how humans learn. It differs from other theories of human behavior that emphasize the roles of environmental and biological factors in the development of human behavior and learning (Bandura, 1986, 2005). Bandura (1986) viewed individuals as self-organizing, proactive, self-reflective, and self-regulating, as opposed to individuals who merely react to the environment or internal impulses. Bandura (1986) viewed human function as a product of dynamic interaction among personal, behavioral, and environmental influences.

SCT evolved over time to include self-beliefs to further explain human learning. In 1963, Bandura and Walters expanded on the existing social learning theory of the time to include observational learning and vicarious reinforcement. Bandura (1977) added self-beliefs of the learner as an important element of social learning theory. Bandura (1986) further elaborated on his view of human functioning and theorized that cognitive, vicarious, self-regulatory, and self-reflective processes occur during human adaptation and change. The element of self-belief was an important underpinning to the current study. Self-beliefs may reflect learners' beliefs about their capability to successfully perform skills necessary to the care of patients requiring biocontainment.

According to SCT, the learner engages in a dynamic process for change to occur in behavior. Bandura (1985) described SCT as consisting of four components:

observation, self-regulation, self-efficacy, and reciprocal determinism, which together facilitate learning. According to Bandura (2005), the basis of learning is in both observation and cognition. As explained by Curran (2014), "observation is powerful and is enhanced when learners debrief the learning experience, connect to the demonstrated behavior, and observe its benefits, motivating the learner to use this modeled behavior for future events" (p. 235). Learners store this new knowledge, debrief, and critically reflect on the outcomes derived from modeled behavior.

Next, learners engage in self-regulation. Self-regulation occurs when learners assume ownership for the learned behavior and use the behavior to facilitate knowledge transfer (Curran, 2014). An important element of biocontainment training is learner participation in simulated practice sessions. Learners participate in case scenarios in a simulated setting and have the opportunity to observe team members and practice skills. During the facilitator-led debriefing session, learners engage in providing and receiving feedback. Consistent with SCT, this process facilitates the transfer of modeled behaviors by motivating the learner to incorporate the new behaviors into the practice setting.

Reciprocal determinism is a key component of the learning process. Reciprocal determinism represents the relationship of personal factors, behaviors, and environmental factors that influence learning (Bandura, 1986). Self-regulation coupled with positive self-efficacy propels the learner to engage in reciprocal determinism (Bandura, 1986). According to Bandura (1985, 2005), the newly learned behavior, positive environment, and cognitive processes interact, demonstrating a bidirectional influence on each other. As a result, the learned behavior is incorporated into the learners' professional practice,

promoting the transfer of learning (Bandura, 2005; Curran, 2014). The principle of reciprocal determination is relevant to this study because it recognizes the importance of positive self-efficacy as an influence necessary to changing behavior. Positive learner self-efficacy supports reciprocal determinism, which in turn may allow for newly learned behaviors to be incorporated into the nurse's professional practice when caring for the biocontained patient.

One example of how a newly learned behavior, cognitive processes, and the environment interact is illustrated when a nurse participates in a skills laboratory for donning personal protective equipment (PPE). Using a learner-centered approach, the education specialist models the procedures for the skill necessary to competently perform the procedure, and the nurse observes each critical step of the psychomotor skill. The nurse then participates in the debriefing session and critically reflects on the observed procedure. During reflection, the nurse focuses on the specific skills that led to the successful outcome of competently donning PPE. The nurse then enters the self-regulation phase and takes ownership of the new behavior. Drawing on previous observations and experience, the nurse applies the new skill to practice in the simulated setting. Continued use of the procedure for donning PPE in difficult circumstances, such as the complex biocontained clinical environment, requires self-efficacy, which in turn supports motivation and problem-solving efforts (Curran, 2014). Thereafter, each time the nurse attempts to competently don PPE, the new behavior, cognitive process, and environment interact to successfully transfer the competency to the practice setting.

SCT emphasizes the belief that individuals are not driven by inner force or external stimulus. Bandura (1986) purported a triadic reciprocity in which behaviors, personal factors (cognition, affect, and biological events), and external environmental factors act together in varying degrees to influence human functioning. Bandura (1986, 1999) referred to this interaction as human agency. It is important to note that reciprocity does not imply that reciprocal influences are of equal strength or occur simultaneously (Wood & Bandura, 1989). The bidirectional flow of the triad indicates that individuals are both producers and products of their environment (Wood & Bandura, 1989). The learned behavior, positive environment, and cognitive processes comingle to have a bidirectional influence on one another, resulting in the incorporation of the newly learned behavior into learners' professional practice (Bandura, 2005). Consistent with a learner-centered approach to education, Bandura (1986) viewed humans as agents who are proactively involved in their development and who make behavioral changes through their actions. The reciprocal nature of the triad in Bandura's social cognitive theory makes it possible for educational strategies to improve personal, environmental, or behavioral processes and behavioral competencies.

SCT further supported this study because the framework lends structure and direction for the educator to facilitate improvement in the learners' self-beliefs (personal factors), improvement in the learners' academic and practice skills (behaviors), and alteration of classroom structures and education plans (environmental) in the effort to promote successful learner outcomes. Bandura (1997) asserted that the main goal of formal education is to provide students with the intellectual tools, efficacy beliefs, and

intrinsic interests necessary to educate themselves. Examination of the correlation between self-efficacy and characteristics revealed opportunities and guidance for enhancements to the learning environment, education plans, and required prerequisites aimed at the professional development of nurses who care for biocontained patients. Nurse educators may be able to address their students' self-efficacy beliefs in an effort to provide more engaging, effective educational experiences that support the delivery of competent, safe care.

Human Agency

Human agency, a main tenant of SCT, supports a learner-centered approach to changing behaviors. Central to Bandura's (1986) view of human agency is "what people think, believe, and feel affects how they behave" (p. 25). Human agency indicates that individuals have the ability to symbolize, use forethought, learn through vicarious experiences, and self-reflect (Bandura, 1999). Vicarious learning occurs when individuals learn by observing the experience and behaviors of other individuals, thereby avoiding performance in the trial and error process (Bandura, 1999). Because individuals have the ability to symbolize, they can create meaning from their environment and use forethought to construct actions, gain new knowledge, and solve problems (Bandura, 1999). Relevant to my study, avoiding performance in trial and error processes in the patient care setting is critical to the safety of the nurse, other health care providers, patients, and the community at large. The concept of human agency and related vicarious learning experiences promotes simulated learner experiences as a potentially effective method for

attaining and transferring the learned skills and behaviors necessary to completely care for a biocontained patient in the clinical setting.

Self-reflection on learning experiences is an important characteristic of learner-centered adult education. Self-regulatory mechanisms allow for self-directed changes in behavior (Bandura, 1994). Evaluation of self (self-concept) and personal incentives (self-motivators) result in self-directed behaviors demonstrated by the individual (Bandura, 1997). Self-reflection, a prominent feature of SCT, is the capability that is most specific to human behavior (Bandura, 1986). Self-reflection allows individuals to make sense of their experiences, self-evaluate, and alter their behaviors or opinions accordingly (Bandura, 1997). These abilities provide individuals with the cognitive means to proactively engage in their development by determining their desired outcomes. Consistent with Bandura's view of self-reflection, self-reflection and self-evaluation are important aspects of the debrief session during biocontainment training that support the learning process and the acquisition of new knowledge and skills.

Self-Efficacy

Bandura's theory of self-efficacy is paramount to SCT. Bandura (1994) studied the effects of self-efficacy and modes of influence by which self-efficacy can be developed and strengthened for personal and social change. He described self-efficacy as an individual's belief in self-capability to successfully perform a specific task to produce given attainments (Bandura, 1994). Self-efficacy beliefs reflect what people believe they can do with the skills they possess under a variety of circumstances (Bandura, 1997). Bandura postulated that self-efficacy, is dynamic, changes over time, and has an effect on

human behavior (Bandura, 1994). Consistent with Bandura's belief, Artino (2012) emphasized that self-efficacy influences the study of academic achievement, motivation, and learning. Therefore, self-efficacy guides how individuals feel, think, behave, and motivate themselves to change behavior.

Self-esteem and self-confidence are terms that have a relationship to self-efficacy but have different meanings and attributes. Bandura (1982) conceptualized self-esteem as one's general feeling of self-worth, and explained that self-confidence is the perception that one is capable of fulfilling particular expectations. Consistent with Bandura's concept of self-efficacy, Zulkosky (2009) explained "Self-efficacy is not concerned with specific skills one has but rather with the judgement of what a person can do with those specific skills" (p. 98). Zulkosky's view of self-efficacy supports Bandura's concept of self-efficacy and the relevance to professional development.

At the core of SCT, and critical to human agency, are individuals' self-efficacy beliefs that foster self-direction over their own thoughts, feelings, and actions. Graham and Weiner (1996) believed that especially in psychology and education, self-efficacy has proven to be a predictor of behavioral outcomes. Bandura (1986) noted that self-efficacy beliefs are derived from self-judgements of one's abilities to organize and implement actions necessary to attain desired types of performances. Bandura viewed individuals as both products and producers of their environments and conceptualized human agency to include collective agency (Bandura, 1986; 1997; 1999). Bandura (1994) emphasized that expectations of one's self-efficacy is affected through four main psychological processes: cognitive, motivational, affective, and selection. The processes shape how one views his

or her capabilities and efficacy (Bandura, 1994; Gardner & Pierce, 1998). Those with high self-efficacy anticipate success, while those with low self-efficacy anticipate failure (Bandura, 1994). Bandura's explanation of the psychological processes that affect self-efficacy beliefs supports the need to better understand the relationship between learner characteristics and professional practice self-efficacy in the endeavor to design professional development activities that facilitate the attainment of necessary skills to competently care for the biocontained patient.

Self-efficacy and motivation are two important variables for professional learning. Self-efficacy provides the foundation for individual motivation and accomplishments by determining the level of goal, perseverance, and resilience in light of failure (Bandura, 1994). Bandura (1997) postulated that individuals' demonstrated performance is more likely to be predicted by their self-efficacy beliefs than by previously attained knowledge, skills, and accomplishments. Bandura explained, "People's level of motivation, affective states, and actions are based more on what they believe than on what is objectively true" (1997, p. 2). Bandura's view of self-efficacy and motivation supports the need to better understand the professional development and the self-efficacy needs of nurses who care for patients requiring biocontainment.

The literature showed that other theorists have studied self-efficacy as a significant component of SCT. Building on Bandura's concept, Zulkosky (2009) believed that locus of control, in addition to cognitive and affective processes are underlying attributes of self-efficacy. Locus of control, an individual's belief about underlying causes of one's life events, may be controlled by external or internal forces (Zulkosky,

2009). An example of internal locus of control is the belief by an individual with a high level of self-efficacy in the use of cognitive and affective processes to obtain an outcome (Zulkosky, 2009). Zulkosky (2009) explained, "Social experiences precede self-efficacy and determine whether someone has high or low levels of self-efficacy" (p. 96). Both Bandura and Zulkosky agreed that mastery experiences facilitate feelings of self-efficacy, which influences the individual's decision to perform a new activity.

A goal of nursing education is to facilitate the ongoing development of competent nurses who provide health care to the members of society. Individual self-efficacy determines one's motivation level, which effects level of effort, persistence in facing barriers, activity choices, persistence, and emotional reaction (Hassankhani et al., 2015). Hassankhani et al. (2015) investigated the relationship between learning motivation and self-efficacy among nursing students using a descriptive-correlational approach. Results of the Pearson's correlation coefficient indicated that the relationship between learning motivation and self-efficacy was significant (0.48, >0.001) (Hassankhani et al., 2015). Consistent with Bandura's belief, the positive and significant correlation between self-efficacy and learning motivation suggested that an increase in learning motivation may be associated with the promotion of self-efficacy (Hassankhani et al., 2015). The researchers concluded that nursing education plans should be modified to include experiences that increase self-efficacy and learning motivation (Hassankhani et al., 2015). Their conclusion supports the need to better understand professional practice self-efficacy in light of professional development for nurses who care for biocontained patients.

Individuals with similar levels of knowledge and skill may differ in their performance and outcomes. Bandura (1997) believed that the two components of successful human functioning, skills, and self-efficacy act upon one another, resulting in reciprocal causation (Bandura, 1997). Consistent with Bandura's belief, Artino (2012) emphasized that effective functioning requires skills and the efficacy beliefs to execute the skills in a competent manner. Individuals must believe they can successfully perform the skill under standard as well as challenging circumstances (Artino, 2012). Likewise, if skills and knowledge are absent, high levels of self-efficacy alone will not produce desired outcomes. Thus, the functioning of one component depends on the functioning of the other component. The two components develop together as individuals learn and grow (Artino, 2012). This concept, which further supports the study in an effort to explore professional development and self-efficacy, is a possible rationale for why individuals with similar levels of knowledge and skill differ in their actual demonstrated behaviors and outcomes.

The literature indicated that individuals with high self-efficacy set higher goal levels and are likely to exert more effort in attaining the goal. Individuals with high self-efficacy view difficult circumstances and tasks as opportunities to master challenges, as opposed to barriers to desired outcomes (Bandura, 1997). Those with low levels of self-efficacy tend to limit their involvement in difficult situations and are less resilient when confronted with failure (Bandura, 1997). Bandura's and Artino's views of self-efficacy are consistent and support the need for educators to better understand ways to facilitate

positive professional practice self-efficacy for adult learners in an effort to achieve educational goals, as in the case of my study.

Self-efficacy may influence affective processes which elicit physiological and emotional responses. Bandura (1994) postulated that affective processes, which trigger physiological and emotional responses, are influenced by self-efficacy. For example, individuals with a low level of self-efficacy exercise a low level of control over stressors, resulting in autonomic reactions, catecholamine secretion, and the release of endogenous opioids (Bandura, 1994). These individuals avoid situations and circumstances because they perceive a lack of capability in performing tasks in a competent manner. Bandura (1994) explained that self-efficacy influences the selection of activities and environments chosen by individuals. Consistent with Bandura's viewpoint, Welch (2014) believed that self-efficacy reflects what individuals believe they can do with their skills according to the activity and under varying circumstances. Individuals select actions, determine how much effort to expend on the actions, and approach actions with either hesitation or assurance based on their self-efficacy beliefs (Welch, 2014). Therefore, individuals avoid situations and circumstances that they believe they are not capable of handling and take on challenges and opportunities that they believe that they can manage. The belief that self-efficacy influences the learner's selection of activities and environment further supports the need for my study.

According to Bandura (1994), individuals form their self-efficacy by interpreting information from four sources. The four main sources of self-efficacy that affects human functioning are enactive mastery experience (actual performance), vicarious experiences

(observation of others), forms of persuasion (both verbal and non-verbal), and physiological and emotional arousal (factors that influence readiness for learning) (Artino, 2012; Bandura, 1986; 1997). Thus, it is through these four main sources that one's beliefs about self-efficacy can be strengthened or weakened.

It is important to incorporate experiences that promote successful outcomes for the learner into educational designs. Enactive self-mastery (mastery experience), the self-interpretation of previous performance, is the strongest source of gaining or losing self-efficacy (Heslin & Klein, 2006; Stanley & Pollard, 2013). Mastery results from one's effort and skill, and is based on experiences that are direct and personal (Artino, 2012; Smith, 2002). Enactive self-mastery is provided to the learner through experiences that promote opportunities for success, and few opportunities for failure (Heslin & Klehe 2006; Stanley & Pollard, 2013). Stanley and Pollard (2013) and Bandura (1982) agreed that the individual's competent performance results in a sense of mastery and self-confidence in one's ability. Relative to my study, activities that support enactive mastery, such as a nurse successfully performing the procedure for doffing PPE under the direction of an experienced nurse prior to independently performing the procedure, may promote professional practice self-efficacy.

While mastery experience is described by Bandura (1994) as the main source of gaining or losing self-efficacy, there is very little meaningful empirical data in existence to support this belief. Dinther, Dochy, Segers, and Braeken (2014) studied the influence of mastery experiences and verbal persuasions on student self-efficacy, and how this influences learning outcomes. Results of their study confirmed the role of both mastery

experiences and verbal persuasions in enhancing students' self-efficacy as aligned to SCT. Findings did not confirm mastery experiences as being a stronger source than verbal persuasions (Dinther et al., 2014). Further research is necessary to better understand the relationship of mastery experience as a main source of gaining or losing self-efficacy, which in turn may have an effect on educational designs.

Simulation training for biocontainment begins with the learner observing expert practitioners demonstrating skills, such as the procedure for drawing blood from a biocontained patient. The vicarious experience, referred to as role-modeling, occurs when the individual observes another performing a task (Artino, 2012). Observation by the individual promotes self-confidence through the careful study of another individual's performance or demonstrated behaviors (Bandura, 1982; Stanley & Pollard, 2013). Consistent with Bandura's concept (1994), Stanley and Pollard (2013) noted that observing individuals succeed in goal attainment heightens the observers' belief that they too can master the skill. Wood and Bandura explained "Proficient models build self-beliefs of capability by conveying to observers effective strategies for managing different situations" (1989, p. 364). It is the act of observation that allows learners to picture themselves in the situation as successful (Stanley & Pollard, 2013). Observing biocontainment care actively engages the nurse in the learning process and may facilitate professional practice self-efficacy and attainment of required skills.

Modeling may be an effective strategy for both experienced and inexperienced learners. Modeling is particularly effective when the learner has minimal past practice or experience with the task, or when the experienced individual observes a better way of

performing a task (Bandura, 1982). Building on Stanley and Pollard's (2013) belief, Fong and Krause (2014) studied the sources of self-efficacy of college students enrolled in a learning frameworks course. Fong and Krause explained, "Seeing individuals similar to one's self succeed can increase perceived efficacy: if someone similar to the learner is capable, the learner can come to believe that she or he is capable of learning as well" (2014, p. 251). The qualitative portion of the study identified success relative to others was an important subtheme within Bandura's (1982) concept of vicarious experiences (Fong & Krause, 2014). This finding further substantiates the need to better understand the relationship of self-efficacy and professional development for nurses providing biocontainment care.

Meaningful feedback to the learner is an important strategy that promotes reflection and changes in behavior. Evidence gleaned from studies by Abe, Kawahara, Yamashina, and Tsuboi (2013) and Stegmann, Pilz, Siebeck, and Fischer (2012) demonstrated that expert modeling and the provision of feedback improved participant performance. Bandura (1994) advocated that verbal (social) persuasion contributes to increasing the learners' belief in their ability. Verbal judgements by others play a significant part in the development of the individual's self-efficacy perception (Bandura, 1994) and "If people receive realistic encouragement, they will be more likely to exert greater effort to become successful than if they are troubled by self-doubts" (Wood & Bandura, 1989, p. 365). Therefore, individuals who are verbally persuaded to believe that they possess the ability to master a skill are more likely to achieve their learning goals.

A review of the literature showed that the benefits of verbal persuasion are well documented. Van Dinther, Dochy, Segers, and Braeken (2014) confirmed the role of social persuasions in enhancing student self-efficacy as described by Bandura's (1994) SCT. Building on Bandura's original theory (1994), they validated that perceptions of feedback from others, such as teachers and peers, influenced students' perceived self-efficacy. The researchers also confirmed that learning focused feedback linked to the task and criteria enhanced students' self-efficacy (Van Dinther et al., 2014). These findings support the need to better understand professional development and self-efficacy of nurses who care for patients requiring biocontainment.

The influence of verbal persuasion on self-efficacy has been further documented in the literature. Fong and Krause (2014) investigated the effects of social persuasions on college students' self-efficacy who enrolled in a learning frameworks course. Qualitative results of the study revealed the participants noted the importance of verbal persuasions and the strong influences of having positive feedback on one's self-efficacy (Fong & Krause, 2014). Similarly, quantitative results of the study highlighted the importance of appropriate and constructive feedback necessary for individuals to feel motivated and reach their potential (Fong & Krause, 2014). The findings of both studies (Fong & Krause, 2014; Van Dinther et al., 2014) validate Bandura's (1994) concept of verbal persuasion. Their findings are significant for this study as the use of verbal persuasion during and following participation in simulated educational activities related to biocontainment care may influence the learners' self-efficacy and their ability to reach potential goals.

Other researchers have studied the effects of providing feedback in an effort to build self-confidence. Aoyama, Tamura, Ishikawa, Yada, and Miyawaki (2013) examined nursing students' levels of self-confidence before and after providing feedback, and evaluated the effects of providing feedback in building self-confidence. Different from the studies conducted by Fong and Krause (2014) and Van Dinther et al., (2014), Aoyama et al., (2013) focused the study on the relationship of feedback to knowledge and skill attainment. Results showed that providing feedback on knowledge and practical skills increased students' levels of self-confidence in their practical skills, but not in their knowledge (Aoyama, et al., 2013). Findings suggested that students need to receive effective feedback. The researchers explained, "Teachers' appropriate and timely intervention in the students' learning process is crucial to help them to gain self-confidence in their nursing skills" (Aoyama, 2013, p. 508). The researchers' findings emphasize the importance for teachers to incorporate into learning designs timely feedback and resulting interventions aimed at fostering self-confidence and the attainment of competent skills required for biocontainment care.

Bandura (1997) believed that individuals exist in psychic environments that they self-create. Physiological arousal (affective arousal) in the form of somatic and emotional states also lend to the formation of self-efficacy beliefs (Bandura, 1986; Wood & Bandura, 1989). According to Wood and Bandura (1989), individuals attribute physiological states or conditions to their self-efficacy perception. McMullan, Jones, and Lea (2012) studied nursing students and the influence of math anxiety, self-efficacy, and numerical ability on drug calculations to determine which factors would best predict the

skill. Results indicated a strong relationship between anxiety, self-efficacy, and ability (McMullan, Jones, & Lea, 2012). Students who failed the drug calculation test were more anxious and less confident in performing calculations than those who passed. These findings are consistent with Bandura's concept of physiological arousal and its relationship to self-efficacy.

The literature indicated that others have studied physiological arousal and self-beliefs. Further building on Wood and Bandura's (1989) concept of physiological arousal and the formation of self-beliefs, Fong and Krause (2014) identified that an individual's degree of confidence may be influenced by somatic or emotional states such as anxiety, stress, or mood. Fong and Krause explained "One's physical status, stress levels, emotional proclivities, and interpretations or misinterpretations of bodily states can alter efficacy beliefs" (2014, p. 252). Students who feel energized towards a learning task may likely approach their work with greater confidence, while individuals experiencing fatigue may perceive that they are not capable of successfully performing a task (Fong & Krause, 2014). Therefore, the physical or emotional state of the learner may influence professional practice self-efficacy. These findings may have implications for the educational design of learning activities for nurses who care for biocontained patients. As in real life clinical situations, PPE may become uncomfortable during drills that have the potential, depending on the scenario, to last up to 1.5 hours.

Recent evidence in the literature strengthens evidence for the concept of physiological arousal and the effects on self-efficacy of learners. Zhao et al. (2015) explored Bandura's concept of physiological arousal by studying coping strategies and

the effects of self-efficacy on Chinese undergraduate nursing students experiencing stress in the clinical setting. Results showed that assignments and workload were the most common stress to students in the clinical setting, and that transference was the most frequently used coping strategy (Zhao et al., 2015). The researchers explained,

> Self-efficacy not only had a positive main effect in predicting the frequency of use of optimistic and problem solving strategies, but also moderated the effects of stress from taking care of patients on transference strategy, as well as stress from assignments and workload on problem solving strategy. (Zhao et al., 2015, p. 401)

The researchers concluded that it is essential to raise students' self-efficacy level to reduce stress and promote positive strategies to be used during practice in the clinical setting.

A review of the literature indicated that an individual needs both skill and self-efficacy to successfully perform a task. If two individuals possess the same level of skill, differences in self-efficacy may lead to different performance outcomes (Gist & Mitchell, 1992; Wood & Bandura, 1989). In consideration of Bandura's (1982; 1997) concept, Boswell (2012) explored whether or not students had a high level of self-efficacy based on their competent performance of a task. Employing a quantitative design, Boswell (2012) studied a convenience sample of undergraduate students. Post training intervention, there was a positive correlation between self-efficacy and task performance, which is consistent with Bandura's concept (1982; 1997). Therefore, it was concluded that interventions to promote self-efficacy need to be included in education programs.

An important consideration in my study is the relationship of professional practice self-efficacy to years of experience as a nurse, the number of times participating in drills for biocontainment, and the number of times caring for a patient requiring biocontainment. Bandura (1982) and Wood and Bandura (1989) believed that as self-efficacy specific to a task increases, the possibility increases for the individual to successfully perform the task in the future. As self-efficacy is dynamic, it evolves with experience (Wood & Bandura, 1989). In another research study, Boswell (2013) studied the relationship between perceived self-knowledge of research methods and research self-efficacy in light of the importance of research skills to workforce readiness. Participants were students who participated in a research methods course for social sciences. The study's design was a pre-and post-course assessment (Boswell, 2013).

Participants completed the Research Self-Efficacy Scale (Holden, Barker, Meenaghan, & Rosenberg, 1999). The scale measured self-confidence in demonstrating research related skills (Boswell, 2013). Findings from the study indicated that the research self-efficacy of the participants was statistically significant in relationship to their perceived knowledge at the beginning and end of the course (Boswell, 2013). The relationship between the variables was stronger at the end of the course, indicating that the more the students learned, the more confident they became in their ability to perform research (Boswell, 2013). The results of the study support Bandura's belief that self-efficacy evolves with an increase of knowledge and experience (Bandura, 1982; Wood & Bandura, 1989). The results of the study further support the need to examine the relationship between professional practice self-efficacy and select characteristics of

learners who care for biocontained patients, such as years of experience and the number of times the learner participated in drills for biocontainment.

The findings from Boswell's study have significance for my research study. Boswell (2013) confirmed Bandura's (1977) belief that expectancy is a primary antecedent factor of behavior. Bandura (1977) described self-efficacy as "the conviction that one can successfully execute the behavior required to produce the outcomes" (p. 193). Miyoshi (2012) further explored Bandura's concept by investigating the causal effects of generalized self-efficacy and task-specific self-efficacy in college students. He hypothesized that there is a difference between general self-efficacy and self-efficacy related to a specific task.

Miyoshi (2012) defined general self-efficacy as one's overall confidence in the ability to succeed. Task-specific self-efficacy, also known as situational self-efficacy, refers to the overall confidence level in performing a particular task or behavior (Fadale, Tucker, Dungan, & Sabol, 2014; Miyoshi, 2012). Relative to my study, if nurses perceive that they are gaining knowledge and skills by participating in an active learning education program, they may view themselves as improving in their capability to safely and competently perform tasks, thus strengthening their self-efficacy. Educational experiences need to be designed which promote professional practice self-efficacy in the delivery of care to biocontained patients.

Findings from Miyoshi's research also suggest that generalized self-efficacy is more stable than task specific self-efficacy. Generalized self-efficacy can predict task-specific self-efficacy in new situations, but task-specific self-efficacy does not predict

generalized self-efficacy (Miyoshi, 2012). The research findings from Miyoshi's study (2012) are pertinent to my study because a strong general self-efficacy may predict task-specific self-efficacy in rendering care to the biocontained patient. Findings may contribute to re-design of the education plan to include strategies to promote and strengthen learner self-efficacy.

Characteristics

The purpose of my study was to explore the relationship between professional practice self-efficacy and selected characteristics of nurses caring for biocontained patients. Select characteristics are number and frequency of participation in simulated drills for biocontainment, number of times in the past two years the nurse has participated in the care of a patient in the clinical setting requiring biocontainment, years of experience as a professional nurse, highest nursing and/or non-nursing degree, type of life support certification, and presence of specialty certification in nursing. The literature showed that researchers have identified multiple participant-related characteristics that influence performance such as age, gender, preparedness, and self-confidence (Beischel, 2013; Brydges et al., 2012; Diez et al., 2013; Fenske, Harris, Aebersold, & Hartman, 2013; Jefferies and Rogers, 2012; Shinnick, Woo, & Evangelista, 2012). However, the literature did not reveal meaningful data about characteristics relative to my study.

A review of the literature indicated that frequently, the concepts of self-esteem, and self-confidence are connected to the concept of self-efficacy (Robb, 2012). According to Robb (2012) and Bandura (1994), differences exist between individuals' perceptions of their abilities to produce designated levels of performance. The nurse's

professional practice self-efficacy is situational, task dependent, and influenced by various factors (Robb, 2012). Zulkosky (2009) believed that the concepts of self-esteem and self-confidence relate to characteristics of an individual and subsequently have an effect on the individual's cognitive and affective actions. This belief supports the need to study the relationship between characteristics and self-efficacy of the nurse caring for biocontained patients.

It is important to accurately perform biocontainment care and related skills in order to contain potentially lethal, highly infectious diseases, and ensure safety. Similarly, it is necessary to perform the Glasgow Coma Scale (GCS) precisely to ensure safety (Mattar, Liaw, & Chan, 2014). The Glasgow Coma Scale is a monitoring tool that measures the depth and duration of altered consciousness (Middleton, 2012). Mattar, Liaw, and Chan (2014) conducted a descriptive correlational study to examine nurses' self-confidence and attitudes towards the GCS. Data analysis showed that the type of clinical discipline, seniority in nursing, and higher attitude scores were key characteristics of nurses' confidence levels in using the GSC (Mattar, Liaw, & Chan, 2014). This study demonstrated differences in attitudes and self-confidence using the GSC between nurses of varying demographics and that there were multiple factors influencing their attitudes and self-confidence. Data resulting from the study supports the need to explore self-efficacy in relationship to characteristics of nurses providing biocontainment care.

Some researchers have studied the relationship of characteristics of specialized nurses to their perceived professional practice self-efficacy. Using a convenience, non-probability sample of 25 pediatric nurses, Stanley and Pollard (2013) studied the

relationship between knowledge and self-efficacy. They investigated the level of knowledge of pediatric pain management, the attitudes of the nurses, and the level of self-efficacy of pediatric nurses. They also looked at the relationship between the years of experience and the levels of knowledge, attitudes, and self-efficacy (Stanley & Pollard, 2013). A cross-sectional, correlational design was employed by the researchers. Participants completed two surveys, one which addressed their knowledge and attitudes regarding pain, and the other which addressed the nurses' self-efficacy in managing children's pain (Stanley & Pollard, 2013).

According to the researchers, coaching and participation in pain management should have helped the nurse gain knowledge through enactive mastery and in turn, increased knowledge should have helped increase the nurse's self-efficacy (Stanley & Pollard, 2013). While findings indicated that there was no statistically significant correlation between knowledge and self-efficacy, there was a statistically significant relationship between years of pediatric experience and level of knowledge, and knowledge and membership in professional nursing organizations (Stanley & Pollard, 2013). The study further exemplifies the importance of necessary research that considers the specific characteristics of learners and the relationship to professional practice self-efficacy in the quest for meaningful educational designs that promote positive outcomes for learners.

On the battlefield, medical treatment of the wounded many times occurs impromptu. Medical emergencies of the wounded usually focus on control of hemorrhage (Sergeev et al., 2012). Physicians and paramedics in the Israel Defense Forces are trained

to perform advanced life support and advanced medical procedures using manikins to prepare for high-risk medical occurrences during battle (Sergeev et al., 2012). Sergeev et al., (2012) focused on the characteristic of experience by investigating the association of experience. The researchers used the training modality of scenario-based practice on manikins for advanced life support medical personnel. Following intervention, participants completed a questionnaire regarding their perceived self-confidence levels for performing high-risk skills such as endotracheal intubation and needle chest decompression (Sergeev et al., 2012). Results indicated that self-confidence levels were related to level of experience. The finding supports the need to explore learner characteristics and the relationship to self-efficacy.

My research study emphasizes the importance of understanding the relationship of learner characteristics and self-efficacy in the professional development of nurses who care for biocontained patients. Tyler et al. (2012) conducted a descriptive study to obtain data that investigated the perception of nurses' characteristics, specifically clinical competency, self-efficacy, and job satisfaction. The purpose of the study was to have nurses describe their perception of the characteristics, so as to provide information for educators to develop evidence-based interventions which maximize these characteristics (Tyler et al., 2012).

Self-efficacy for clinical performance was assessed using the Self-Efficacy in Clinical Performance instrument; a Likert-response instrument used to report confidence levels (Cheraghi, Hassani, Yagmaei, & Alavi-Majed, 2009). Results of the study indicated confidence for 22 of the 37 (60%) items (Tyler et al., 2012). The top six items

indicated a low level of confidence, and the other 16 items indicated a lack of self-efficacy as noted by one or two participants (Tyler et al., 2012). The data revealed that the individual who reported a lack of proficiency in 11 to 20 activities also reported a lower, but not statistically significant, self-efficacy level (Tyler et al., 2012). Participants who reported a lack of proficiency for 0-10 activities had a higher level of self-efficacy for clinical performance. The study results support the development of specific educational opportunities for the experienced nurse with the aim of promoting ongoing, life-long learning, growth, and development.

The above sited research studies examined variables in participants that may affect professional practice self-efficacy. Overall, the results indicated that characteristics, such as years of experience as a professional nurse and presence of specialty certification in nursing may have an effect on self-efficacy. Relative to my research study, the studies discussed above support the importance of considering key characteristics of nurse learners when seeking to promote professional practice self-efficacy and create educational designs that meet learner needs.

The characteristic of specialty certification in nursing was addressed in my research study. Examples of specialty certification in nursing are pediatric nursing and critical care nursing. Haskins, Hnatiuk, and Yoder (2011) believed that certification enhances feelings of empowerment during clinical practice that may reflect in the nurse's level of self-confidence. Fights (2012) noted that increased feelings of competence and self-confidence may influence the care that nurses provide. Stromberg et al. (2005) reported that nurse managers consider certified nurses to have a proven knowledge base

in their area of specialization and demonstrate an enhanced ability to function in complex clinical situations. Samples-Twibell et al. (2008) studied nurses' perceptions of their self-confidence and the benefits and risks of family presence during resuscitation. Results indicated that the nurses' perception of benefits, risks, and self-confidence in regard to family presence were significantly interrelated and the perceptions of more benefits and fewer risks were related to membership in professional organizations and professional certification and working in an emergency room (Samples-Twibell et al., 2008).

While some evidence in the literature indicated nurses who are certified provide a high level of quality care, most authors agree that additional research is needed on this topic (Fights, 2012; Kendall-Gallagher & Blegen, 2009). The lack of substantial evidence in the literature regarding the relationship of the characteristic specialty certification in nursing to professional practice self-efficacy supports the need for my study. Information gleaned from the study may provide potential indications for educational designs for biocontainment training programs that consider specified learner characteristics.

Simulation

Simulation training for biocontainment care allows for practice in team participation in clinical situations that are likely to occur in the practice setting. The importance of inter-professional team training for the delivery of effective, safe patient care has become paramount in importance, especially when treating diseases that are high-stake, rare events (van Schaik, Plant, Diane, Tsang, & O'Sullivan, 2015). Simulation is an ideal instructional method because it provides for experiential learning within a safe environment and allows team members to practice skills (Yuan, Williams,

& Fang, 2012). Simulation learning experiences range from role playing to the creation of life-like practice environments and clinical scenarios, some of which may use high-fidelity manikins and equipment.

The literature indicated that social scientists studied the relationship of simulation training and self-efficacy. Researchers van Schaik et al. (2015) developed a simulation-based inter-professional team training program that focused on pediatric emergencies. Subsequently, they performed an analysis of the program's impact on self-efficacy among pediatric residents and nurses. Results indicated that the program had a beneficial effect on self-efficacy in resuscitation skills for nurses (van Schaik et al., 2015). Nurses who participated in a minimum of 1 mock code drill had higher scores in all 8 self-efficacy items than those who did not participate in the mock code drill (van Schaik et al., 2015). Most participants agreed or strongly agreed that mock codes improved their confidence in managing emergencies (van Schaik et al., 2015). This study illustrates the relationship of simulation training to professional practice self-efficacy and further supports the need for my study. Results from the study may reveal indications for initial and ongoing professional development activities that incorporate simulation training designs into the education plans.

As life-long learners, nurses need to possess cognitive skills, the ability to critically reflect on their performance, and anticipate needs of their patients. Burke and Mancuso (2012) explained, "Simulation integrates principles of social cognitive theory (SCT) into an interactive approach to learning that encompasses the core principles of intentionality, forethought, self-reactiveness, and self-reflectiveness" (p. 543).

Debriefing, an important aspect of the simulated experience, promotes self-efficacy and allows for self-regulation of demonstrated behaviors (Burke & Mancuso, 2012). Therefore, simulation training requires an environment that is conducive to learning and promotes mastery of skills.

Participation in simulation training is a key characteristic of the population under study. The lack of ample opportunities to allow students to apply theory to practice is a general problem in nursing education (Hall, 2015). Likewise, there is a lack of sufficient opportunities to practice care of the biocontained patient and related skills. The lack of sufficient opportunities to practice is a particular challenge for educators and students who practice biocontainment care in the local learning environment. In order to ensure safety for the nurse, health care providers, the patient, and the community, procedures must be performed without deviation from protocols. Several factors add to the challenge of providing biocontainment care, such as performing complex procedures garbed in PPE that may be uncomfortable and restrictive with certain types of movement.

Overcoming challenges in the provision of safe biocontainment care may be supported by practice, experience, and a high level of self-efficacy. Bandura's (1995) theory of SCT implies that an instructional treatment may increase motivation and self-efficacy and lead to competent skills (Hall, 2015). Hall explained, "As students become more competent and skilled, they become more confident and more motivated to try to learn the skill better" (2015, p. 124). A review of the literature indicated that simulation produces superior learning outcomes when compared to other traditional methods, such as the lecture (Cooper, Cant, Porter, Bogossian, McKenna, Brady, & Fox-Young, 2012;

LeFlore, Anderson, Zielke, Nelson, Thomas, Hardee, & John, 2012). Cooper et al. (2012) believed that simulation should be used to augment learning and that it is particularly useful in providing experiences that seldom occur in the clinical setting. Educational designs that include carefully crafted clinical scenarios and mimic practice settings may support the attainment and maintenance of the necessary skill set for nurses who provide biocontainment care.

In the local setting, nurses are required to participate in biocontainment simulation experiences. However, there existed variety in the complexity of clinical scenarios, and the frequency and amount of drills. Meyer, Connors, Hou, and Gajewski (2011) demonstrated that students who participated in simulation prior to the experience in the clinical setting had improvement in clinical performance. Schlairet and Fenster (2012) expanded on the study by comparing different dosing and sequencing schemes for simulation practice and clinical experiences. They found that a pattern in which simulation practice preceded the clinical experience was most effective (Schlairet &Fenster, 2012). Building on these studies, Dancz, Sun, Moon, Chen, and Ozel (2014) found that sequencing simulation experiences from lower to higher fidelity resulted in improved learner confidence. Therefore, when designing simulation training experiences for biocontainment, the literature indicated that it is important to begin with basic scenarios that sequentially build in complexity to allow for competence and expertise in performance for a variety of clinical situations. Data from my study provide further insights into the necessary frequency of participation in biocontainment drills.

There have been limited studies that examine the use of simulation training in nursing specialties. Using a convenience sample of third year students, Onova (2013) conducted a study using a pre-test and post-test design to investigate the use of simulation training in the management of labor and delivery emergencies. Results indicated that the students' self-efficacy increased post simulation training (Onova, 2013). The high-risk patient population described in this study, patients with a suspected or confirmed highly contagious and potentially lethal infectious disease requiring biocontainment, is low frequency in terms of occurrence in the clinical practice setting. Some nurses do not have adequate opportunities to practice essential skills necessary to become competent and maintain a required level of practice. Simulated clinical experiences offer opportunities for learners to practice in a nonthreatening atmosphere receive feedback through debriefing, which may result in creased professional practice self-efficacy and the transfer of skills to the clinical setting.

Other social researchers have examined educational approaches to be utilized for the attainment of high-risk, low frequency skills. Pauly-O'Neill and Prion (2013) conducted an evaluative study to investigate the overall influence of a mixed educational approach on student knowledge and self-confidence in pediatric intravenous medication administration. They identified diminishing opportunities for students to practice this high-risk, low frequency skill in the clinical practice setting (2013). After lecture, students spent approximately forty hours in a pediatric simulation completing high-risk skills scenarios that included medical prescribing and system-based pharmaceutical error, unpredictable medication administration dilemmas, and acute drug reactions (2013).

Following the training intervention of simulation with scenarios, students completed a posttest and self-confidence survey. Results indicated a rise in knowledge and reported self-confidence with intravenous medication administration (2013). The researchers concluded that a clinical rotation enhanced with simulated experiences in intravenous medication administration provided a rich learning environment that afforded students experience with risk-free problem solving (2013). The results of this study further substantiate the need to examine professional development strategies that promote the self-efficacy of nurses who care for biocontained patients.

There are varying opinions as to the relationship between simulation training and the learner's level of self-efficacy. Hall (2015) examined the effectiveness of high-fidelity simulation in a senior maternity baccalaureate nursing program. Bandura's theory of self-efficacy guided the study that focused on whether students who received training through simulation in addition to traditional clinical training achieved greater practical learning and critical thinking skills (Hall, 2015). Results of the study indicated that students who participated in simulation training scored significantly better than students who did not participate in simulation training. Building on the findings of the study conducted by Pauly-Oneill and Prion (2013), the researchers explained that the use of high-fidelity simulation training as an instructional treatment may generate interest and enhance confidence in skills performance (Hall, 2015). While LaFond and Vincent (2012) confirmed that simulation contributes to self-confidence and self-efficacy, O'Donnell, Decker, Howard, Levette-Jones, and Miller (2014) indicated that there is less evidence that simulation contributes to self-efficacy. Yuan, Williams, and Fang (2012)

found mixed results for the relation of simulation to confidence and competence. Controversy in the literature as to whether there exists a relationship between simulation training and self-efficacy level further substantiates the need for my study.

Inaccuracies in nurses' perception of their self-efficacy may influence their goals and outcomes relative to providing biocontainment care. Cardoza and Hood (2012) conducted a correlation study to examine nursing students' self-efficacy prior to and post simulation training. They rated participating students using a scale that had high inter-rater reliability and validity. Concluding data identified that some nursing students had an unrealistic self-assessment of their clinical capabilities prior to participation in simulation, primarily because they did not clearly understand what comprised an emergency situation (Cardoza & Hood, 2012). Different from the Bandura's (1994) belief, Cardoza and Hood (2012) concluded that practice does not always improve self-efficacy. Their study supports my study that looked at the characteristics of years of experience in nursing, number of times the nurse has participated in a simulation biocontainment experience, and the number of times actually caring for a biocontained patient. The above stated characteristics may or may not influence the nurses' accurate perception of their self-efficacy. Inaccurate perceptions of self-efficacy may have an effect on learner outcomes.

The number and frequency of participation in simulated drills is a characteristic that is investigated in my study. Beebe (2012) found that as the number of hours of clinical simulation increased, so did the scores increase for critical thinking and knowledge level. Kennedy, Maldonado, and Cook (2013) confirmed through their study

that repeated exposure to clinical scenarios through simulation is effective in increasing critical thinking and knowledge. While the literature supports repetitive practice through simulation, there is minimal evidence which quantifies what the appropriate amount of simulation practice should be for skill mastery and the attainment of a high level of self-efficacy. This lack of evidence in the literature further exemplifies the importance of necessary research that considers self-efficacy and specific characteristics of learners in the quest for meaningful educational designs that promote positive outcomes for learners.

Controversy exists in the literature as to whether gains realized in the environment, including improvements in self-confidence and self-efficacy, transfer to the clinical practice setting. In a longitudinal, randomized study sponsored by The National Council of State Boards of Nursing (NCSBN), researchers found that simulation can effectively replace up to 50% of clinical time (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). Similarly, McGaghie, Issenberg, Barsuk, and Wayne (2014) found that gains realized in the simulation environment did transfer to the clinical practice setting. Finan, Bismilla, Campbell, LeBlanc, Jeffries, and Whyte (2012) also explored whether improved procedural performance following simulation training transferred to the clinical practice setting. Findings from their study suggested that learners who demonstrated improved performance in the simulated environment did not necessarily transfer learning to the clinical setting (2012). Existing conflicts in the literature further substantiates the need for educational research to better understand the relationship of self-efficacy and select characteristics of nurse learners who care for biocontained patients, inclusive of participation in simulation training.

In summary, social cognitive theory provides an explanation of the main causes of human behavior and how adults learn. Bandura (1986; 1997) believed that a high level of self-efficacy leads to improved performance in any given activity, task, or behavior. Modification of behavior involves an alteration in the individual's perception of self-efficacy (Zulkosky, 2009). The literature showed that although self-efficacy concepts have been incorporated into the training of some professions, such as military training, minimal research has been conducted using this concept in the education of professional nurses (Townsend & Scanlon, 2011). Social cognitive theory supports my study because the framework provides guidance for the educator to promote improvements in learners' knowledge and skills and make alterations in education plans aimed at the facilitation of successful learner outcomes.

There was not a clear understanding in the local learning environment whether there is a correlation between nurses' perception of professional practice self-efficacy in caring for patients requiring biocontainment care and select characteristics. Select characteristic are number and frequency of participation in simulated drills for biocontainment, number of times in the past two years the nurse has participated in the care of a patient in the clinical setting requiring biocontainment, years of experience as a professional nurse, highest nursing and/or non-nursing degree, type of life support certification, and presence of specialty certification in nursing. Given the infrequency of available clinical opportunities to care for a biocontained patient, practice opportunities were minimal. Simulation training provides opportunities to practice and integrates principles of SCT into an interactive approach to learning and may promote professional

practice self-efficacy (Burke & Mancuso, 2012; Cardoza & Hood, 2012). Controversy in the literature further supports the need to study simulation training and its relationship to professional practice self-efficacy.

The findings from the systematic review of the literature indicate that empirical data are not available to identify perceived self-efficacy levels of nurses caring for patients requiring biocontainment and if there is a significant correlation to select characteristics. Before further inference can be made, it was paramount to investigate professional practice self-efficacy to select characteristics of this population of nurses in order to further determine significance to professional development activities.

Implications

Addressing the local problem has implications for social change. Current educational practices, viewed in light of the literature, pointed to the need to have a clear understanding of the nurses' perceived level of professional practice self-efficacy and whether there is a relationship to select characteristics of nurses who care for patients requiring biocontainment. Findings of the research informed the development of the education project. Directions for the project, based on the outcomes of the research, include the development of a training plan that informs the overall educational design to include learning experiences that promote professional self-efficacy and the transfer of knowledge and skills from the learning environment to the clinical practice setting. Results from this study may lead to the development of self-directed, life-long learners capable of being members of high-performing teams of health care providers that render

care to patients with highly infectious, potentially lethal diseases requiring biocontainment, thus protecting the community at large.

Data from this study may also inform future studies that help to identify educational best practices. Additional research may be necessary to validate findings from this study and better understand ways to promote professional practice self-efficacy, skill development, and competent performance for the nurse providing biocontainment care. Results from this study may indirectly improve effects on patient outcomes and safety for citizens if nursing care becomes more effective and efficient for this patient population.

Summary

Section 1 provided evidence of the problem, identification of key stakeholders, guiding research questions, a comprehensive review of the literature and discussion of the theoretical framework and its relevance to this study. The global threat of emerging high-risk, potentially fatal infectious diseases requiring biocontainment, such as Ebola Virus Disease, related treatment strategies unfamiliar to United States nurses, and limited opportunities to practice in the clinical setting has effected the local learning environment and the nurses' required skill competencies (Senior, 2014). As such, the need was established for effective education and training that provides nurses with the knowledge and skills necessary to protect themselves, other health care providers, and world citizens (Ragazzoni et al., 2015). Current literature and research studies were examined to gain a comprehensive perspective of the problem, identify a theoretical framework to guide the study, and add depth to better understanding of the history and scope of the problem.

Section 2 presents the design and approach for the study, rationale for chosen methodology, and the instruments to be utilized. Participant selection procedures, the procedures for the protection of human subjects, data collection and analysis, assumptions, limitations, scope, and delimitations are also discussed relative to the study. Subsequent sections will present analysis of data and findings with interpretation and an educational intervention with a plan for implementation and evaluation.

Section 2: Methodology

The competent performance of health care providers is paramount to the provision of care that results in quality outcomes for patients. Professional nurses must acquire and maintain demonstrated competency in the required high-risk skills to deliver safe, effective care for patients with EVD or other diseases requiring biocontainment (Cornock, 2011). Bandura (1994) explained that the level of self-efficacy may be related to competent performance by the individual. The purpose of the study was to determine if there was a statistically significant relationship between professional practice self-efficacy and select characteristics of nurses who care for patients requiring biocontainment.

In Section I discussed the research methods employed to answer the research questions. The research questions were intended to guide the investigation of the relationship between the variables. Topics discussed in Section 2 are the research design, sample selection, research setting, and the intended method for participant selection and recruitment. The method of data collection is also discussed along with instrumentation and the data analysis process.

Research Design and Approach

I used a quantitative nonexperimental exploratory method with a correlational design to determine whether a statistically significant relationship existed between the study variables (see Lodico, Spaulding, & Voegtle, 2010). Quantitative designs allow data to be collected in such a way that the data are able to be subjected to statistical analyses (Corty, 2014). Correlational researchers endeavor to quantify two or more

variables and examine relationships between the variables as indicated by patterns in the data (Lodico et al., 2010). For example, the correlations of the measures of the variables, if significantly different from zero, would indicate statistical relationships and amounts of shared or common variance between the measures. This type of relationship study is referred to as exploratory because any suggested relationships between variables would need additional study prior to the establishment of cause and effect relationships (Lodico et al., 2010).

The current study was intended to provide insight into the relationship between nurses' professional practice self-efficacy levels when providing care to biocontained patients and selected characteristics. A correlational research design was selected to answer the research questions and better understand the relationship between professional practice self-efficacy and selected characteristics of nursing education and certification. The seven selected characteristics examined included (a) nurse participation in simulation training, (b) frequency of participation in simulated drills, (c) number of times caring for a patient who requires biocontainment, (d) years of clinical experience, (e) education level, (f) life support certification, and (g) specialty nursing certification. The Nursing Care Self-Efficacy Scale was used to gather the quantitative data on self-efficacy.

Setting and Sample

The study setting was a medical center in the Northeast region of the United States that is equipped to receive and care for patients with highly infectious diseases requiring biocontainment. The population studied was professional registered nurses employed at the medical center who successfully completed the training for care of the

patient requiring biocontainment. Power is the probability of rejecting the null hypothesis when the null hypothesis should be rejected (Corty, 2014). A power analysis identifies the necessary sample size by accounting for desired level of statistical significance (α), power, and effect size (Creswell, 2012). A power of 95% is the power level traditionally used in the social sciences (Lodico et al., 2010). The sample size needed to achieve a power level of 95% ($\beta = 0.05$) for a two-tailed correlational analysis with $\alpha = 0.05$, was calculated with SAS accounting for a moderate effect size of 0.5 (AI-Therapy Statistics, n.d.). For the study results to reach a power level of 95%, at least 46 responses were needed for bivariate analysis and 53 for regression analysis accounting for seven predictor variables (Appendix C and Appendix D).

Because the population of eligible participants at the study site was small ($N = 92$), all eligible participants were invited to participate. Electronic mail response rate to a survey that does not use any follow-up is typically 25-30% (Fincham, 2008). A 25% response rate in this study's targeted population would have been 23 responses. Such a number of responses would have led to results that were not adequately powered for multiple regression analysis. For this reason, I implemented strategies presented in a recent Cochrane Review that explains how electronic response rates can be improved (Edwards et al., 2009). Per the sample size calculation, a minimum response rate of 57.6% (53 responses) was needed to achieve a power of 95% for the regression analysis, while bivariate correlation analysis required a response rate of 50% (46 responses).

The inclusion criterion for this study was professional nurses who are assigned to teams designated to care for patients requiring biocontainment. Exclusion criteria

included nurses who were not members of the biocontainment care teams and those who had not completed biocontainment training. The participants were informed that participation in the study was voluntary and that they could withdraw at any time without fear of reprisal.

Data Collection Method

All data for this study were collected from one sample of participants at one point in time using an online survey containing the Nursing Care Self-Efficacy Scale (NCSES, Welsh, 2014). Data were also collected regarding the nurses' professional development characteristics. Professional registered nurses at one medical center in the Northeast region of the United States who met the selection criteria were asked to complete the NCSES. Participation was anonymous and voluntary. The invitation to participate was sent via e-mail by research staff at the study site (Appendix H). Included in the email was the purpose of the study, a link to the survey, the instructions for completion and submission of the survey, and a target date for completion. Google Forms, an online survey platform, was used to administer the scale. The initial target date for return of the surveys was 2 weeks from the sent date. A follow-up e-mail was sent 1 week after the initial invitation to remind the nurses of the opportunity to participate in the research study (Appendix I). At the 2-week target date, an extension period was implemented consisting of an additional 2 weeks. An e-mail was sent at that time (Appendix J). A follow-up e-mail was sent at the beginning of the second week to remind the nurses of the opportunity to participate in the research study (Appendix I).

The invitation e-mail explained that completion and return of the survey indicated consent to participate in the study. Demographic data built into the tool were collected and included the following: years of experience as a nurse, highest nursing and nonnursing degree attained, number and frequency of participation in simulated drills for biocontainment, number of times in the past 2 years the nurse has participated in the care of a patient in the clinical setting requiring biocontainment, type of life support certification, and presence of specialty certification in nursing. No identifying information was collected to protect anonymity. Surveys were completed and submitted electronically. The submitted data were accessible to researcher staff at the study site. I received the data from the researcher staff and had no way of identifying who completed each survey.

Instrumentation

Data in reference to the study variable self-efficacy were collected using the Nursing Care Self-Efficacy Scale (NCSES). Welsh (2014) developed and validated the NCSES, which was published in 2014. Welsh granted permission in writing to use the scale for this study (Appendix B). The tool is used to measure nurses' self-efficacy beliefs about their professional skills and provides a basis for developing plans for professional nurse skill development. According to Welsh (2014), " identification of low-efficacy beliefs for specific professional skills can trigger an exploration of environmental or other factors that negatively impact self-efficacy and hinder professional performance" (p. 371). The NCSES can be used to evaluate outcomes of

educational programs, identify topics for professional growth, and provide a better understanding of factors that may impact professional practice (Welsh, 2014).

Participants completed a survey that included demographic data and the NCSES. The demographic section of the survey collected data about the participants' characteristics. Demographic data included number and frequency of participation in simulated drills for biocontainment, number of times in the past 2 years the nurse had participated in the care of a patient in the clinical setting requiring biocontainment, years of experience as a professional nurse, highest nursing and/or nonnursing degree, type of life support certification, and presence of specialty certification in nursing. The NCSES collects interval data. The survey does not include short answer or other methods to collect data. The 16-item linear scale is divided into two sections: the Complex Nursing Care Self-Efficacy subscale consisting of 11 items and the Fundamental Nursing Care Self-Efficacy subscale consisting of five items (Welsh, 2014). Respondents rank their perceived confidence in their ability to perform 16 nursing care activities on a scale of 0 (cannot do at all) to 10 (certain can do) (Welsh, 2014). A higher score on the individual item indicates greater self-efficacy for that skill. A total scale score is calculated by adding the scores of each item in the scale; higher total scores indicate greater self-efficacy for nursing performance (Welsh, 2014). The raw data collected for this study are included in Appendix G.

The NCSES was developed based on Bandura's guide for scale construction (Welsh, 2014). A pilot study to trial the scale was conducted with the same 10 participants at two different times points. The test-retest reliability, with an alpha co-

efficient of 0.93 the first time and 0.95 the second time, indicated strong internal reliability for the NCSES (Welsh, 2014). A larger study with a sample size of 150 participants yielded high reliability coefficients. Cronbach's coefficient alpha was 0.94 for the NCSES, 0.92 for the Complex Nursing Care Self-Efficacy subscale, and 0.87 for the Fundamental Nursing Care Self-Efficacy subscale (Welsh, 2014). The tool's validity is based on expert opinion from medical-surgical nursing faculty of nursing and the Academy of Medical-Surgical Nurses Standards of Nursing Practice published in 2000 (Welsh, 2014).

Assumptions, Limitations, Scope, and Delimitations

Every element of this study could not be controlled, predicted, or included in the design. Therefore, I made assumptions relative to this study. I assumed that the nurses would take the necessary time to thoroughly read and respond to each item, and that their responses would be truthful, independent, and void of influence from other nurses and hospital administrators. I also assumed that respondents would represent the demographic diversity of the entire team of nurses who provide care to patients with highly infectious diseases requiring biocontainment.

I assumed that all questions would be answered by all participants and that there would be a high rate of return for completed surveys. The assumption of a high response rate was a potential weakness of this study. A low response rate affects the study because it limits the representation of the population under study and further limits generalizability of the results. Because there was not a high rate of return for the completed survey by the initial deadline, I sent the survey out a second time to allow for

an increased response rate. Data collected were analyzed and found to meet the initial power level sample estimates. Further research is indicated to broaden the study population and potentially increase generalizability. The self-reporting nature of the data in the study was a possible limitation due to the potential for subjectivity on the part of the participants.

The research questions influenced my choice of methodology for this study. The use of a correlational design limits the generalizability of the results and eliminates the participants' randomization to experimental and control groups. The lack of treatment and control groups does not lend to more accurate measurement of the relationship between the independent and dependent variables. Eligible nurses from one acute care medical center participated in this study. Other groups of nurses who care for biocontained patients could have reported differently based on their experiences and environment. I did not assess the specifics of their education and training experiences particular to biocontainment care and effects on their nursing practice. Future research could be used to examine this relationship.

The scope of this study was narrowed to professional nurses who cared for patients with highly infectious, potentially lethal diseases that require biocontainment. The boundary of the study was the location. Specifically, nurses who met the participation criteria at one acute care medical center composed the participant population. Professional nurses who are not charged with the responsibility to care for this patient population were excluded to determine the relationships between the variables of the study. Observation and measurement of actual performance in caring for

biocontained patients were not feasible for this study due to the infrequency of actual patient occurrence in the clinical setting and the need to protect the rights of participants. I am employed at the investigational site, a U.S. acute care medical center.

Protection of Human Subjects

The protection of human participants is of paramount concern. Protection of human subjects was addressed in the study design to establish safeguards to protect the rights of the participants. I completed two formal training programs for the participation of human subjects in social science research: the National Institute of Health (NIH) Protecting Human Research Participants course and the Collaborative Institutional Training Initiative (CITI) Social & Behavior Research Course (Appendix E & Appendix F). Approval from the research institution's internal review board (IRB), as well as IRB approval from the participating institution was obtained prior to collecting data from any participant.

The researcher for this study is employed in a leadership position at the participating institution. Recruitment, informed consent, and data collection processes are designed so that the researcher and anyone else will not know who participated and who did not participate in the study. This is to protect the participant's confidentiality. There was no way to trace responses back to determine identity of the participants. To uphold the research principles of respect for persons and beneficence and neutralize authority dynamics, a fully anonymous survey was conducted. Participants did not know that I was the researcher. They were informed that a doctoral student was conducting the research. Informed consent was obtained from participants to protect them from harm and ensure

confidentiality (Lodico, Spaulding, & Voegtle, 2010). This study requested waiver of written informed consent as the participant's signature would be a personal identifier in the otherwise anonymous study.

Each potential subject received an invitation e-mail which addressed all elements of informed consent as a prerequisite for participation (Appendix H, Appendix I, and Appendix J). The email explained that completion and submission of the survey by the participant indicated consent for participation. Also explained in the e-mail was that participation is voluntary, anonymity will be protected, and the participants' performance evaluation and employment status would not be affected.

The use of Google Forms as a survey platform protected anonymity by not associating the participant identifiers with hospital accounts. Each entry was assigned a unique numerical identifier to allow for differentiation between entries in lieu of personal identifiers. The data that comprised analyses artifacts was stored in a password protected spread sheet and computer. Information will be kept for 5 years after the study is completed at which time it will be deleted from the electronic file.

Data Analysis

The interval variables evaluated in this study are the participant's total NCSES self-efficacy scale score, number of simulated drills, number of times in the past two years the nurse has participated in the care of a patient in the clinical setting requiring biocontainment, and years of experience as a professional nurse. Ordinal scale variables being evaluated in this study are the frequency (monthly, every six weeks, quarterly) of participation in simulated drills and the highest nursing or non nursing degree that the

participant has obtained. The nominal variables being evaluated in this study are type of life support certification, and presence of specialty certification in nursing. Analysis was performed on the data using computerized statistical software, SAS version 9.4.

Descriptive statistics were utilized to describe the sample population. The mean, median, and standard deviation value for interval variables are presented in table format, as well as the minimum, maximum, and range. Nominal and ordinal variables are reported in count and percentage and presented in table format. Normality of interval variables were evaluated using the Shapiro-Wilk test. Examination of variables were completed using correlational analysis. Inferential statistics between normally distributed interval variables using Pearson's correlate were performed, with a p value of < 0.05 indicating statistical significance between the variables. Inferential statistics between interval and ordinal variables, or between non-normally distributed interval variables, using Spearman's correlate were performed, with a p value of < 0.05 indicating statistical significant relationships between variables. A scatterplot was created to of visualize correlations. Examination of the relationship between interval and nominal variables consisting of two categories (i.e., binomial variables) was performed using the point biserial correlation. Examination of the difference in the rankings of the interval variable for nominal categories with more than two categories was performed using the Kruskal-Wallis Test. A scatterplot was utilized to plot the self-efficacy scores of nurses by nominal variables. A multiple regression analysis utilizing general linear regression was performed to evaluate the predictive relationships between the dependent (self-efficacy) and independent variables (professional development characteristics) (Corty, 2014). This

type of multiple regression is warranted as the primary outcome variable of interest, self-efficacy, is interval in nature as measured by the NCSES. Results are presented in the form of a regression equation and associated coefficients.

In conclusion, the data gathered from this study provide a clearer understanding of the nurses' perceived level of professional practice self-efficacy and whether or not there is a relationship to select characteristics of nurses who care for patients requiring biocontainment. Dissemination of the information from the study may inform future studies which identify educational best practices for promoting professional practice self-efficacy, skill development, and competent performance for professional nurses who provide care for patients requiring biocontainment.

Data Analysis Results

The purpose of data analysis is to present the results in tables or figures and interpret the results from statistical tests (Creswell, 2012). The first step in analyzing the quantitative data is to prepare the data for analysis. Preparing and organizing the data for analysis consists of scoring the data. The scores of the 16 questions that comprised the NCSES scale were added together to create a new column which contained the total NCSES score. The total NCSES score is an example of a summed score, in which the scores of an individual over several items are added to measure a variable that cannot be properly measured by a single item (Creswell, 2012).

Organizing the data for analysis also includes the creation of codes. This was accomplished by assigning numeric or alphanumeric values to ordinal and nominal data. For highest nursing degree, *1* was assigned for Associate Degree, *2* for Bachelor's

Degree, *3* for Master's Degree, and *4* for Doctoral Degree. For highest non-nursing degree, *0* was assigned to not applicable, *1* was assigned for Associate Degree, *2* for Bachelor's Degree, *3* for Master's Degree, and *4* for Doctoral Degree. A highest overall degree column was created and included the highest value for each participant from the highest nursing degree and highest non-nursing degree columns. The same number assignments were used for highest overall degree.

For frequency of drills, *1* was assigned to quarterly drills, *2* for drills that occurred every 6 weeks, and *3* for drills that occurred monthly. For presence of specialty certification, *n* was assigned to those who specified no specialty certifications and *y* to those who specified holding specialty certifications. For life support certification, *BLS* was assigned to those with only Basic Life Support (BLS) certification, *BLS-ACLS* to those holding both BLS and Advanced Cardiac Life Support (ACLS) certifications, *BLS-ACLS-PALS* to those holding BLS, ACLS, and Pediatric Advanced Life Support (PALS) certifications, *BLS-PALS* to those holding BLS and PALS certifications, and *PAL*S to those holding only PALS certification.

Statistical Analysis Software (SAS) 9.4 was selected as the program to analyze the data. SAS includes the types of statistics necessary to answer the research questions and hypothesis, such as correlational and regression analysis, normality tests, and difference between distribution means. This statistical program also has the ability to import data files from Microsoft Excel, and to create the graphs and tables necessary for the analysis. The data was entered by participants via an online survey platform called Google Forms. After the collected data was downloaded from Google Forms in Microsoft

Excel format, the data was organized in Microsoft Excel. It was uploaded into SAS for data analysis.

Consideration was given to the potential for errors in the data or missing data prior to the implementation of the study. The Google Forms survey was configured to require all participants to complete all fields, thus preventing missing values. The survey also restricted appropriate fields to certain selections (i.e., Associate Degree, Bachelor's Degree, Master's Degree, or Doctoral Degree). The survey restricted interval fields to appropriate values (i.e., the questions pertaining to NCSES scale were restricted to values from 0 to 10). This restriction eliminated the possibility of out of range values.

After preparing and organizing the data, each of the research questions and hypotheses were addressed. Descriptive statistics were utilized to indicate central tendencies in the data (i.e., mean and median), the spread of score referred to as standard deviation (*SD*), and range. Inferential statistics were used to assess the relationship among variables and differences between means to draw generalizations to the study population. In descriptive statistics, only one variable is analyzed at a time (Creswell, 2012). Inferential statistics analyze multiple variables at the same time (Creswell, 2012).

A total of 52 nurses participated in the survey. The results are presented in Appendix G. Although the original power size calculations for the regression analysis, showed that 53 participants would be needed for a 95% power level, a more nuanced SAS-generated table (See Table 1) that used the same parameters as that in Appendix D revealed that the sample of 52 has an actual power level of 95%.

Table 1

Sample Size Power for 95% Power Level General Linear Model Regression Analysis

Index	Nominal Power	Actual Alpha	Actual Power	*N Total*
1	.943	.05	.945	51
2	.944	.05	.945	51
3	.945	.05	.945	51
4	.946	.05	.950	52
5	.947	.05	.950	52
6	.948	.05	.950	52
7	.949	.05	.950	52

Research Question 1

RQ1: What are the descriptive statistics for the following characteristics of nurses who participate in biocontainment training to include: years of experience as a professional nurse, number of simulated drills for biocontainment in which nurse has participated, number of times in the past two years that the nurse participated in the care of an actual patient requiring biocontainment, the self-efficacy score as measured by the Nursing Care Self-Efficacy scale, highest nursing and/or non-nursing degree, level of life support certifications, frequency of participation in simulated drills for biocontainment, and presence of a specialty certification.

The mean years of nursing experience was 20.44 (*SD* = 11.33). The median years of nursing experience was 20. The minimum and maximum years of nursing experience were 2 and 40 (range of 38 years). The mean number of simulated drills that nurses participated in were 18.08 (*SD* = 48.32). The median number of simulated drills that each nurse participated in was 8. In this case, the median number of simulated drills is a more accurate representation of central tendency since some of the nurses who participated in the survey were participants in care of patients requiring biocontainment since the inception of the teams. The minimum and maximum number of simulated drills that nurses participated in were between 1 and 300 (range of 299 drills).

The mean number of times that the nurses participated in care of a patient requiring biocontainment was 1.12 (*SD* = 1.45). The median number of times that nurses cared for patients requiring biocontainment was 0 as most nurses did not have the opportunity to care for an actual patient in the clinical setting. The minimum and maximum number of times in the past two years that the nurses cared for a patient requiring biocontainment were between 0 and 5 (range of 5 times). The mean total NCSES score was 141.75 (*SD* = 22.31). The median total NCSES score was 148. The minimum and maximum total NCSES scores were 32 and 160 (range of 128). (See Table 2).

Table 2

Descriptive Statistics of Interval Variables

N=52	Mean	Median	*SD*	Min	Max	Range
Years of experience	20.44	20	11.33	2	40	38
Number of drills	18.08	8	48.32	1	300	299
Biocontainment patient care in past 2 years	1.12	0	1.45	0	5	5
Total NCSES Score	141.75	148	22.31	32	160	128

Thirty (57.69%) nurses had a Bachelor degree as their highest degree, 19 (36.54%) had a Master degree as their highest degree, and 3 (5.77%) had an Associate degree as their highest degree. Twenty-one participants (40.38%) had all three life support certifications (i.e., Basic Life Support [BLS], Advanced Cardiac Life Support [ACLS], and Pediatric Advanced Life Support [PALS]). Nine participants (17.31%) had both BLS and ACLS, 12 (23.08%) had both BLS and PALS. Eight participants (15.38%) had only BLS. Two participants (3.85%) had only PALS. Thirty-eight (73.08%) of the nurses had at least one specialty certification, while 14 (26.92%) had none. Forty-six (88.46%) nurse reported participating in simulated drills on a quarterly basis, while 1 (1.92%) nurse reported participating every 6 weeks, and 5 (9.62%) nurses reported participating monthly (See Table 3).

Table 3

Descriptive Statistics of Nominal and Ordinal Variables

Variable: Categories	Frequency	%
Highest Degree		
Associate	3	5.77%
Bachelor	30	57.69%
Master	19	36.54%
Frequency of Drills:		
Quarterly	46	88.46%
Every 6 Weeks	1	1.92%
Monthly	5	9.62%
Life Support Certification:		
BLS	8	15.38%
BLS & ACLS	9	17.31%
BLS & ACLS & PALS	21	40.38%
BLS & PALS	12	23.08%
PALS	2	3.85%
Specialty Certification		
No	14	26.92%
Yes	38	73.08%

Because research question 1 involved only descriptive statistics, no hypotheses were tested.

Normality Testing

A test of normality resulted in a significant Shapiro-Wilk statistic ($p < .05$) for all interval variables (See Table 4). Thus, the numeric data did not follow a normal distribution. As a result, the nonparametric Spearman correlation was performed between self-efficacy scores and the interval variables. The Spearman correlation was also performed between self-efficacy scores and the ordinal variables.

Table 4

Normality Tests of Interval Variables

	Years of Nursing Experience	Number of Drills that the Nurses Have Participated in	Biocontainment Patient Care in Past 2 Years	Total NCSES Score
Shapiro-Wilk (*W*)	0.93	0.23	0.77	0.71
P Value	.0046	< .0001	< .0001	< .0001

Research Question 2

RQ2: What is the relationship between the reported level of nurses' professional practice self-efficacy and the number of simulated drills completed?

HO2: There is no statistically significant relationship between the reported level of nurses' professional practice self-efficacy and the number of simulated drills completed.

HA2: There is a statistically significant relationship between the reported level of nurses' professional practice self-efficacy and the number of drills completed.

Results. The Spearman correlation coefficient (r_s) was 0.31 between total NCSES scores and number of drills. This is a positive, significant ($p < .05$) relationship of moderate effect size. See Table 5.

Table 5

Correlation Between Total NCSES Score & Number of Drills

Correlation Variables (*N*= 52)	Total NCSES Score & Number of Drills
Spearman Correlation Coefficient	0.31
P Value	.0237

A scatterplot has an *x* and *y* axis. Each axis represents a variable (Lodico, Spaulding, & Voegtle, 2010). Each study participant is represented by a point in the plot. The scatterplot below (see Figure 1) shows a visual representation of the positive, significant relationship between total NCSES score and number of drills.

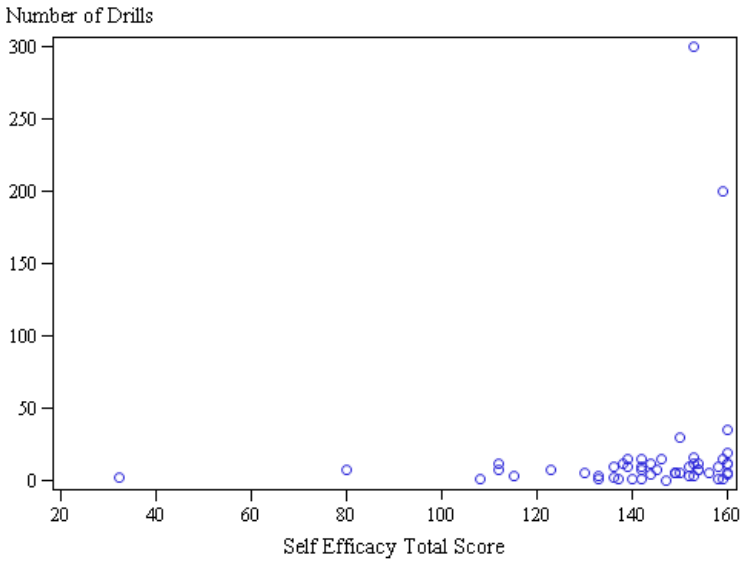

Figure 1. Scatterplot showing relationship between total NCSES score and number of biocontainment drills.

Hypothesis determination. The significant results supported rejecting the null hypothesis for research question 2, thus providing support for the alternate hypothesis.

Research Question 3

RQ3: What is the relationship between the reported level of nurses' professional practice self-efficacy and the frequency of simulated drills completed?

HO3: There is no statistically significant relationship between the reported level of nurses' professional practice self-efficacy and the frequency of simulated drills completed.

HA3: There is a statistically significant relationship between the reported level of nurses' professional practice self-efficacy and the frequency of drills completed.

Results. The Spearman correlation between total NCSES scores and frequency of biocontainment simulation drills showed a positive, nonsignificant relationship of small effect size, $r_s = 0.10$, $p > .05$. See Table 6.

Table 6

Correlation Between Total NCSES Score & Frequency of Drills

Correlation Variables (*N*= 52)	Total NCSES Score & Frequency of Drills
Spearman Correlation Coefficient	0.10
P Value	.4738

The scatterplot below (see Figure 2) shows a visual representation of the positive, nonsignificant relationship between total NCSES score and frequency of drills.

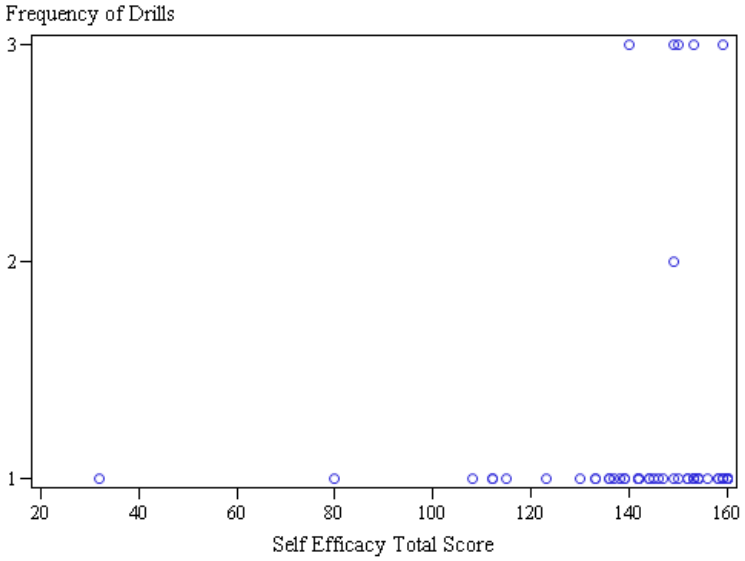

Figure 2. Scatterplot showing relationship between total NCSES score and frequency of biocontainment drills. *Note.* For frequency of drills: 1= Quarterly, 2= Every 6 Weeks, 3 = Monthly

Hypothesis determination. The results fail to reject the null hypothesis for research question 3. Thus, the alternate hypothesis is not supported.

Research Question 4

RQ4: What is the relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and years of professional practice?

HO4: There is no statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and years of professional practice.

HA4: There is a statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and years of professional practice.

Results. The Spearman correlation between total NCSES scores and years of nursing experience showed a positive, nonsignificant relationship of low to moderate effect size, $r_s = 0.22$, $p > .05$. See Table 7.

Table 7

Correlation Between Total NCSES Score & Years of Nursing Experience

Correlation Variables (N= 52)	Total NCSES Score & Years of Nursing Experience
Spearman Correlation Coefficient	0.22
P Value	.1209

The scatterplot below (see Figure 3) shows a visual representation of the positive, nonsignificant relationship between total NCSES score and years of nursing experience.

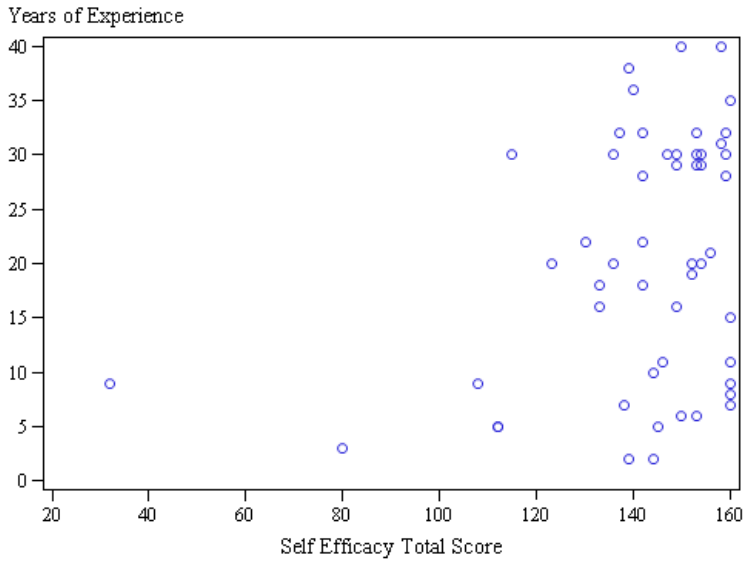

Figure 3. Scatterplot showing relationship between total NCSES score and years of nursing experience.

Hypothesis determination. The results fail to reject the null hypothesis for research question 4. Thus, the alternate hypothesis is not supported.

Research Question 5

RQ5: What is the relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the highest nursing and/or non-nursing degree obtained?

HO5: There is no statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the highest nursing and/or non-nursing degree obtained.

HA5: There is a statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the highest nursing and/or non-nursing degree obtained.

Results. The correlation between total NCSES scores and highest overall degree showed a positive, significant relationship of moderate effect size, r_s =0.31, $p < .05$. See Table 8.

Table 8

Correlation between Total NCSES Score & Highest Overall Degree

Correlation Variables (*N*= 52)	Total NCSES Score & Highest Overall Degree
Spearman Correlation Coefficient	0.31
P Value	.0258

The scatterplot below (see Figure 4) shows a visual representation of the positive, significant relationship between total NCSES score and highest overall degree.

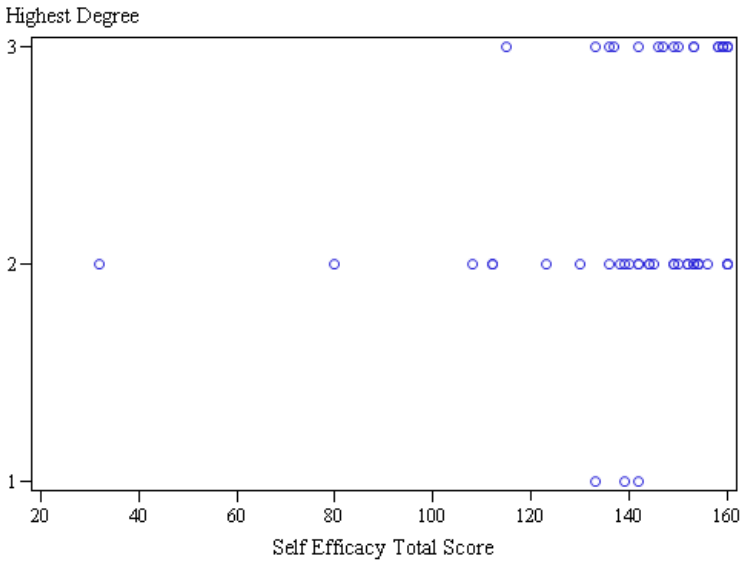

Figure 4. Scatterplot showing relationship between total NCSES Score and highest degree overall. *Note.* For Highest Degree, 1 = Associate, 2 = Bachelor, 3 = Master.

Hypothesis determination. The results reject the null hypothesis for research question 5 thus providing support for the alternate hypothesis.

Research Question 6

RQ6: Are there significant differences between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and type of life support certification.

HO6: There are no statistically significant differences between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and type of life support certification.

HA6: There are statistically significant differences between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and type of life support certification.

Results. There were no significant differences between the total NCSES score and types of life support certifications as evidenced by a Kruskal-Wallis test *p* values of > .05. The variables are right for the Kruskal-Wallis test because this test is used when comparing differences between a nominal variable with an interval variable that does not meet the normality assumption (McDonald, 2014). In this case, the interval variable that did not meet the normality assumption is the total NCSES score. The nominal variable is the various groups of life support certification combinations (i.e., BLS or PALS). See Table 9 for descriptive statistics of total NCSES score by type of life support certifications, and Table 10 for the Kruskal-Wallis test.

Table 9

Descriptive Statistics of Total NCSES Score by Life Support Certification

Life Support Certification(s)	BLS	BLS & ACLS	BLS & ACLS & PALS	BLS & PALS	PALS
Mean	147.63	148.89	139.62	137.17	136
Standard Deviation	15.58	8.37	27.9	24.02	8.49
Minimum	115	136	32	80	130
Median	152.5	149	149	144.5	136
Maximum	160	160	160	160	142

Table 10

Difference Testing between Total NCSES Score and Life Support Certification

Kruskal-Wallis Test	
χ^2	3.15
DF	4
P Value	.5325

The scatterplot below (see Figure 5) shows a visual representation of the differences between total NCSES score by life support certification type.

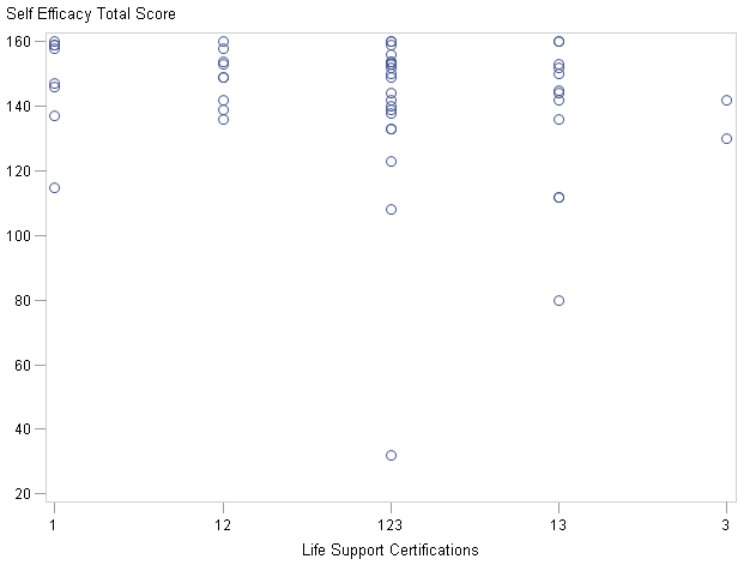

Figure 5. Scatterplot showing total NCSES score by life support certification. *Note:* 1=BLS, 2=BLS-ACLS, 3=BLS-ACLS-PALS, 4=BLS-PALS, 5=PALS.

Hypothesis determination. The results fail to reject the null hypothesis for research question 6. Thus, the alternate hypothesis is not supported.

Research Question 7

RQ7: What is the relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and presence of specialty certification.

HO7: There is no statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and presence of specialty certification.

HA7: There is a statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and presence of specialty certification.

Results. There was no significant relationship between total NCSES score and presence of specialty certification as evidenced by a point biserial correlation (r_{pb}) of 0.06965, $p > .05$. See Table 11.

Table 11

Correlation Between Total NCSES Score & Presence of Specialty Certification

Correlation Variables (N= 52)	Total NCSES Score & Presence of Specialty Certification
Point Biserial Correlation Coefficient	0.06965
P Value	.6237

The scatterplot below (see Figure 6) shows a visual representation of the positive nonsignificant relationship between total NCSES score and presence of specialty certification. The points in the scatterplot appear distributed along two lines. The line to the right of the scatter plot represents participants who had a specialty certification. The line to the left represents participants who did not have a specialty certification.

Figure 6. Scatterplot showing relationship between total NCSES score and the presence of specialty certification. *Note:* n = no and y = yes.

Hypothesis determination. The results fail to reject the null hypothesis for research question 7. Thus, the alternate hypothesis is not supported.

Research Question 8

RQ8: What is the relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the number of times caring for a patient in the clinical setting in the past two years?

HO8: There is no statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the number of times caring for a patient in the clinical setting in the past two years.

HA8: There is a statistically significant relationship between the reported level of professional practice self-efficacy for nurses required to provide biocontainment care and the number of times caring for a patient in the clinical setting in the past two years.

Results. The Spearman correlation between total NCSES score and the number of times caring for a patient in the clinical setting in the past two years showed a positive, nonsignificant relationship of low to moderate effect size, $r_s = 0.19$, $p > .05$. See Table 12.

Table 12

Correlation Between Total NCSES Score & Recent Biocontainment Patient Care Experiences

Correlation Variables (N= 52)	Total NCSES Score & Biocontainment Patient Care Experiences in the Past 2 Years
Spearman Correlation Coefficient	0.19
P Value	.1808

The scatterplot below (see Figure 7) shows a visual representation of the positive, nonsignificant relationship between total NCSES score and number of times caring for a patient in the clinical setting in the past two years.

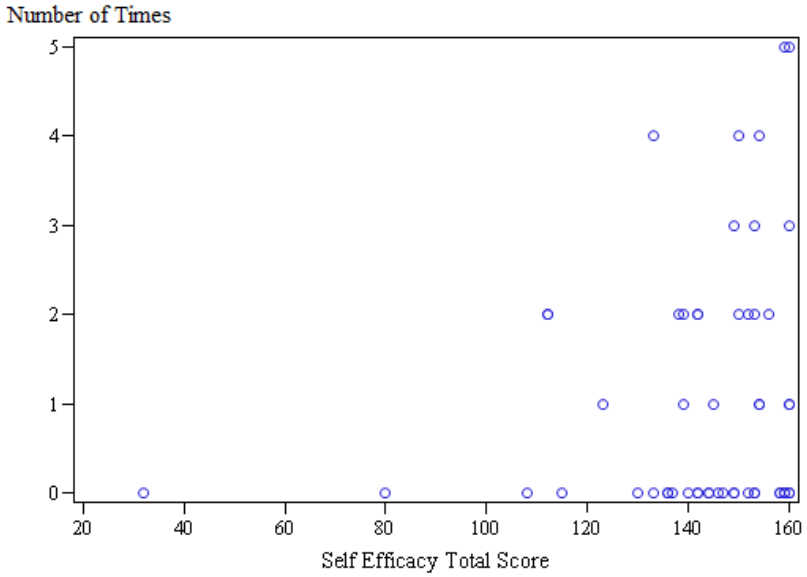

Figure 7. Scatterplot showing relationship between total NCSES score and number of biocontainment patients cared for in the past 2 years.

Hypothesis determination. The results fail to reject the null hypothesis for the research question 8. Thus, the alternate hypothesis is not supported.

Research Question 9

RQ9: Do the nursing professional development independent variables of years of experience as a professional nurse; number of simulated drills for biocontainment in which nurse has participated; number of times in the past two years that the nurse participated in the care of an actual patient requiring biocontainment; highest nursing and/or non-nursing degree; level of life support certifications; frequency of participation in simulated drills for biocontainment; and presence of a specialty certification predict the dependent variable of self-efficacy in biocontainment nursing?

HO9: The nursing professional development independent variables of years of experience as a professional nurse; number of simulated drills for biocontainment in

which nurse has participated; number of times in the past two years that the nurse participated in the care of an actual patient requiring biocontainment; highest nursing and/or non-nursing degree; level of life support certifications; frequency of participation in simulated drills for biocontainment; and presence of a specialty certification do not predict the dependent variable of self-efficacy in biocontainment nursing.

HA9: The nursing professional independent development variables of years of experience as a professional nurse; number of simulated drills for biocontainment in which nurse has participated; number of times in the past two years that the nurse participated in the care of an actual patient requiring biocontainment; highest nursing and/or non-nursing degree; level of life support certifications; frequency of participation in simulated drills for biocontainment; and presence of a specialty certification predict the dependent variable of self-efficacy in biocontainment nursing.

Multiple regression analysis was performed using a general linear regression model equation produced from the collected information. The predictor variables were entered simultaneously into the regression equation model. The resulting equation (see Figure 8) can be used to predict the total NCSES score for a given individual. To predict the total NCSES score for a given individual, quantitative variables (coefficients) are replaced with the respective numerical values of the variables (i.e., age, years of experience; Creswell, 2012). For example *years of nursing experience* would be replaced with the number *5* if the individual for which the total NCSES score is being predicted with the equation has 5 years of nursing experience. For categorical (i.e., type of life support certification and presence of specialty certification) and ordinal variables (i.e.,

highest overall degree), reference and dummy variables were utilized (Chatterjee & Hadi, 2012). The reference variables that were used were: *monthly drills*, *presence of specialty certification*, *PALS certification*, and *highest degree is masters*. The reference variables do not need to be included in the equation because the constant by which the reference variables are multiplied is always *0*. All other categorical and ordinal variables are replaced with the dummy variable *1* if it is true, or with the dummy variable *0* it is false, for the individual for which the total NCSES score is being predicted with the multiple regression equation.

Total NCSES Score = 116.13 + (0.68*Years of Nursing Experience) + (0.022*Number of Biocontainment Drills) + (2.56 *Number of Biocontainment Patients in the Last Two Years) – (23.94*Highest Degree is Associate) – (8.76*Highest Degree is Bachelor) + (0*Highest Degree is Masters) + (0.70*BLS) + (8.02* BLS & ALS) + (9.03*BLS, ALS, and PALS) + (6.01* BLS & PALS) + (0* PALS) + (6.02*No Specialty Certification) + (0*Yes Specialty certification)+ (7.56*Quarterly Drills) + (6.20* Drills every 6 weeks) + (0*Monthly drills)

Figure 8. Multiple regression equation utilizing a general linear regression model.

Results. Unlike the correlations used to test research questions 2, 3, 4, 5, 7, and 8, which only look at two variables at a time, the coefficients of the regression equation (β) show the relationship of each variable to total NCSES score while taking all other variables into account. Much of the same information that was determined by the earlier relationship tests can be affirmed by the regression equation. For example, the results of research question 5 determined that a higher academic degree is positively associated with a higher total NCSES score. Likewise, the regression equation shows that $\beta_{highest}$

$\beta_{highest\ degree\ is\ associate}$ (-23.94) and $\beta_{highest\ degree\ is\ bachelor}$ (-8.79) are lower relative to $\beta_{highest\ degree\ is\ masters}$ (the reference variable).

There is also a positive relationship between *years of nursing experience* (β=0.68), *number of biocontainment drills* (β=0.022), *number of biocontainment patient in the past two years* (β=2.56). Nurses who have all three life support certifications (BLS, ACLS, & PALS) have a higher total NCESE score than those with any other combination (BLS, PALS, BLS and PALS, or BLS and ACLS). Less frequent drills and no specialty certification were positively associated with a higher total NCSES score.

Despite these relationships, only years of experience in nursing had a *p* value < .05 (See Table 13). Therefore, years of experience in nursing is the only variable that has predictive value for forecasting total NCSES scores when looking at all of the variable simultaneously.

Hypothesis determination. Since one of the nursing professional development independent variables (years of experience in nursing) predict the dependent variable of self-efficacy in biocontainment nursing, the results reject the null hypothesis for research question 9. This determination provides support for the alternative hypothesis.

Table 13

Table for General Linear Model Regression Analysis

Parameter	*DF*	Estimate	Standard Error	Wald 95% Confidence Limits		Wald χ^2	*P* Value
Intercept	1	116.13	25.49	66.17	166.08	20.76	< .0001
Years of Experience	1	0.68	0.34	0.02	1.34	4.03	.04
Number of Drills	1	0.022	0.08	-0.14	0.18	0.07	.79
Number of Biocontainment Patients in the Past 2 years	1	2.56	2.38	-2.10	7.22	1.16	.28
Highest Degree							
Associate	1	-23.94	15.28	-53.90	6.01	2.45	.12
Bachelor	1	-8.76	8.24	-24.90	7.39	1.13	.29
Master	0	0.00	0.00	0.00	0.00	.	.
Life Support Certification							
BLS	1	0.70	19.07	-36.67	38.08	0.00	.97
BLS & ACLS	1	8.02	18.09	-27.43	43.48	0.20	.66
BLS, ACLS, & PALS	1	9.03	16.55	-23.40	41.46	0.30	.59
BLS & PALS	1	6.01	16.34	-26.01	38.02	0.14	.71
PALS	0	0.00	0.00	0.00	0.00	.	.

Table 13 Continued

Parameter	*DF*	Estimate	Standard Error	Wald 95% Confidence Limits		Wald χ^2	*P* Value
Specialty Certification							
No	1	6.02	7.89	-9.44	21.48	0.58	.45
Yes	0	0.00	0.00	0.00	0.00	.	.
Frequency of Drills							
Quarterly	1	7.56	13.37	-18.64	33.76	0.32	.57
Every 6 Months	1	6.20	26.06	-44.88	57.28	0.06	.81
Monthly	0	0.00	0.00	0.00	0.00	.	.
Scale	1	20.06	1.97	16.55	24.31		

The intercorrelations between number of biocontainment drills, higher level of formal education, and number of years of nursing experience were examined. (See Table 14). Highest overall degree was significantly correlated with years of nursing experience. There was no significant correlation between number of biocontainment drills and years of nursing experience. There was no significant correlation between number of biocontainment drills and highest overall degree.

Table 14

Intercorrelations Between Variables Correlated With or Predictive of NCSES

Correlation Variables	Spearman Correlation Coefficient (*p* Value)
Highest Overall Degree & Years of Nursing Experience	0.275 (*p* = .048)
Number of Biocontainment Drills & Years of Nursing Experience	-0.009 (*p* = .948)
Number of Biocontainment Drills & Highest Overall Degree	-0.103 (*p* = .468)

Summary

The research design for this study was quantitative. All the data were collected from participants who voluntarily completed an online survey. The sample population included nurses who were members of the biocontainment team in a U.S. Acute Medical Center. The relationship between nurses' professional practice self-efficacy and selected characteristics was evaluated. The selected characteristics were: number of simulated drills, frequency of drills, highest overall degree, years of nursing experience, presence of specialty certification, type of life support certification, and number of biocontainment patient the nurse has cared for in the past two years.

Descriptive statistics were presented for each of the variables. Inferential statistics were computed to examine the relationship between total NCSES score and each of the professional practice characteristics beings studied. The relationship between total

NCSES score (an interval variable) and other interval variables (i.e., years of nursing experience, number of biocontainment drills that the nurse has participated in, and number of patients requiring biocontainment that the nurse has cared for in the past two years) were examined using the nonparametric Spearman Correlation because the data were not normally distributed. Likewise, Spearman Correlation was utilized to examine the relationship between total NCSES scores (an interval variable) and ordinal variables (i.e. highest overall degree and frequency of biocontainment drills). The relationship between the interval variable of total NCSES scores and the binominal variable for presence of specialty certification was tested with point biserial correlation. The difference between the interval variable of total NCSES scores and the nominal variable of types of life support certifications were tested with the Kruskal-Wallis test. A multiple regression analysis utilizing a general linear regression model was performed to examine those variables that serve as good predictors of total NCSES score.

In conclusion, the number of biocontainment drills and highest overall degree were significantly correlated with a higher total NCSES score. Years of nursing experience was the only significant predictor of a higher total NCSES score. The results of the data analysis suggest that a higher level of formal education and more biocontainment drills may positively affect professional practice self-efficacy for nurses caring for the patient requiring biocontainment. The results also suggest that a higher number of years of nursing experience is a predictor of higher levels of professional practice self-efficacy as measured by total NCSES score. Based on the results of my

study, I have designed a professional development program and prerequisites for nurses who care for patients requiring biocontainment.

Section 3: The Project

More than ever, nurse educators are challenged with opportunities brought about by globalization and technology that affect adult learning (Merriam et al., 2007). The global threat of highly infectious, potentially lethal diseases unfamiliar to nurses impacts the learning environment and the need for nurses to achieve a high level of professional practice self-efficacy and competency in the high-risk skill set necessary to provide safe, competent, quality care for patients requiring biocontainment (Senior, 2014). Because few patients present to the clinical setting with potential or confirmed infectious diseases requiring biocontainment, the high-risk skill set is considered low in frequency. There are minimal opportunities to practice the high-risk skill set in the clinical setting, which presents a significant challenge to nurse educators and the professional nurse.

The project deliverable from my study was a professional development curriculum and related materials for nurses who care for patients requiring biocontainment. The project plan (Appendix A) was developed in response to the findings of my study. The literature indicated that there is a relationship between self-efficacy and the attainment of clinical knowledge and skills (Bambini et al., 2009; Kuiper et al., 2010; Wagner et al., 2009). Bandura's (1986) concept of self-efficacy and Kolb's (1984) concept of experiential learning are reflected in the program design, learning modalities, and assessment methods. The 5-day education program is designed to enhance the cognitive knowledge, psychomotor skills, and self-efficacy of the professional nurse who cares for patients requiring biocontainment.

Kolb's (1984) experiential learning model served as the framework for the design of the project, affording learners the opportunity to enter into the learning experience, practice high-risk skills in a simulated laboratory setting, and transfer new knowledge and skills to the clinical practice setting, thereby promoting professional practice self-efficacy. An experiential approach that promotes professional practice self-efficacy is especially suited to the education of nurses who care for patients requiring biocontainment. Cognitive knowledge, clinical decision-making, and the performance of exact procedures and skills by the nurse are necessary for the provision of safe care to this high-risk patient population to minimize risk of disease transmission to self, other patients, health care providers, and the public.

Section 3 includes the rationale for the project and provides a thorough review of the literature relative to the theoretical framework for the project. The project description, evaluation plan, and implications are also presented.

Rationale

Cornock (2011) explained that it is necessary for nurses to obtain and sustain competency in the required skill set to deliver safe and effective care to patients. According to Cranford (2015), nurses who use skills infrequently may experience stress and role ambiguity, which may result in a lack of competent performance. Kolb (1984) argued that learners must enter into the experience, reflect, think, and act to gain knowledge and change behaviors. Bandura (1986, 1997) posited that high self-efficacy beliefs lead to improved performance in skills and activities. The literature indicated that some researchers identified the potential benefits of self-efficacy building interventions

within the design of the learning experience (Robb, 2012, Sitzman & Ely, 2011). Although empirical data are not available to understand the professional practice self-efficacy levels of nurses caring for patients requiring biocontainment, nursing research has indicated a link between self-efficacy and clinical skill attainment (Bambini et al., 2009; Kuiper et al., 2010; Wagner et al., 2009).

What was not known in the local learning environment was whether there was a significant correlation between the nurses reported levels of self-efficacy when caring for patients requiring biocontainment and select professional characteristics. Before further inference could be established, it was of the utmost importance to study whether there was a relationship of professional practice self-efficacy to selected characteristics in consideration of the significance to nursing education and professional development for nurses that care for patients requiring biocontainment. Guided by Bandura's social cognitive theory, I conducted a quantitative correlational study to examine the relationships between nurses' professional characteristics and their perceived professional practice self-efficacy when providing care to patients requiring biocontainment. Results indicated that the number of biocontainment drills and highest overall degree were significantly correlated with a higher total NCSES score. Years of experience was a significant predictor of a higher total NCSES score.

Findings from the study allowed for the development of prerequisite criteria for biocontainment training. Methodologies and learning experiences within the education curriculum are aimed at promoting experiential learning, professional practice self-efficacy, and clinical competency. Given the results of this study, the high risk for

contracting the disease if skills are not performed according to exact safety procedures, and the low frequency of opportunities to practice in the clinical setting on patients requiring biocontainment, simulation training is the preferred method to be incorporated into the educational design. In concert with Kolb's experiential learning theory, simulation as a method provides effective opportunities to allow for experience in performing skills and problem-solving activities necessary for infection control and the management of patients with potentially lethal infectious diseases (Ragazzoni et al., 2015).

The program goals are as follows:

1. to offer a comprehensive, learner-centered experience that provides the professional nurse with the cognitive information and psychomotor skills necessary to provide safe and competent care to the patient requiring biocontainment;
2. to offer learning experiences aimed at enhancing professional practice self-efficacy in the delivery of care to patients requiring biocontainment; and
3. to provide clinical experiences in a simulated setting that promote competent performance of the high-risk skill set required to safely care for patients requiring biocontainment.

Learning modalities aimed at promoting experiential learning and professional practice self-efficacy include PowerPoint presentations, case studies, skills laboratories with practice and validation, simulated practice scenarios with instructor feedback and participant reflection, and simulated drills. Formative and summative assessments include

a pretest and posttest, validation of psychomotor skills using a performance checklist, evaluation of performance in simulated laboratory sessions and drills using case studies and a performance checklist, a critical thinking exercise, and course evaluation summaries. Participants who successfully complete the program will receive contact hours that may be used toward requirements for specialty certification in nursing.

Review of the Literature

I conducted a comprehensive review of the literature by accessing electronic databases. I also employed a Google Scholar search using search terms and phases with and without the Boolean operator *and*. Search terms and phrases used to define and narrow the scope of the literature review included *adult learning theory*, *adult education*, *nursing education*, *experiential learning model*, *David Kolb*, *David Kolb's experiential learning model*, *experiential learning*, *curriculum development*, *teaching methods*, *educational methods*, *simulation*, *simulation training*, *reflection*, *discussion*, *case studies with feedback*, *formative evaluation*, and *summative evaluation*. A parallel query was performed using Academic Search Complete, Cumulative Index to Nursing and Allied Health Literature (CINAHL) Plus with Full Text, Education Resource Information Center (ERIC), MEDLINE with Full Text, EBSCO, and ProQuest.

The following review of the literature was based on evidence from selected professional journal articles, documents, and textbooks. Saturation of the literature was demonstrated by reviewing primary source articles and studies from the fields of education, nursing, and other health care specialties. Articles reviewed were limited to

the English language from peer-reviewed journals published from 2012 through 2016. Older studies and seminal references were used if pertinent to the project.

Theoretical Framework

Nurses who care for patients requiring biocontainment are expected to demonstrate the knowledge and high-risk skills necessary to safely and accurately deliver care in the clinical practice setting. Baack and Alfred (2013) found that nurses were more likely to respond to a disaster event if they were more confident in their abilities. Similarly, Chilton, McNeil, and Alfred (2016) argued that providing training in advance of a disaster improved nurses' self-efficacy and willingness to respond to an infectious disease event.

Experiential education informs a variety of methodologies in which educators and learners participate in experiences supported by reflection, critical analysis, and synthesis, which ultimately results in the increase of knowledge and skills for the adult learner (Association for Experiential Education, 2014). Although conventional classroom methods place the responsibility for learning primarily on the teacher, experiential learning places the adult at the center of the learning experience.

Nursing education requires a framework for understanding the content to be learned and the processes and skills to provide safe, competent care. To develop self-efficacy and the necessary skill set, the nurse caring for the highly infectious patient requiring biocontainment needs to be provided with experiential learning opportunities within the educational design. Because the experiential learning process allows for practice and transfer of knowledge and skills to the clinical setting, it serves as the

essential connection between the classroom and clinical settings (Kolb, Kolb, Passarelli, & Sharma, 2014). Experiential learning is especially effective in biocontainment training as the direct application of skills in the clinical setting without prior experience may negatively impact life-threatening situations and the spread of disease.

Kolb's (1984) experiential learning theory informed this project. The project consists of a 5-day education program designed to build the knowledge, skills, and professional practice self-efficacy of nurses who care for patients who require biocontainment. Kolb (1984) defined experiential learning as the process whereby knowledge is created through the transformation of experiences. The knowledge and skills obtained by the learner are most effective when they provide meaning to the student (Svinivki & McKeachie, 2011). Dewey's philosophical pragmatism, Lewin's social psychology, and Piaget's cognitive developmental genetic epistemology collectively formed Kolb's unique perspective on learning and development (Merriam et al., 2007).

Kolb's (1984) theory differs from other learning theories such as Knowles's (1970) andragogy because experiential learning theory places a major emphasis on experience within the learning process as crucial to changing behaviors (Svinivki & McKeachie, 2011). Relative to this project, Kolb's theory supported nurses' active participation in all phases of the learning process and methods, such as simulated experiences based on actual clinical scenarios for patients requiring biocontainment. Experiential learning theory includes four essential components: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Concrete experience is the engagement of the learner in activities and observable behaviors (Kolb,

1984). Reflective observation includes self-evaluation and links the expected outcomes to the actual outcomes, thereby building knowledge (Kolb, 1984). Of particular importance during the reflective observation component are any differences between what is understood and experienced. Grierson, Barry, Kapralos, Carnahan, and Dubrowski (2012) found that video-based observational practice extends simulation-based learning outside of the immediate training space. Learners benefits from didactic information that directs their attention to the essential cues or critical elements for success (Grierson et al., 2012).

Reflection is assimilated into abstract concepts involving knowledge, logic, and the opportunity to build ideas and concepts (Kolb, 1984). The active experimentation component occurs with the application of knowledge to a situation to plan for interventions (Kolb, 1984). During the active experimentation phase, the learner applies the new idea or modified concept to the situation, and implications are tested and applied to new experiences (Kolb, 1984). The experiential learning process offers hands-on experiences for the adult learner and promotes engagement with the content, as well as reflection and application. According to constructivist theory, effective learning occurs by doing, applying the new knowledge or skill, and problem solving (Dennick, 2012). According to Hattie & Yates (2013), this type of student-centered experience aims to make learning visible and meaningful to the learner.

Kolb's (1984) theory is also dependent on the learner's awareness of each of the elements (. Kolb viewed learning as an integrated process with each component supporting the next. Kolb argued that it is possible to enter the cycle at any stage. Kolb and Fry (1975) emphasized that effective learning includes learner style and abilities

within each of the four components of the experiential learning process. Congruent with Kolb's theory, James, D'Armore, and Thomas (2011) described learning style as the characteristic method of gaining knowledge, skill, or attitudes through study or experiences that cause the adult learner to interact with the environment. Learner awareness of the components and application of knowledge is dependent on metacognition, or the conscious awareness of learning and how one learns (Chmil, Turk, Adamson, & Larew, 2015).

Kolb (1976) identified four basic learning styles: diverger (concrete, reflective), assimilator (abstract, reflective), converger (abstract, active), and accommodator (concrete, active). Kolb (1984) argued that learning from experience requires four different abilities: willingness to enter into the new experience (concrete experience), observational and reflection skills necessary to view the new experience from various perspectives (reflective observation), analytical abilities required to create new ideas about the experience (abstract conceptualizations), and decision-making and problem solving skills to transfer the new ideas to actual practice (Merriam et al., 2007). A review of the literature indicated that Kolb's learning style model had been applied to nursing students more than any other model (Aina-Popoola & Hendricks, 2014). In agreement with Kolb's model, Manolis, Burn, Assudai, and Chinta (2012) explained that to be active learners, nursing students need to develop one or more learning styles to blend with professional nursing action, experience, and cognition. Caulley, Wadey, and Freeman (2012) studied the learning styles of first year orthopedic surgical residents. Their findings validated Kolb's learning style theory in that the way individuals acquire

knowledge, skills, or experiences is their learning style. Learning styles and learning methods influence student approaches to learning (Caulley et al., 2012). Alkhasawneh (2013) further expounded that the methods by which students learn affect the way they react to a program of study and their understanding of the program objectives. Therefore, it was important to acknowledge different learning styles and methods in the education of nurses.

Using experiential learning theory as a framework, Roessger (2014) examined learning styles of adult learners and the use of reflection by participants. Results of the study indicated that reflection for some may lead to anxiety and may act as a barrier to knowledge and skills acquisition. Roessger concluded that the adult learner must experience the reflective process in an environment that is perceived as safe to minimize anxiety and the resulting barrier to the acquisition of new behaviors.

Kolb (1976, 1984) recognized the relationship between the characteristics of a discipline and the learning styles of its members and thus recommended that professional learning should develop all types of learning skills. Felder and Brent (2005) also recognized this relationship and agreed that educational programs need to develop a variety of learning skills for adults. This approach is consistent with Marek's (2013) belief that students may be more engaged when their learning style is addressed in learning experiences.

Experiential learning is dependent on the inclusion of all elements of learning (Kolb, 1984). Experiential education promotes the development of competent behaviors through formative and summative feedback, repeated performance, and reflective

observation (Kolb, 2015). Methods within the educational design need to coincide with the particular element or component in order to support learner engagement in the activity. According to Mobbs (2015), concrete experiences usually occur in the classroom environment and include methods such as PowerPoint presentations, e-learning modules, observations, case studies and problem sets, and written assignments.

Methods that support reflective observation include discussion, rhetorical questions, and keeping journals and logs (Mobbs, 2015). Chan (2012) studied the learning process for engineering students who participated in community service activities and found that the didactic classroom methods and the practical experience in the community setting together supported the learning process for the students. According to Chan (2012), the students were able to reflect on knowledge gained in the classroom and apply the new knowledge to the experience in the community setting. This qualitative study further supports Kolb's learning theory regarding the importance of reflection in attaining knowledge and skill acquisition (Chan, 2012).

Consistent with Kolb's theory (1984), Mobb (2015) believed that abstract conceptualizations allow the learner to better understand the experience and resulting relationships, thus creating integrative ideas and concepts. During this component of the learning process, adults use observations, models, knowledge, and skills from past learning experiences (Kolb, 1984; Mobbs, 2015). Active experimentation occurs when the learner puts into practice the newly learned concepts by applying them to new experiences (Kolb, 1984). Projects, case studies, and simulation training are methods that promote active experimentation (Mobb, 2015).

To mirror this concept, the 5-day biocontainment education program takes the learner through the 4 stages of experiential learning and incorporates a variety of methods that promote learning for adults with varied learning styles. At the start of the program, each participant will complete Kolb's Learning Style Inventory (KLSI). Kolb and Kolb (2013) found the KLSI to be an accurate measure of an individual's preference for understanding information during learning. Due to the fact that nurses practice in a challenging environment where they are required to use various learning methods to process and integrate information, it is important for them to recognize their learning style and be able to recall knowledge and skills gained during classroom, laboratory, and clinical experiences (Aina-Popoola & Hendricks, 2014). Consistent with Kolb's (1984) and Marek's (2013) beliefs, different methods have been incorporated into the curriculum design to promote student learning and motivation to study. Examples of methods utilized in the program are power point presentations, demonstrations, skills laboratories, critical thinking exercises with case scenarios, simulation exercises, and drills with case scenarios, reflection and feedback.

The primary method used in the 5-day program is simulation training. A study conducted by Hayden, Smiley, Alexander, Kardong-Edgren, and Jeffries (2014) found that simulation-based activities are being utilized increasingly in nursing education programs to replace clinical hours in the actual practice setting. According to Jeffries (2012), the experiential learning process combines the required concepts of nursing and the nursing process to promote the development of clinical nursing judgment and competent evidence based practice. Similarly, findings from a qualitative study

conducted by Schwindt and McNelis (2015) indicated that simulation is a promising approach to the development of competent behaviors and skills in graduate nursing education.

Simulation laboratory experiences incorporated into the 5-day biocontainment education program are reflective of Kolb's (1984) experiential learning process. To provide experiences that are not readily available in the clinical setting and considered high-risk, students are afforded the opportunity to participate in clinical scenarios in a safe environment that permits mistakes and learning opportunities free from the concern of serious or catastrophic outcomes (Beckem & Watkins, 2012).

The 5-day program is designed to include multiple simulation exercises. Beebe (2012) found that critical thinking and knowledge scores increased as the number of hours spent in simulation exercises increased. Kennedy, Maldonado, and Cook (2013) validated that the longer periods of simulation correlated with improved learner outcomes. Abe, Kawahara, Yamashina, and Tsuboi (2013) confirmed that repeated participation in clinical scenarios through simulation exercises was effective in improving learner outcomes. The literature does not quantify what the necessary or minimum amount of participation in simulation should be to be effective. However, Childs, and Sepples (2006) believed that a 25-minute simulation exercise was too short. Therefore, simulation exercises within the proposed program are designed to mimic the length of time needed to perform the skills in the actual clinical setting.

Bastable (2014) agreed with Beckem and Watkins (2012), emphasizing that the learning environment during simulation needs to be conducive to learning,

nonthreatening, and afford students the opportunity to practice skills and receive timely feedback. Clinical judgment can be assessed and further developed when there are essential observable behaviors that allow for evaluation by the instructor or individual, of the level of mastery in cognition, psychomotor, and affective domains (Mariani, Cantrell, Meakim, Prieto, & Dreifuerst, 2012).

During the simulated practice sessions, time is allotted for reflection, feedback, and debriefing thus allowing for analysis and conclusions. Abe et al., (2013) and Stegmann, Pilz, Siebeck, and Fischer (2012) found that feedback from facilitators and from peers improved student learning and performance. Consistent with Kolb's (1984) learning theory, they believed that conclusions drawn from feedback and reflection are then used in future situations, resulting in new experiences for the professional nurse. Brydges, Nair, Ma, Shanks, and Hatala (2012) found that learning in simulation enhanced skill retention and higher correlations between competence and confidence. Similarly, results of a study done by Dunn, Osborne, and Link (2014) supported the assumption that high fidelity simulation training may be a valuable tool for increasing nursing students' self-efficacy for clinical practice.

Bandura's theory explains that an instructional treatment, in this case simulation exercises with case scenarios, may increase interest and motivation, increase self-efficacy, and lead to the attainment of cognitive and psychomotor competencies and skills (Bandura, 1995). It is important that simulation design be theory based and its effect on outcomes measured and evaluated. Chmil et al. (2015) conducted a quasi-experimental research study using a convenience sample of current students as the

experimental group and a historical sample of students who completed the course in the previous year. The study applied Kolb's experiential learning model to design the simulation experience, examined how the design affected clinical judgment, and described the relationship between clinical nursing judgment and student performance (Chmil et al., 2015). The researchers' findings suggested that engagement of students in the experiential learning experience using simulation improved clinical nursing judgment and competency in simulation performance (Chmil et al., 2015). Therefore, it can be concluded that the use of simulation exercises based within the experiential learning model may better prepare the learner to perform, than a non-experiential design for simulation.

Hall (2015) conducted a retrospective study, guided by Bandura's theory of self-efficacy, which examined the effectiveness of adding high-fidelity simulation to traditional hospital-based clinical experiences. The population studied was senior maternity nursing students in a baccalaureate nursing program. The focus of the study was whether or not students who participated in high-fidelity simulation achieved increased learning, critical thinking skills, and NCLEX performance potential (Hall, 2015). Simulation students were found to score significantly higher than the no simulation student group (Hall, 2015). Hall (2015) explained that it is plausible to assume that the use of simulation enhanced student confidence in their ability to perform clinical procedures, ultimately contributing to improvement in skills, and cognitive competencies. The findings are consistent with a study conducted by Shoemaker, Riermersma and Perkins (2009) who found that simulation, in addition to traditional hospital training, had

a significant positive effect on students' practical skills, as well as a significant positive effect on students' critical thinking skills.

In alignment with the experiential learning process, simulation training for biocontainment involves team members working together, is interactive, participative, reflective, and has the potential to be applied to similar clinical scenarios in the practice setting. Competence as a team member in specific role responsibilities is an essential aspect of the team approach to caring for the patient with a highly infectious, potentially fatal disease requiring biocontainment. Experiential learning promotes team building and competence (Lavender et al., 2014) and the learner gains hands-on knowledge of processes by interacting with the experience and team members, and participating in the opportunity to reflect (Kolb, 1984; Kolb & Kolb, 2005). The Institute of Medicine's *Future of Nursing Report* (2011) and the National League for Nursing (2013) stressed the importance of communication and teamwork in nursing education and practice. Results of a quasi-experimental study conducted by Garbee et al. (2013) suggested that high fidelity simulation is an effective pedagogy for teaching communication and teamwork skills to nursing, medical, and respiratory therapy students.

Bandura's (1986) social learning theory posits that individuals learn from one another in a variety of ways, including observation. Through vicarious learning, the individual constructs ideas and thoughts about observed behaviors (Bandura, 1986). This theory supports the concept that observing others' actions and behaviors promotes learning and self-efficacy (Livsey & Lavender-Stott, 2015). Monfardini et al. (2013) studied neural processes during observational learning experiences. The researchers

found neural processing during vicarious learning experiences to be similar to neural processes used in learning during trial and error experiences. (Monfardini et al., 2013).

Eldridge, Bear, Wayne & Perea (2013) found that having student peers observe and provide feedback during a simulation exercise promotes learning in nursing and other health professions educational settings. Livsey and Lavender-Stott (2015) explored the use of peer observation to evaluate student performance during a home visit simulation scenario. The researchers specifically explored whether or not serving as a peer observer supports vicarious learning to facilitate skill development in assessment, communication, critical thinking skills, and technical skills (Livsey & Lavender-Stott, 2015). In alignment with the findings of Eldridge et al. (2013), Livsey and Lavender-Stott (2015) concluded that integrating peer observations and feedback into simulated learning experiences promotes student learning specific to assessment and communication skills.

Bultas, Hassler, Erole, and Rea (2014) conducted a research study using a pre-test post-test control group design to compare the effectiveness of high-fidelity simulation with traditional static mannequins as a teaching strategy for pediatric nurses participating in the American Heart Association's Pediatric Emergency Assessment and Recognition Stabilization course. Guided by Kolb's (1984) theory of experiential learning, the study evaluated knowledge, retention, skill performance, and team confidence (Bultas et al., 2014). Results indicated that using high fidelity simulation scenarios within the continuing education plan increased knowledge retention, improved skill performance, and increased performance scores for teamwork (Bultas et al., 2014). Therefore, the use of simulation with case scenarios is an effective method for preparing the nurse for

effective and efficient participation as a team member, which is of utmost importance in providing safe, competent care for this patient population.

An important part of simulation training is the use of case studies based on actual clinical scenarios, and coaching by instructors and experienced preceptors. Ammentorp, Jensen, and Uhrenfeldt (2013) conducted a study of health care professionals and how they learn. The researchers reported that coaching sessions provided health care providers with a new vision for their practice. Craddock, O'Halloran, McPherson, Hean, and Hammick (2013) conducted a mixed qualitative and quantitative study that investigated case-based learning. Building on Kolb's experiential theory and consistent with Bandura's Social Cognitive Theory (1986; 2005), they reported participation, respect, collaboration, and critical reflection to be key components of adult learning (Craddock et al., 2013).

In conclusion, the literature indicates that the relationship between self-efficacy and the attainment of clinical knowledge and skills necessary to be transferred to the practice setting are strengthened through the application of experiential learning components within the educational design. Nurses who utilize skills infrequently may demonstrate a lack of competent performance in the clinical setting. Incorporating experiential learning components and related methods, such as simulation training, debriefing, and case studies may promote professional practice self-efficacy and overall competent practice when caring for patients requiring biocontainment.

Project Description

The project genre created from the findings of my research is a 5-day professional development program for nurses entitled *Care of the Patient Requiring Biocontainment.* The purpose of the project is to prepare a team of professional nurses that specialize in the care of the patient with highly infectious diseases that require biocontainment. Preparing a highly specialized, select team of nurses, as opposed to training all nursing staff to care for this patient population, limits unnecessary risks to providers, other patients, and the community (Verkat et al., 2015). The program outcome goals are:

1. To offer a comprehensive, learner-centered experience that provides the professional nurse with the cognitive information and psychomotor skills necessary to provide safe and competent care to the patient requiring biocontainment.
2. To offer learning experiences aimed at enhancing professional practice self-efficacy in the delivery of care to patients requiring biocontainment.
3. To provide clinical experiences in a simulated setting which promote competent performance of the high-risk skill set required to safely care for patients requiring biocontainment.

Learning modalities aimed at promoting experiential learning and professional practice self-efficacy include power point presentations, case studies, skills laboratories with practice and validation, simulated practice scenarios with instructor feedback and participant reflection, and simulated drills. The target audience for the program is all professional nurses throughout the organization who provide care for the patient

requiring biocontainment and who meet criteria for participation. Criteria for participation includes:

- Minimum of a BSN degree in nursing
- Minimum of 2 years (4160 hours) of clinical practice in an acute care health setting

The program will be offered as a continuing education activity 6 times throughout the calendar year, free of cost to employees, through the Department of Clinical Education. The start date for this professional development curriculum is January, 2018. Program faculty consist of instructors who are registered professional nurses employed by the organization as nursing education specialists. Each instructor has earned a minimum of a master degree in nursing and has documented demonstration of competency in the specialized skill set required to care for the patient requiring biocontainment. The instructor-to-student ratio in the laboratory setting is one instructor to 4 nurses, which is consistent with the number of nurses present at any given time to care for the patient requiring biocontainment. Participants who successfully complete the program will receive nursing contact hours which may be used toward the requirements for specialty certification in nursing.

As the program coordinator, I will assume responsibility for the design, implementation, and evaluation of the program. I will meet with the manager of the Department of Clinical Education 4 months in advance of the agreed upon program implementation date. Final plans will be made at this meeting in regard to specific dates and times for each program, availability of education specialists to teach in the program,

and classroom and laboratory space to accommodate 16 participants for each program. Nurse leaders and participants will be notified via email of program dates, times, locations, and the registration procedure 3 months in advance of the first program start date to accommodate individual participants and unit schedules. The registration procedure will be on-line and consistent with the organization's registration procedure for attendance at continuing education programs. I will submit the application for nursing contact hours through the organization's approved provider unit 3 months in advance of the first program start date. The submission date coincides with the provider unit's application deadline, thus ensuring that contact hours will be secured prior to the start of the first program.

Six weeks prior to the start of the program, I will hold a two-hour faculty meeting with education specialists that will be participating as instructors in the program. The intent of the meeting is to review the purpose and goals of the program, learner objectives, the program content outline, teaching methods, case scenarios, laboratory experiences, simulation exercises, critical thinking exercises, evaluation methods, and necessary materials and equipment. Special emphasis will be placed on learner reflection, feedback, and debriefing. Evaluation tools, such as performance checklists and written examinations will be reviewed in detail. Specific teaching assignments will be discussed and determined with input from participating faculty. The faculty meeting will also provide time for instructors to ask questions and seek clarification as necessary on any aspect of the program, methods, evaluations, and role responsibilities.

The program will be conducted in a classroom that accommodates up to 25 students, a skills laboratory for practice sessions, and the biocontainment area for drills. The classroom and skills laboratory environments are conducive to learning. Room light is adequate, temperature is controlled, and there are tables and comfortable chairs for students arranged in a semi-circle to promote learner engagement, participation, and dialogue. Beverages and light refreshments will be available during break times. The cafeteria will be available for meals. Two rest rooms are located across from the classroom. The classroom is equipped with easels, flip charts, a blackboard and markers, a projection screen, LCD projectors, and desktop computers.

Adjacent to the classroom is a skills laboratory with 4 stations equipped to practice psychomotor skills in the presence of an assigned, qualified instructor. The laboratory will be reserved for this program. Laboratory equipment includes adult and child simulation mannequins, personal protective equipment (PPE) equipment, equipment and materials for performing laboratory tests on collected body fluid specimens, and equipment and products necessary to containing spills and contaminated items. Suction equipment, oxygen equipment, equipment for obtaining vital signs, bed linens, commode, bed pans, and disposal containers are also present. All items used for practice in the laboratory are the identical items used in the biocontainment area. Computers are available to allow documentation within the electronic record playground based on case studies and scenarios. The biocontainment area and related rooms have been secured to for all simulated drills so that the learners perform in the actual environment in which care is delivered to patients requiring biocontainment.

The plan for the 5-day program and related materials are displayed in Appendix A. All educational activities are guided by learner objectives and build progressively from simple to complex. Day 1 begins with a pre-test of knowledge and management of patients with highly infectious diseases requiring biocontainment. Participants will also complete the same survey used to collect data for the study, which is comprised of demographic data and the Nursing Care Self-Efficacy Scale (NCSES) (Welch, 2014). Permission will be requested to use the NCSES in the first day of the training program. Payment agreements and any other copyright requirements will also be addressed. Data collected from both the test and survey will be used as part of the summative assessment of learning and change in behavior. Learners will also complete the Learning Style Inventory (Kolb, 1984) to gain insight into their personal learning style and support the recall of knowledge and skills gained through various learning experiences (Aina-Popoola & Hendricks, 2014).

Each day begins with an overview of the day's agenda and a review of learner objectives. Each day ends with a summation that includes a debrief session with time for questions and discussion, and completion of a program evaluation. All lectures are delivered using a power point presentation. Topics included in Day I include a review of EVD and other highly infectious diseases requiring biocontainment, the hospital plan for preparedness, protection of health care providers, and both a video and a live demonstration of donning and doffing PPE. Day II begins with practice in the laboratory setting performing donning and doffing of PPE utilizing the trained observer, orientation to the actual biocontainment unit, lectures, and demonstrations for managing the patient

with expected or confirmed infectious diseases, inclusive of environmental procedures and exposure management, simulated practice exercises based on clinical scenarios, and an introduction to laboratory testing within the biocontainment unit.

Day III continues to build onto knowledge and skills by including practice for specimen collection, performing laboratory tests, and transporting patients using the Isometric-chamber (Iso-chamber). Students also participate in critical thinking exercises based on case scenarios. Day IV includes a comprehensive skills validation in a simulated laboratory session. Each participant will be validated in donning and doffing PPE, performing laboratory tests, and transporting a patient using the Iso-chamber. Students will participate in two simulated exercises based on case scenarios. A video enhanced debriefing session occurs after each exercise, which is facilitated by the instructor. The last educational activity for the day is a power point presentation and lecture on public health surveillance.

Day V includes two comprehensive simulation exercises based on case studies, followed by a debriefing session that is video enhanced and includes instructor and learner feedback. Students also participate in two critical thinking exercises based on case studies with instructor and learner feedback. Each participant completes the Nursing Care Self-Efficacy Scale and the post test of knowledge and the management of patients with highly infectious diseases requiring biocontainment.

Instructional Materials

In addition to the facility, simulation mannequins, live actors, audio visual equipment, lap top computers, electronic handouts of PowerPoint presentations and

competency validation checklists will be available to the instructors and students. A simulation laboratory will be equipped with the actual equipment used for each skill in the clinical setting, including PPE, laboratory testing equipment, patient care supplies, and cleaning supplies.

Existing Resources

Allocated funds within the budget for the nursing education and professional development will support the 5-day program, inclusive of equipment and the application fee for continuing education credits. The program is free to employed nurses who are responsible to care for patients requiring biocontainment. All instructors that teach in the program are salaried employees of the medical center and competent in all aspects of care for the patient requiring biocontainment.

Potential Barriers

Potential barriers include use of the biocontainment unit for simulation practice. As there is only 1 unit, if a patient is admitted to the unit, the area would not be available for training. Instructor availability may be an issue due to unforeseen circumstances, such as illness. Additionally, nurse participants may not be able to attend the program due to staffing issues related to high patient census and acuity and an insufficient number of nurses to cover staffing needs.

Potential Solutions to Barriers

The skills laboratory on the 5th floor of the medical center will need to be converted to an environment that mimics the actual biocontainment unit should the unit be occupied by a patient. All mannequins and equipment will need to be transferred to the

skills laboratory. Instructors that work per diem for the medical center may need to replace unavailable instructors. The salary for the per diem instructor would be paid through the nursing education budget. Nurses participating in the program will need to be scheduled by their nurse manager 6 weeks in advance of the program so that their clinical hours can be back filled by other nurses, preventing disruption in patient care.

Roles and Responsibilities of Instructors and Students

Instructors are expected to maintain the necessary skills required to care for patients requiring biocontainment. Each instructor is responsible to create a learning environment that is conducive to learning and that reflects learner-centered education within an atmosphere of mutual trust and respect between the instructor and student. Instructors are also responsible to facilitate interactive discussions utilizing reflective questioning, evaluate and give feedback, facilitate debriefing sessions, and complete all formative and summative evaluation forms, including performance checklists. Students are responsible for self-learning, learning new behaviors, and identifying learning needs and opportunities to learn. Students are required to participate in all learning experiences, and assessment and evaluation activities within the program design.

Project Evaluation Plan

The evaluation of the project will be based on the purpose and goals of the project aimed at preparing a team of professional nurses that specialize in the care of the patient with highly infectious diseases that require biocontainment. The evaluation plan for the project includes both formative and summative assessments. Formative assessments will occur during student learning activities so that the information and feedback gleaned

from students can be used to improve the learning of current students by making immediate changes in educational experiences and methods (Suskie, 2009). Formative assessment also includes giving students feedback on their strengths and opportunities for improvement and can guide the development of future educational programs (Suskie, 2009). Formative evaluations for this project plan include a pre-test of knowledge of care for the patient requiring biocontainment, the Nursing Care Self-Efficacy Scale, and the Learning Style inventory, all of which have the potential to direct learning activities. Debriefing and video enhanced debriefing is another type of formative evaluation that will be used to engage students in reflective evaluation of their performance and to improve the educational design of learning experiences as necessary. A debriefing tool will be utilized to guide the discussion with students.

Summative assessments will be utilized to evaluate student learning at the end of an instructional unit and often compares learning against a rubric (Suskie, 2009). Evidence of student learning will be determined through measurements obtained from the post test for care of the patient requiring biocontainment and the Nursing Care Self-Efficacy Scale. Student learning will also be measured by the differences in pre-test and post-test scores. The Nursing Care Self-Efficacy Scale will provide valuable information for students and teachers to better understand student self-efficacy levels before and after participation in the program. The competency validation checklist is a summative evaluation instrument which will be used by instructors to evaluate each critical element of the procedure performed by the student. The checklist will allow for diagnosis of

strengths and weaknesses in performance of skills, while also serving as a tool for student feedback and to direct further learning.

At the end of each day of the 5-day program the student will complete a course evaluation. This written evaluation includes an evaluation by the student of how well he/she met each learner objective, and evaluation of each instructor in terms of knowledge of the subject, presentation, and effective use of teaching strategies. The assessment also includes the opportunity for the student to state what content and/or learning experiences were most helpful, what content and/or learning experiences were least helpful, information to be added to the class, overall comments on the learning experience, and any additional comments or feedback from the student. Key stakeholders, including administration and managers, instructors, and students, will be informed of enrollment rates, and all results of the 5-day program, including a summation of the course evaluation.

Project Implications

Findings of the research informed the development of the education project consisting of a 5-day professional development curriculum. The educational design includes learning experiences that promote professional self-efficacy and the transfer of knowledge and skills from the learning environment to the clinical practice setting. The design is of particular significance because there are limited opportunities to practice the skills necessary to care for the patient requiring biocontainment. Successful completion of the program by students may lead to the development of self-directed, life-long learners who are members of high-performing teams of health care providers that render

care to patients with highly infectious, potentially lethal diseases requiring biocontainment, thus protecting the community at large. This project may inform future educational programs within the immediate learning environment and in similar learning environments outside of the medical center that are responsible for caring for this type of patient population. To date, there is not a core curriculum or established best practices for educating nurses to care for patients with highly infectious diseases requiring biocontainment. Thus, this program may contribute to the establishment of core curriculum for this specific topic. Successful completion of the program by participants may contribute to successful patient outcomes and improved safety for citizens if nursing care becomes more effective and efficient for this patient population.

Section 4: Reflections and Conclusions

Section 4 provides a description of the reflections and conclusions gleaned from my experiences as I applied the research process and developed the project plan. Research, analysis, and project development afforded many opportunities for my learning, growth, and development as an educator. Throughout the overall experience, my scholarship, research, collaborative interaction, literature review, and scholarly writing skills significantly improved. This section includes my reflections and conclusions regarding the project strengths and limitations; recommendations for alternative approaches; scholarship, project development, and evaluation; leadership and change; importance of my work; and implications, applications, and directions for future research.

Project Strengths and Limitations

Results of my study provided insights into the relationship between the level of nurses' professional practice self-efficacy specific to care of the patient requiring biocontainment and their professional characteristics. One strength of the project was that it addressed an area of higher education that has been minimally researched and is of major concern to the health care community and global citizens (Burkle, 2014; WHO, 2014). Inadequate educational preparation of professional nurses was a key factor in the case of two registered nurses in Texas who contracted EVD after caring for a patient with the disease. The nurses lacked the proper training to care for this patient population, which included proper use of personal protective equipment (Dawson & Carpenter, 2015). To date, there is not a standardized core curriculum for educational programs that

prepare nurses to care for patients with highly lethal, easily transmitted infectious diseases who require biocontainment.

My study provided data and information to inform best practices for the education of professional nurses in the care of patients who require biocontainment. In response to the findings of my study, the project deliverable was a professional development curriculum for nurses who care for patients requiring biocontainment. The establishment of a professional development program that is evidence based and provides the educational experiences necessary to deliver competent care while protecting self, other health care providers, patients, and the community met the needs of the local learning environment and was a major strength of the project. Strengths of the professional development curriculum included the following:

- Simulated experiences are based on actual clinical scenarios provide for repetitive practice in the application of knowledge and skills.
- Debriefing sessions allow participants to reflect and receive input from others.
- Assessment tools support evaluation of perception, knowledge, and performance.
- Continuing education credits are provided to participants who successfully complete the program.
- On-site classrooms have environments conducive to learning.
- Simulation laboratories closely mimic the clinical setting.
- Educators possess the knowledge and skills necessary to facilitate learning and to care for patients requiring biocontainment.

- The offering is free of cost for participants, and they are paid their regular salary to attend.

In addition to meeting the needs of the local learning environment, the project has the potential to meet the needs of international and national medical, nursing, other health care communities, global citizens and government agencies including the CDC who are concerned about the provision of effective education for nurses and other health care providers aimed at preventing the spread of EVD and other highly infectious and lethal diseases (Ragazzoni et al., 2015). The project provides nurse educators with direction and insight into the necessary components of a professional development program that meets the needs of administrators and learners tasked with providing competent, safe care to this patient population.

Results of my study indicated that a higher level of formal education may positively affect professional practice self-efficacy. The results also suggested that a higher number of years of nursing experience is a predictor of higher levels of professional practice self-efficacy as measured by the total NCSES score. Based on my findings, prerequisite criteria have been established for learner participation in the program. The establishment of prerequisite criteria for learners aids administrators and educators in the selection of program participants who possess characteristics that support the attainment of professional practice self-efficacy and the advanced knowledge and skills necessary to safely deliver the complex and precise care to patients requiring biocontainment.

A thorough review of the literature revealed a relationship between self-efficacy and the attainment of clinical knowledge and skills (Bambini et al., 2009; Kuiper et al., 2010; Wagner et al., 2009). Bandura's (1986) concept of self-efficacy and Kolb's (1984) concept of experiential learning are reflected in the learning modalities and assessment methods. A strength of the program is that methods and strategies within the program design are intended to enhance the cognitive knowledge, psychomotor skills, and self-efficacy of the professional nurse who provides care for patients requiring biocontainment. Bandura's concept of self-efficacy is reflected in the program design, learning modalities, and assessment methods as evidenced by self-assessment, reflection, opportunities to critically think and make decisions, ability to practice skills multiple times in a safe environment, and ability to obtain feedback from others.

Results of my study indicated that the number of biocontainment drills was significantly correlated with a higher level of self-efficacy. As patient care experiences for this high-risk population are limited in the clinical setting, the program design affords the nurse ample opportunities to apply knowledge and psychomotor skills while fulfilling requirements for learning as set forth by Kolb's (1984) concept of experiential learning. The project addresses the problem of nurses' lack of experience and lack of opportunities to practice care elements for this patient population. Simulation training is the preferred instructional method because it provides for experiential learning within a safe environment while team members practice skills (Yuan et al., 2012). Therefore, a strength of the project is hands-on practice through simulation training sessions that include lifelike practice environments, actual clinical scenarios, and ample opportunities

to apply knowledge and practice the precise skills necessary to build professional practice self-efficacy and competently care for patients requiring biocontainment.

Reflection on my study and the deliverable project resulted in the identification of limitations. The correlational design limited the generalizability of results to stakeholders beyond the local learning environment (Creswell, 2012). The design also eliminates the participants' randomization to experimental and control groups and does not support more accurate measurement of the relationship between the independent variables on the dependent variable.

The study population included eligible nurses from one acute care medical center, which was a limitation of the study. Other groups of nurses outside of the acute care medical center who care for patients requiring biocontainment may report data differently based on their professional characteristics, experiences, and environment. The study and project does not allow for a detailed assessment of previous education and training experiences of the participants specific to biocontainment care. Therefore, a limitation of the study and resulting project was a lack of understanding of prior biocontainment education experiences of the learner that may affect the participants' nursing practice, learning, and professional self-efficacy. The 5-day continuing education program was designed based on the assumption that all learners need basic education and training in biocontainment care as opposed to a design that considers individual experiences and needs. The professional development program could be designed to accommodate experienced learners by offering skills validation sessions prior to the program, allowing for waiver of related skills laboratories and practice sessions.

A significant limitation of the study that affects the project design was that the population under study did not include other health care providers who are members of the team that provides care to the patient requiring biocontainment. The lack of an interdisciplinary partnership within the design of the educational offering prohibits other health care providers from participating in learning experiences. Additionally, limiting the education to nurses does not allow for team dynamics to be experienced to the fullest extent during training, which may affect performance in the clinical setting. The study was also limited because observation and measurement of nurse performance in delivering care to patients requiring biocontainment in the clinical setting or in a simulated setting was not feasible for this study. The inclusion of such data may have served to further refine methods and strategies used in the professional development program.

Recommendations for Alternative Approaches

A correlational research design was used for my study to quantify the variables and examine the relationships between the variables. The use of a correlational design limited the generalizability of the results (Creswell, 2012). Also, the investigation site was limited to one local learning environment. Although other stakeholders may find value in the findings of my study, findings may vary at other investigation sites. Extending the study population to other investigation sites may remediate this limitation. Also, implementing a qualitative study that allows for data collection regarding the nurses' perspective of self-efficacy and aspects of the professional development program may provide a rich narrative description. This qualitative data, as well as the formative

and summative evaluations of the professional development offering, could influence the program design and methods necessary to adjustment the project based on identified learner needs.

Participants in the study were professional nurses charged with the responsibility of providing care to the patient requiring biocontainment. The professional development program, a deliverable from the study, was designed specifically for the professional nurse. An alternative approach to addressing the problem of lack of preparedness in caring for the patient requiring biocontainment is to include other health care providers as participants in both the study and in the professional development program. An interdisciplinary approach would allow all providers who contribute to the care of the patient to receive consistent education, training, and evaluation while allowing for members to develop as a team.

The professional development program could be designed to accommodate an interdisciplinary learning approach by incorporating a core component that addresses common learning needs of the health care team relative to the cognitive, psychomotor, and affective domains. The program could be designed to break out into specialty tracks upon completion of the core component to promote skill attainment of other health care providers such as physicians, respiratory therapists, and laboratory technicians. Biocontainment drills could be interdisciplinary, allowing for practice of roles and responsibilities of all health care team members. This approach would contribute to a more realistic learning experience that mimics professional practice in the clinical setting.

Another consideration would be to design a professional development program that includes online learning modules aimed at promoting independent learning and accommodation of professional schedules. Cognitive learning segments, critical thinking exercises based on actual clinical scenarios, surveys, self-assessment of learning style, and pretests and posttests could be incorporated into this type of learning platform. Upon successful completion of the online educational components, the learner would then move to the laboratory setting for live demonstrations, practice, debriefing, and evaluation of the training experience. This alternative strategy would shorten the length of time spent in the classroom, assist with time constraints for the learner by allowing for flexibility, and lessen the potential problem of inadequate staff coverage for lengthy periods of time due to attendance at the professional development offering.

To remediate the problem of ongoing preparedness and maintaining competency and a high level of professional practice self-efficacy exacerbated by limited experiences in the clinical setting, periodic drill sessions could be built into the design of the professional development program. Upon completion of the 5-day program, each participant would be required to participate in a minimum of one biocontainment drill per quarter. The learner would have the opportunity to participate in additional drills as necessary. Also, the skills laboratory could be made available on an ongoing basis for practice of specific skills such as donning and doffing of PPE, as determined by individual learner needs.

Scholarship, Project Development and Evaluation, and Leadership and Change

As I reflect on my scholarship as an educator and nurse, I am reminded of the knowledge and skills I have gained through the experience of applying the research process and designing a meaningful project based on the results of my study. I have gained insights that have helped me to demonstrate scholarly behavior. The greatest benefit that I have gained is a hardwired belief that educational research is necessary if nurse educators are to provide experiences for adult learners that are grounded in evidence and reflect best practices. Only then will the professional development of nurses and their improved practice have a profound effect on quality patient outcomes.

My first encounter with a scholarly growth experience occurred as I diligently worked at identifying a research problem, which was not an easy task. I began by reflecting on topics of interest within my educational setting. Based on my experiences as a nurse educator, I identified several topics to potentially study, such as understanding more about how entry level nurses adjust to their new roles and responsibilities during their first year as licensed professional nurses. I soon realized that I was not passionate about the topics and did not feel a strong sense of inquiry.

In October 2014 I was thrust into an educational situation I had never experienced. I was responsible for the education and training of professional nurses and other team members who were to deliver care to patients with suspected or confirmed EVD. Due to the global threat of the spread of Ebola Virus Disease (EVD), it was evident that nurses needed effective education and training that would provide the attainment of skill sets similar to those required of foreign medical teams (Ragazzoni et al., 2015).

Nurses in the local learning environment reported they felt unprepared to effectively care for patients with EVD or other high-risk diseases requiring biocontainment (U. S. acute care medical center, personal communication, 10/17/14). Basic nursing education and professional development programs did not provide for this professional practice need.

Tension escalated within the local educational environment when the organization was designated by the governor as one of only a very few hospitals in the state to receive patients with suspected or confirmed EVD or other highly contagious, potentially lethal infections requiring biocontainment. Concerns by administration, educators, nurses, other health care providers further increased when two nurses in Texas contracted EVD from an infected patient. Lack of proper training and lack of the appropriate equipment were the major deficits that caused spread of the disease (Dawson & Carpenter, 2015).

To further compound the problem, the CDC did not have procedures or protocols specific to the care of patients with EVD or other highly infectious diseases requiring biocontainment. An established curriculum aimed at the professional development of nurses who were deemed responsible to care for this patient population did not exist in the literature. The required skill set was complex and needed to be performed in an exact manner with no room for error, lest the highly infectious disease be spread to those caring for the patient and the community at large. Thus, my research problem was born out of true necessity within the local learning environment.

The difficulty that I was facing provided an opportunity to identify a problem that could best be addressed through the research process. According to Conrad and Pape (2014), observing the characteristics of a problem is the initial step to greater

understanding of the problem. As the person responsible for providing professional development education for nurses, I was concerned about whether or not the nursing staff felt secure in their ability to learn new, complex skills necessary to delivering competent care to patients with EVD while protecting self, other employees, and the community from spread of the deadly disease. The teams that were formed to care for patients requiring biocontainment included professional nurses with a variety of professional backgrounds and characteristics. There was not a clear understanding in the local learning environment as to whether or not there is a correlation between the nurses' perception of professional practice self-efficacy in caring for patients requiring biocontainment and select professional characteristics. As a result, I experienced a true sense of inquiry and passion for my identified problem which arose from a need within the local learning environment. My scholarship and sense of inquiry increased as I gained a deeper belief in the need to conduct educational research in order to gain insights which may lead to solutions to the problem. This belief has become part of my value system as an educator and nurse.

Developing research questions taught me the importance of carefully crafting questions that are aimed at investigating the nature of the problem. My questions went through several revisions and in the end, I developed nine scholarly research questions aimed at exploring the identified problem. Through the application of the research process I also experienced the importance of carefully determining the research design that best suits the study and guides the process of investigation. I realized that consideration of participant rights and their subsequent protection must be addressed

early in the research process, and not just at the point of data collection. Participant protection is a key element when making decisions about the design of the study. Protection of participant rights was of major concern to me as I am employed at the study site. This factor was a critical element that contributed to the decision to take a quantitative approach to my study.

I found statistical analysis of the collected data to be quite difficult and took much longer than anticipated. As a scholar, I experienced the importance and necessity of support systems that were available to me as a student and researcher. Instruction and guidance that I received from my research chairperson and committee, as well as the knowledge I gained from previous courses allowed me to successfully complete this phase of the process. Working with the data afforded me the opportunity to see how the data yields answers to the questions and guides the development of a deliverable.

Results of my study and a thorough review of the literature led to the creation of a 5-day professional development program for nurses who care for patients requiring biocontainment. I originally envisioned that a 3-day program would include the necessary elements and learning experiences for the learner. As I crafted the program to also address the lack of clinical experiences available to the learner in the practice setting, I found it necessary to emphasize methods within the program that placed an emphasis on promoting professional practice self-efficacy, multiple simulation training and practice sessions, self-reflection, and formative and summative evaluations.

To accommodate adequate learning experiences that led to a strong skill set for nurses and promote professional practice self-efficacy I found it essential to extend the

program to 5 days. While it is important to develop a project that is based on results of the study, I learned that it is just as important to design a deliverable for learners and other stakeholders that support the outcomes of the study to the fullest extent. Therefore, the experience of designing a deliverable based on my study results increased my scholarship as an educator and researcher.

My study results also led to the creation of prerequisites for participation in the program. To date there is not established criteria to determine who may participate as a member of the biocontainment team. I found that the establishment of program prerequisites based on professional characteristics may also serve as a guide for administrators and educators as they select members for the biocontainment team.

Through my experience of conducting educational research and the development of a project, I have gained scholarly characteristics as evidence by a deeper respect for the necessary application of the research process within the learning environment. As an educator, my value system now includes a passion for educational research that supports the investigation, discovery, and creation of educational best practices based on scientific evidence that promotes lifelong learning and development.

The knowledge and understanding I have gained through investigation and application of the research process has had a profound effect on my professional practice self-efficacy as an educator and investigator. I have become more skilled in searching the literature to the point of saturation and more knowledgeable about teaching methods and strategies. I have witnessed the importance of keeping abreast of current issues at home and abroad that affect health care and ultimately the learning environment. My endeavors

following graduation include future research that builds on my study results. Because of my experience with the research process, I desire to continuously evolve as a role model for lifelong learning that encourages others to become inquisitive about problems and possible solutions that lead to best educational practices.

According to Suskie (2009) evaluation is an important and necessary aspect of any program that leads to change. The evaluation plan is in alignment with the purpose and goals of the project and includes both formative and summative assessments. The evaluation plan is a major component of the project because it is comprehensive and provides for feedback regarding the program and student learning, while affording the opportunity to adjust the program and to best meet learner needs.

Formative assessments, intended to provide feedback which can be used to make immediate changes to the program will occur during student learning activities, such as simulated laboratory practice sessions. Formative assessment also includes giving students feedback. Examples of formative methods utilized to give students feedback are the self-efficacy survey, the learning style inventory, and video enhanced debriefing sessions.

Summative assessments will be utilized in the form of course evaluations, a post-test, and competency validation of psychomotor skills. Pre-test and post-test scores will be compared to determine student learning at the completion of the program. Tools that were developed to measure learning were designed to complement the particular evaluation method. For example, the competency validation checklist is an instrument that will be used by instructors to evaluate student performance and can be used both in

the laboratory and clinical settings to provide feedback. Because the tool is comprised of the critical elements of the procedure it allows for the diagnosis of strengths and weaknesses in skill performance. A benefit of the tool is that it can be used to direct further learning. The evaluation plan includes informing key stakeholders, those being administration, managers, instructors, and students, of enrollment rates and program outcomes. Stakeholders will also receive a summation of the course evaluations and informed of any resulting changes to the program.

A leader is an individual who shapes the environment and motivates others to learn and change behaviors (Salmela, Eriksson, & Fagerstrom, 2013). Throughout the research process and development of my deliverable, I experienced opportunities for leadership and change. Upon reflection, I saw myself as a change agent for an identified problem in the local learning environment. In order to be an effective change agent, I needed to use strong leadership skills, such as the ability to accurately assess a situation, identify a problem, communicate effectively, and evaluate solutions to the problem.

Throughout my experience, I observed the relationship between leadership and scholarship. I believe that a characteristic of a strong leader is the ability to identify a problem, say to self and stakeholders “I don’t know” and then have the courage to investigate and determine possible solutions. My experience in conducting a study and developing a project afforded me the opportunity to experience exactly the aforementioned. As a leader in education my hope is to instill in others a spirit of inquiry and the determination to seek answers that lead to best practices.

I discovered that being an effective leader and change agent includes keeping abreast of global occurrences and health care issues that may affect the local learning environment, as well as the competent delivery of care to patients both home and abroad. Through my review of the literature I realized that the "panic" that occurred during the 2014 Ebola crisis could have been avoided if we, as leaders, proactively addressed the management of the disease early on when it was on the rise.

In summary, the experiences that were put before me as I applied the research process and developed my project helped me to grow professionally. The opportunity to use leadership skills throughout my project study yielded improved scholarship and a sense of professional practice self-efficacy as an educator and researcher.

Reflection on Importance of the Work

The international and local medical, nursing, and other health care communities, national, state, and local government agencies including the Centers for Disease Control and Prevention (CDC), hospital administration, and educators were concerned about the lack of effective education aimed at preventing the spread of highly infectious, deadly diseases (Ragazzoni et al., 2015). My study is important because it addressed an area of higher education for which there is very little research and is of major concern to citizens globally (Burkle, 2014; WHO, 2014).

The results of my study provided a better understanding as to whether there is a significant correlation between the level of nurses' professional practice self-efficacy specific to the care of patients requiring biocontainment and select professional characteristics. Results of my study provided for a deliverable project, a 5-day

professional development program for nurses who care for this patient population. Importantly, the professional development program provides hospital administrators and educators with an educational framework that promotes professional practice self-efficacy and learner development of the necessary cognitive and psychomotor skills required to competently care for patients requiring biocontainment. The program has the potential to serve as a model for the design of other professional development offerings that include methods that facilitate the development of professional practice self-efficacy and ultimately leading to increased learner successes.

My study is also important because it provided insights which led to the establishment of prerequisites for learner participation in the program. Previously, prerequisites for training and team membership were non-existent and primarily based on the nurses' desire to volunteer to care for this patient population, regardless of professional characteristics, such as years of experience and level of education. The newly established prerequisites are intended to aid hospital administrators and educators in the selection process of participants to be trained and ultimately become part of the team that cares for patients requiring biocontainment.

The importance of my work is also reflected in the tools that were developed to assist educators and learners in evaluating performance and guiding plans for individual learner needs. Such tools have not been available in the literature. For example, competency validation checklists were designed for skills such as donning and doffing PPE. The tools, which are comprised of critical elements for performing the particular

procedure, can serve as models for use in other educational settings and may be tailored to reflect variations in procedure and equipment.

My primary learning was related to the research process and using study results to create a deliverable project. While I have participated in other research projects in the past, taking the lead as an investigator allowed me to experience the various phases of research in detail. I learned to identify a problem, develop research questions aimed at exploring the problem, collect and interpret data, and utilize results to design and evaluate a professional development program for adult learning. I grew to appreciate the importance of identifying potential researcher biases and the protection of human rights.

Implications, Applications, and Directions for Future Research

Results of my study provided insights that have the potential to affect positive social change at the local, regional, state, and national levels. The identified need to educate nurses to competently care for patients requiring biocontainment, and the lack of consistent educational practices to do so, led to the desire for more information about the nurses' perceived level of professional practice self-efficacy and whether there is a relationship to select characteristics of nurses who care for this patient population. Data from this study provides for positive social change because it informed the professional development education plan of enhancements in the design of methods and experiences that support increased levels of professional practice self-efficacy for nurses who care for patients requiring biocontainment. A recommendation for future research also includes extending the population to include participants from other organizations and learning environments that meet study criteria. Extending participant population may provide for

richer data and a deeper understanding of the relationship between professional characteristics and professional practice self-efficacy for nurses who care for patients requiring biocontainment.

Data gleaned from my study and the resulting program has the potential to facilitate the growth and development of self-directed, lifelong learners that become members of high performing teams responsible for delivering care to patients requiring biocontainment. Success in meeting learner objectives may or may not influence the delivery of effective nursing care, quality outcomes for patients, and heightened safety for health care providers and the community. Further research is recommended to investigate this concept.

The deliverable project from my study is a 5-day professional development program that provides simulated experiences aimed at providing nurses with the knowledge and complex skill set required to competently care for patients requiring biocontainment. The program has the potential to serve as a core curriculum for the development of nurses who care for this patient population at the local site. The curriculum can be transferred to other organizations and educational settings at the regional, state, and national levels. The content can be tailored to reflect specific clinical environment, organizational policies, and equipment utilized for biocontainment. The program design may also be used as a model for the development of a training program for other health care professionals that are members of the biocontainment team.

Another deliverable from my study is the establishment of pre-requisites intended to assist administrators and educators in the selection process of participants for the

program at the local level, who ultimately become members of the team that care for patients requiring biocontainment. Standardized pre-requisites for program participation can be utilized at other organizations and educational settings at the regional, state, and national levels. Future research is indicated to validate findings from my study and determine cause and effect of select characteristics on professional practice self-efficacy which may lead to a deeper understanding and refinement of program pre-requisites.

While results of my study indicate that the number of biocontainment drills was significantly correlated with a higher total NCSES score, the data are not sufficient to indicate the minimum number of drills necessary for learners to attain competent performance. Future research is necessary to explore this concept and determine a minimum number of drills to include in professional development program specific to the skill set required to competently deliver biocontainment care.

Data obtained from my study may inform future studies aimed at the development of methods and best practices that support professional practice self-efficacy and the further establishment of pre-requisite criteria for participation in the program. Further research is necessary to validate findings from my study and gain insights into cause and effect relationships between professional practice self-efficacy, skill development, and the competent performance of nurses who care for patients requiring biocontainment.

Results from my study and participation in the professional development program may or may not indirectly affect patient outcomes and safety for citizens if nursing care becomes increasingly effective and efficient for this patient population. As such, this concept would need to be further explored through the application of the research

process. Data gleaned from my study not only provided better understanding, but also brought to light additional questions. For example, the use of simulation as a method to employ when clinical experiences are limited needs to be further studied in a scientific manner. A deeper understanding regarding the use of simulation training may lead to application of the method for learning other types of care in which actual experiences are not readily available in the clinical setting.

Conclusion

Increasing global occurrences of highly infectious, potentially lethal diseases had an effect on the local learning environment and the required skill set for professional nurses. The global threat of Ebola Virus Disease (EVD) and other high-risk diseases requiring biocontainment demanded competency in the management of complex patient needs and safety procedures that prevent the spread of such diseases. My quantitative correlational study, supported by Bandura's (1984) social cognitive theory, examined the relationships between nurses' professional characteristics and their perceived self-efficacy when providing care to patients requiring biocontainment. Data results suggested that a higher level of formal education and a higher number of participation in biocontainment drills may positively affect professional practice self-efficacy. The results also suggested that a higher number of years of nursing experience is a predictor of higher levels of professional practice self-efficacy. The deliverable project from my study is a 5-day professional development program for nurses who care for patients requiring biocontainment. Prerequisites for participation in the program were also established to assist administrators and educators in the selection of students who would ultimately

become members of a highly specialized team that provides care for this patient population.

My study facilitates positive social change by informing the education plan of learning experiences that support the development of professional self-efficacy for nurses who are members of the team that care for patients with highly contagious, potentially lethal diseases. Standardized prerequisites are intended to guide administrators and educators in the selection of nurses to participate in the program and ultimately become team members. It is my hope that the professional development program will provide for a core curriculum and standardized pre-requisites that can be utilized in learning environments at the local, state, regional, and national levels to educate nurses to competently care of patients requiring biocontainment and preventing the spread of highly contagious infectious diseases to health care providers and global citizens.

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Appendix A

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

The program goals are:

1. To offer a comprehensive, learner-centered experience that provides the professional nurse with the cognitive information and psychomotor skills necessary to provide safe and competent care to the patient requiring biocontainment.

2. To offer learning experiences aimed at enhancing professional practice self-efficacy in the delivery of care to patients requiring biocontainment.

3. To provide clinical experiences in a simulated setting which promote competent performance of the high-risk skill set required to safely care for patients requiring biocontainment.

Program Participants:

The target audience for the program is all professional nurses throughout the organization who provide care for the patient requiring biocontainment and who meet criteria for participation. Criteria for participation includes:

• Minimum of a BSN degree in nursing

• Minimum of 2 years (4160 hours) of clinical nursing practice in an acute care health setting

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Day I

8:00-8:15	Introduction • Introductions • Review of Program Schedule • Review of Learner Objectives	Classroom A
8:15-9:30	Assessments #1 • Learning Style Inventory (45 minutes) • Interpretation guidelines • Discussion	Classroom A Student Completes
9:30-10:00	Break	
10:00-10:30	Assessment #2 • The Nursing Care Self-Efficacy Scale (NCSES)	Classroom A Student Completes
10:30-11:00	Assessment #3 • Pretest: Care of the Patient Requiring Biocontainment	Classroom A Student Completes

11:00-12:30	Ebola Virus and Other Highly Infectious Diseases Requiring Biocontainment
	• Ebola Virus Disease and other viral fevers
	  ○ Epidemiology
	  ○ Pathophysiology
	  ○ Disease Transmission
	  ○ Signs & Symptoms
	  ○ Diagnostic Criteria
	  ○ Disease Management/Medical Treatments
	• Nursing Care Guidelines and Safety Protocols
	• Team Approach to Care
		Classroom A
		Lecture/ PowerPoint Presentation

12:30-1:30	Lunch	
1:30-2:00	Hospital Plan for Preparedness • Organizational Approach to Preparedness • Policies/Procedures	Classroom A Lecture/ PowerPoint Presentation

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Day I (Continued)

2:00-2:45	Protecting Health Care Providers • Center for Disease Control Guidelines • Video Instruction from the CDC (13:22 minutes): Donning and Doffing Personal Protective Equipment (PPE) http://www.medscape.com/viewarticle/833907	Classroom A Lecture/PPT On-line Video
2:45-3:00	Break	
3:00-4:00	Live Demonstration • Donning PPE • Doffing PPE • Role of the Trained Observer	Skills Lab Demonstration (Instructors)
4:00-4:30	Summation • Debrief Day I • Q&A • Day I Program Evaluation	Classroom A Discussion

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Day II

8:00-8:15	Introduction • Overview of Day II • Review of Learner Objectives	Classroom A
8:15-9:30	Practice Laboratory • Donning/Doffing PPE • Trained Observer	Skills Laboratory Student Practice
9:30-10:00	Break	

10:00-11:00	Orientation to Biocontainment Area
	• Tour of Biocontainment Areas
	  ○ Supply Closet/Equipment
	  ○ Dressing Room/Mirrors
	  ○ Showers
	  ○ Patient Care Room Set Up
	  ○ Cool Zone
	  ○ Warm Zone
	  ○ Hot Zone/Biocontainment Room
	  ○ Observation Area/Cameras
	  ○ Documentation Area/Computer on Wheels
		Biocontainment Area
		Tour/Detailed Review

11:00-12:30	Managing the Patient with Expected or Confirmed Infectious Disease Requiring Biocontainment
	• Patient Presentation to Emergency Department
	• Incident Command System
	• Roles & Responsibilities of the RN and other members of the health care team
	• Preparing to Receiving a Patient
	• Patient Admission Procedure
	  ○ Patient Belongings
	• Patient Discharge Procedure
	• Environmental Procedures
	  ○ Disinfection
	  ○ Managing Spills
	  ○ Containing Contaminants
	• Exposure Management
		Biocontainment Area
		
		Lecture
		Lecture
		Lecture
		Demonstration
		
		Demonstration
		Demonstration
		
		Demonstration

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Day II (Continued)

12:30-1:30	Lunch	
1:30-3:00	Simulation Laboratory: Scenarios # 1, # 2	Biocontainment Area
	Scenario #1 (30 minutes) • Preparing to Receive the Patient • Admission of the Patient • Debrief (15 minutes)	Simulated Practice With Case Scenario
	Scenario #2 (30 minutes) • Safe handling of body fluids, linens, equipment, personal belonging, environmental procedures • Discharging a Patient • Debrief (15 minutes)	Simulated Practice With Case Scenario
3:00-3:15	Break	
3:15-4:00	Diagnostic Laboratory Testing • Instructor Demonstration ○ Nursing Responsibilities ○ Specimen Collection: Blood, Urine, Respiratory ○ Point of Care Testing ▪ HIV ▪ Malaria ▪ Influenza ▪ Urine Pregnancy ▪ Urine Chemistry ▪ Arterial Blood Gases ▪ CBC ▪ Chemistry Screen ○ Documentation ○ Guidelines for Specimen Delivery to the Center for Disease Control ○ Ebola Virus Disease Specimen Collection	Skills Lab Demonstration Discussion
4:00-4:30	Summation • Debrief Day II • Q&A • Day II Program Evaluation	Classroom A Discussion

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Day III

8:00-8:15	Introduction • Overview of Day III • Review of Learner Objectives	Classroom A
8:15-9:30	Skills Laboratory: Practice • Donning/Doffing PPE • Trained Observer	Skills Lab Student Practice
9:30-10:00	Break	
10:00-11:30	Skills Laboratory: Practice • Specimen Collection: Blood, Urine, Respiratory • Point of Care Testing • Ebola Virus Disease Specimen Collection • Documentation	Skills Lab Student Practice
11:30-12:30	Patient Transportation • Safety & Infection Control Guidelines • Demonstration (Instructor): Transportation Using the Iso-Chamber	Skills Lab Discussion Practice
12:30-1:30	Lunch	
1:30-2:30	Simulation Exercise: Scenario # 3 • Transporting the Patient to the OR	Skills Lab Simulated Practice/ Case Scenario
2:30-3:00	Critical Thinking Exercise: Scenario #4	Classroom A Case Study/ Discussion
3:00-3:15	Break	
3:15-4:15	Skills Laboratory: Practice • Donning PPE • Doffing PPE • Point of Care Testing	Skills Lab Student Practice
4:15-4:30	Summation • Debrief Day III • Q&A • Day III Program Evaluation	Classroom Discussion

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Day IV

8:00-8:15	Introduction • Overview of Day IV • Review of Learner Objectives	Classroom A

8:15-10:00	Skills Validation
	• Donning PPE
	• Doffing PPE
	• Trained Observer
	• Performing Lab Tests
	  ○ Collecting Specimens
	  ○ Point of Care Testing
	• Transportation using the Iso-Chamber
		Skills Lab
		Validation

10:00-10:30	Break	
10:30-12:00	Simulated Practice Session: Scenario # 5	Biocontainment Area Practice Drill
12:00-12:30	Debrief Session • Video Enhanced	Reflection/Discussion
12:30-1:30	Lunch	
1:30-3:00	Simulated Practice Session: Scenario # 6	Biocontainment Area Practice Drill
3:00-3:15	Break	
3:15-3:30	Debrief Session • Video Enhanced	Reflection/Discussion
3:30-4:00	Public Health Surveillance	
4:00-4:30	Summation ○ Debrief Day IV • Q&A • Day IV Program Evaluation	Classroom A Reflection/Discussion

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Day V

8:00-8:15	Introduction • Overview of Day V • Review of Learner Objectives	Classroom A
8:15-10:00	Simulated Practice Session: Scenario # 7 • Practice Drill (85 minutes) • Debrief (20 minutes) ○ Video Enhanced	Biocontainment Area
10:00-10:15	Break	
10:15-10:45	The Nursing Care Self-Efficacy Scale (NCSES)	Classroom A
10:45-11:15	Professional Practice Self-Efficacy • Discussion • Learner Feedback: Experiences that Promote Professional Practice Self-Efficacy • Skill Maintenance and Ongoing Competency	Classroom A Reflection/ Focus Group Interview Discussion
11:15-11:45	Post Test: Care of the Patient Requiring Biocontainment	Classroom A
11:45-12:15	Review Post Test	
12:15 -1:00	Lunch	
1:00-2:00	Critical Thinking Exercises • Scenario #8 (Group 1) • Scenario #9 (Group 2) • Debrief	Case Studies/ Discussion
2:00-2:15	Break	
2:15-4:00	Simulated Practice Session: Scenario #10 • Practice Drill (85 minutes) • Debrief (20 minutes) ○ Video Enhanced	Biocontainment Area
4:00-4:30	Summation • Debrief Day V • Q&A • Day V Program Evaluation	Classroom

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Learner Objectives
Day I

At the completion of Day I of the program entitled Care of the Patient Requiring Biocontainment, the participant will be able to:

- Describe characteristics of each learning style.
- Identify his/her individual learning style.
- List 3 types of highly infectious diseases requiring biocontainment.
- Describe the following for each disease:
  - Epidemiology
  - Pathophysiology
  - Disease Transmission
  - Signs and Symptoms
  - Diagnostic Criteria
- Explain disease management and related treatments for patients with highly infectious diseases.
- Describe 3 priority nursing care guidelines for patients requiring biocontainment.
- Discuss key safety principles for managing patients with highly infectious diseases requiring biocontainment.
- Describe the organization's plan for preparedness related to Ebola Virus and similar types of outbreaks.
- Explain the rationale for an interdisciplinary team approach to caring for patient requiring biocontainment.
- Describe guidelines for protecting health care providers.
- List the steps for donning PPE.
- List the steps for doffing PPE.
- Explain the role of the trained observer.

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Learner Objectives
Day II

At the completion of Day II of the program entitled Care of the Patient Requiring Biocontainment, the participant will be able to:

- Demonstrate the procedure for donning PPE.
- Demonstrate the procedure for doffing PPE.
- Explain the role of the trained observer.
- Demonstrate steps performed by the trained observer to validate adherence to procedure for donning and doffing PPE.
- Describe the biocontainment area, inclusive of cool, warm, and hot zones.
- Explain the role of the incident command center in notifying the team of a suspected or confirmed case of Ebola Virus Disease or other highly infectious disease requiring biocontainment.
- Explain the role and responsibilities of the RN caring for the patient who requires biocontainment.
- Describe the role and responsibilities for each of the following team members:
    - Biocontainment Manager
    - Group Supervisor
    - Infectious Disease Nurse
    - Physician
    - Patient Care Technician
    - Security Officers
    - Environmental Services Personnel
- Demonstrate the following procedures during simulated case scenario:
    - Admission of a Patient
    - Discharge of a Patient
    - Safe handling of body fluids and contaminated items
    - Exposure Management
    - Operating Observation Cameras

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Learner Objectives

Day III

At the completion of Day III of the program entitled Care of the Patient Requiring Biocontainment, the participant will be able to:

- Demonstrate the procedure for donning PPE.
- Demonstrate the procedure for doffing PPE
- Demonstrate steps performed by the trained observer to validate adherence to procedure for donning and doffing PPE.
- Explain infection control guidelines for protecting health care providers, other patients, and the community from spread of EVD or other highly infectious disease requiring biocontainment.
- Perform the following tests on collected specimens:
    - Arterial Blood Gases
    - Chemistry Screen
    - Complete Blood Count
    - HIV
    - Influenza
    - Malaria
    - Urine Pregnancy
    - Urine Chemistry
- Explain the steps for Ebola Virus Disease specimen collection.
- State the guidelines for EVD specimen delivery to the Center for Disease Control.
- Demonstrate the procedure for transporting a patient using the Iso-Chamber.
- Demonstrate critical thinking and decision-making skills as evidence by performance within assigned scenario/case study.

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Learner Objectives
Day IV

At the completion of Day IV of the program entitled Care of the Patient Requiring Biocontainment, the participant will be able to:

- Perform independently the following according to procedure:
  - Donning PPE
  - Doffing PPE
  - Trained Observer Responsibilities
  - Transportation using the Iso-Chamber
  - Tests on collected specimens:
    - Arterial Blood Gases
    - Chemistry Screen
    - Complete Blood Count
    - HIV
    - Influenza
    - Malaria
    - Urine Pregnancy
    - Urine Chemistry
- Describe the process for public health surveillance.
- Demonstrate, critical thinking and decision-making skills which reflect safe and competent care for the patient requiring biocontainment.
- Demonstrate adherence to procedures and guidelines for minimizing the risk of spread of highly infectious diseases.

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Learner Objectives
Day V

At the completion of Day V of the program entitled Care of the Patient Requiring Biocontainment, the participant will be able to:

- Demonstrate, through participation in a simulated drill, critical thinking and decision-making skills which reflect safe and competent care for the patient requiring biocontainment.
- Demonstrate adherence to procedures and guidelines for minimizing the risk of spread of highly infectious diseases.
- Describe professional practice self-efficacy as it relates to competency and performance in the clinical setting.
- Discuss a plan for skill maintenance and on-going competency in the provision of care for patients requiring biocontainment.

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Day I

EVALUATION

Please evaluate each objective using the rating code below. Circle your response.

Code: A = EXCELLENT, B = GOOD, C = FAIR, D = POOR, E = N/A

How were the following objectives met?

Rating					Obj. No.	Objective
A	B	C	D	E	1.	Describe characteristics of each learning style.
A	B	C	D	E	2.	Identify his/her individual learning style.
A	B	C	D	E	3.	List 3 types of highly infectious diseases requiring biocontainment.
--	--	--	--	--	4.	Describe the following for each disease:
A	B	C	D	E	--	a. Epidemiology
A	B	C	D	E	--	b. Pathophysiology
A	B	C	D	E	--	c. Disease Transmission
A	B	C	D	E	--	d. Signs and Symptoms
A	B	C	D	E	--	e. Diagnostic Criteria
A	B	C	D	E	5.	Explain disease management and related treatments for patients with highly infectious diseases.
A	B	C	D	E	6.	Describe 3 priority nursing care guidelines for patients requiring biocontainment.
A	B	C	D	E	7.	Discuss key safety principles for managing patients with highly infectious diseases requiring biocontainment.
A	B	C	D	E	8.	Describe the organization's plan for preparedness related to Ebola Virus and similar types of outbreaks.
A	B	C	D	E	9.	Explain the rationale for an interdisciplinary team approach to caring for patient requiring biocontainment.
A	B	C	D	E	10.	Describe guidelines for protecting health care providers.
A	B	C	D	E	11.	List the steps for donning PPE.
A	B	C	D	E	12.	List the steps for doffing PPE.
A	B	C	D	E	13.	Explain the role of the trained observer.

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Day I

EVALUATION

Please evaluate each instructor in the following categories using the rating code below. Circle your response.

Code: A = EXCELLENT, B = GOOD, C = FAIR, D = POOR, E = N/A

Speaker/Instructor	Knowledge of subject	Presentation orderly and understandable	Effective use of teaching strategies (lecture, discussion, exercises, small groups, role playing, assignments, etc.)
Instructor #1 (name)	A B C D E	A B C D E	A B C D E
Instructor #2 (name)	A B C D E	A B C D E	A B C D E
Instructor #3 (name)	A B C D E	A B C D E	A B C D E
Instructor #4 (name)	A B C D E	A B C D E	A B C D E

What content/learning experiences were most helpful to you?

_____

_____

_____

What content/learning experiences were least helpful to you?

_____

_____

_____

Is there any information that you think should be added to this class?

_____

_____

_____

Overall, I found the learning experience:

_____

_____

_____

Additional Comments:

_____

_____

_____

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment
Day II

EVALUATION

Please evaluate each objective using the rating code below. Circle your response.

Code: A = EXCELLENT, B = GOOD, C = FAIR, D = POOR, E = N/A

How were the following objectives met?

Rating					Obj. No.	Objective
A	B	C	D	E	1.	Demonstrate the procedure for donning PPE.
A	B	C	D	E	2.	Demonstrate the procedure for doffing PPE.
A	B	C	D	E	3.	Explain the role of the trained observer.
A	B	C	D	E	4.	Demonstrate steps performed by the trained observer to validate adherence to procedure for donning and doffing PPE.
A	B	C	D	E	5.	Describe the biocontainment area, inclusive of cool, warm, and hot zones.
A	B	C	D	E	6.	Explain the role of the incident command center in notifying the team of a suspected or confirmed case of Ebola Virus Disease or other highly infectious disease requiring biocontainment.
A	B	C	D	E	7.	Explain the role and responsibilities of the RN caring for the patient who requires biocontainment.
--	--	--	--	--	8.	Describe the role and responsibilities for each of the following team members:
A	B	C	D	E	--	a. Biocontainment Manager
A	B	C	D	E	--	b. Group Supervisor
A	B	C	D	E	--	c. Infectious Disease Nurse
A	B	C	D	E	--	d. Physician
A	B	C	D	E	--	e. Patient Care Technician
A	B	C	D	E	--	f. Security Officers
A	B	C	D	E	--	g. Environmental Services Personnel
--	--	--	--	--	9.	Demonstrate the following procedures during simulated case scenario:
A	B	C	D	E	--	a. Admission of a Patient
A	B	C	D	E	--	b. Discharge of a Patient
A	B	C	D	E	--	c. Safe handling of body fluids and contaminated items
A	B	C	D	E	--	d. Operating Observation Cameras
A	B	C	D	E	--	e. Exposure management

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment
Day II

EVALUATION

Please evaluate each instructor in the following categories using the rating code below. Circle your response.

Code: A = EXCELLENT, B = GOOD, C = FAIR, D = POOR, E = N/A

Speaker/Instructor	Knowledge of subject	Presentation orderly and understandable	Effective use of teaching strategies (lecture, discussion, exercises, small groups, role playing, assignments, etc.)
Instructor #1 (name)	A B C D E	A B C D E	A B C D E
Instructor #2 (name)	A B C D E	A B C D E	A B C D E
Instructor #3 (name)	A B C D E	A B C D E	A B C D E
Instructor #4 (name)	A B C D E	A B C D E	A B C D E

What content/learning experiences were most helpful to you?

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What content/learning experiences were least helpful to you?

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Is there any information that you think should be added to this class?

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Overall, I found the learning experience:

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Additional Comments:

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Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Day III

EVALUATION

Please evaluate each objective using the rating code below. Circle your response.

Code: A = EXCELLENT, B = GOOD, C = FAIR, D = POOR, E = N/A

How were the following objectives met?

Rating					Obj. No.	Objective
A	B	C	D	E	1.	Demonstrate the procedure for donning PPE.
A	B	C	D	E	2.	Demonstrate the procedure for doffing PPE
A	B	C	D	E	3.	Demonstrate steps performed by the trained observer to validate adherence to procedure for donning and doffing PPE.
A	B	C	D	E	4.	Explain infection control guidelines for protecting health care providers, other patients, and the community from spread of EVD or other highly infectious disease requiring biocontainment.
--	--	--	--	--	5.	Perform the following tests on collected specimens:
A	B	C	D	E	--	a. Arterial Blood Gases
A	B	C	D	E	--	b. Chemistry Screen
A	B	C	D	E	--	c. Complete Blood Count
A	B	C	D	E	--	d. HIV
A	B	C	D	E	--	e. Influenza
A	B	C	D	E	--	f. Malaria
A	B	C	D	E	--	g. Urine Pregnancy
A	B	C	D	E	--	h. Urine Chemistry
A	B	C	D	E	6.	Explain the steps for Ebola Virus Disease specimen collection.
A	B	C	D	E	7.	State the guidelines for EVD specimen delivery to the Center for Disease Control.
A	B	C	D	E	8.	Demonstrate the procedure for transporting a patient using the Iso-Chamber.
A	B	C	D	E	9.	Demonstrate critical thinking and decision-making skills as evidence by performance within assigned scenario/case study.

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Day III

EVALUATION

Please evaluate each instructor in the following categories using the rating code below. Circle your response.

Code: A = EXCELLENT, B = GOOD, C = FAIR, D = POOR, E = N/A

Speaker/Instructor	Knowledge of subject	Presentation orderly and understandable	Effective use of teaching strategies (lecture, discussion, exercises, small groups, role playing, assignments, etc.)
Instructor #1 (name)	A B C D E	A B C D E	A B C D E
Instructor #2 (name)	A B C D E	A B C D E	A B C D E
Instructor #3 (name)	A B C D E	A B C D E	A B C D E
Instructor #4 (name)	A B C D E	A B C D E	A B C D E

What content/learning experiences were most helpful to you?

_____

_____

_____

What content/learning experiences were least helpful to you?

_____

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_____

Is there any information that you think should be added to this class?

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Overall, I found the learning experience:

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_____

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Additional Comments:

_____

_____

_____

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Day IV

EVALUATION

Please evaluate each objective using the rating code below. Circle your response.

Code: A = EXCELLENT, B = GOOD, C = FAIR, D = POOR, E = N/A

How were the following objectives met?

Rating					Obj. No.	Objective
--	--	--	--	--	1.	Perform independently the following according to procedure:
A	B	C	D	E	--	a. Donning PPE
A	B	C	D	E	--	b. Doffing PPE
A	B	C	D	E	--	c. Trained Observer Responsibilities
A	B	C	D	E	--	d. Transportation using the Iso-Chamber
--	--	--	--	--	--	e. Tests on collected specimens:
A	B	C	D	E	--	i. Arterial Blood Gases
A	B	C	D	E	--	ii. Chemistry Screen
A	B	C	D	E	--	iii. Complete Blood Count
A	B	C	D	E	--	iv. HIV
A	B	C	D	E	--	v. Influenza
A	B	C	D	E	--	vi. Malaria
A	B	C	D	E	--	vii. Urine Pregnancy
A	B	C	D	E	--	viii. Urine Chemistry
A	B	C	D	E	2.	Describe the process for public health surveillance.
A	B	C	D	E	3.	Demonstrate, critical thinking and decision-making skills which reflect safe and competent care for the patient requiring biocontainment.
A	B	C	D	E	4.	Demonstrate adherence to procedures and guidelines for minimizing the risk of spread of highly infectious diseases.

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Day IV

EVALUATION

Please evaluate each instructor in the following categories using the rating code below. Circle your response.

Code: A = EXCELLENT, B = GOOD, C = FAIR, D = POOR, E = N/A

Speaker/Instructor	Knowledge of subject	Presentation orderly and understandable	Effective use of teaching strategies (lecture, discussion, exercises, small groups, role playing, assignments, etc.)
Instructor #1 (name)	A B C D E	A B C D E	A B C D E
Instructor #2 (name)	A B C D E	A B C D E	A B C D E
Instructor #3 (name)	A B C D E	A B C D E	A B C D E
Instructor #4 (name)	A B C D E	A B C D E	A B C D E

What content/learning experiences were most helpful to you?

_____

_____

_____

What content/learning experiences were least helpful to you?

_____

_____

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Is there any information that you think should be added to this class?

_____

_____

_____

Overall, I found the learning experience:

_____

_____

_____

Additional Comments:

_____

_____

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Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Day V

EVALUATION

Please evaluate each objective using the rating code below:

Code: A = EXCELLENT, B = GOOD, C = FAIR, D = POOR, E = N/A

How were the following objectives met?

Rating					Obj. No.	Objective
A	B	C	D	E	1.	Demonstrate, through participation in a simulated drill, critical thinking and decision-making skills which reflect safe and competent care for the patient requiring biocontainment.
A	B	C	D	E	2.	Demonstrate adherence to procedures and guidelines for minimizing the risk of spread of highly infectious diseases.
A	B	C	D	E	3.	Describe professional practice self-efficacy as it relates to competency and performance in the clinical setting.
A	B	C	D	E	4.	Discuss a plan for skill maintenance and on-going competency in the provision of care for patients requiring biocontainment.

Please evaluate each instructor in the following categories using the rating code below. Circle your response.

Code: A = EXCELLENT, B = GOOD, C = FAIR, D = POOR, E = N/A

Speaker/Instructor	Knowledge of subject	Presentation orderly and understandable	Effective use of teaching strategies (lecture, discussion, exercises, small groups, role playing, assignments, etc.)
Instructor #1 (name)	A B C D E	A B C D E	A B C D E
Instructor #2 (name)	A B C D E	A B C D E	A B C D E
Instructor #3 (name)	A B C D E	A B C D E	A B C D E
Instructor #4 (name)	A B C D E	A B C D E	A B C D E

What content/learning experiences were most helpful to you?

_____

_____

_____

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Day V

EVALUATION

What content/learning experiences were least helpful to you?

Is there any information that you think should be added to this class?

Overall, I found the learning experience:

Additional Comments:

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Pre Test

Date:	Name:	Cost Center:

Directions: There is one correct response for each item. Please fill in the circle next to the best response.

1. The Ebola Virus Disease:
   a. Is spread through contact with blood/body fluids of an infected person, or contaminated needles and other objects
   b. Includes the Marburg Virus and Cueva Virus
   c. Is a highly infectious, potentially lethal disease
   d. Is a respiratory disease spread via the airborne route

   ○ a, b, c
   ○ a, c
   ○ a, d
   ○ all of the above

2. Ebola Virus is a member of the:
   a. Tymovirales family
   b. Caudovirales family
   c. Rhadoviridae family
   d. Filoviridae family

   ○ a
   ○ b
   ○ c
   ○ d

3. Standard treatment for suspected Ebola Virus Disease or other highly infectious diseases includes:
   a. Monitoring the patient at home until a confirmed diagnosis of Ebola Virus Disease or other highly infectious disease
   b. Management of fluid and electrolyte imbalances
   c. Maintaining safe oxygen levels and blood pressure
   d. Managing symptoms, such as high fever, vomiting, pain

   ○ a, b, d
   ○ a, b, c
   ○ b, c, d
   ○ all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Pre Test

4. Transmission of the Ebola virus can occur:
   a. Between family member and close contacts
   b. Upon contact with dead bodies
   c. Between infected patients and medical staff
   d. Through breaches in barrier nursing and/or reusing medical equipment

   - a, b, c
   - a, c, d
   - a, d
   - all of the above

5. Which statements are true regarding Biocontainment Units:
   a. Provide for containment of extremely pathogenic organisms usually by isolation in a secure room or facility to prevent accidental release to the environment or others
   b. Allow for the provision of treatment affected by bio terrorism or extremely infectious naturally occurring diseases
   c. Provide a means to help contain an outbreak or stop an outbreak
   d. Allow for timely diagnosis and immediate treatment of suspected or confirmed case of highly infectious diseases

   - a only
   - b only
   - a, b, c
   - all of the above

6. Early recognition is critical for infection control. The CDC recommends testing for all persons with onset of fever within 21 days of having a high-risk exposure. High-risk exposure includes the following:
   a. Percutaneous or mucous membrane exposure with body fluids of a person with suspected or confirmed Ebola Virus Disease
   b. Direct skin contact with body fluids of a person with suspected or confirmed Ebola Virus Disease
   c. Participation in funeral rites or other direct exposure to human remains of a person with suspected or confirmed Ebola Virus Disease
   d. Contact with human remains in the geographic area or recently in the geographic area where the outbreak of Ebola Virus Disease is occurring

   - a, c, d
   - b, d
   - a, b, c
   - all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Pre Test

7. In addition to Ebola Virus Disease, other highly contagious and deadly infections requiring biocontainment are:
   a. SARS, MERS, Monkeypox
   b. Lassa Fever, severe pneumonia
   c. SARS, MERS, Monkeypox, Lassa Fever, multidrug resistant TB
   d. Lassa Fever, MERS

   ○ a
   ○ b
   ○ c
   ○ d

8. Common symptoms of Ebola Virus Disease are:
   a. Fever, coughing, severe headache
   b. Muscle and joint pain, vomiting, diarrhea
   c. Loss of appetite, shortness of breath, bleeding
   d. Chest pain, a skin rash consisting of discoloration and raised spots

   ○ a, d
   ○ a, b
   ○ a, b, c
   ○ All of the Above

9. Low risk exposure to Ebola Virus Disease includes:
   a. People who spent time in a health care facility where patients who have Ebola Virus Disease are being treated
   b. Health care workers who used appropriate PPE
   c. Employees at the healthcare facility not involved in the care of a patient with Ebola Virus Disease
   d. Individuals in the U.S who had direct contact with bats, rodents, or primates

   ○ a, b, c
   ○ a, b
   ○ a, c
   ○ all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Pre Test

10. When cases of the disease appear, health care providers must:
    a. Be able to recognize a case of Ebola Virus Disease or other highly infectious disease
    b. Immediately implement isolation precautions and barrier techniques
    c. Have the capability to request diagnostic tests
    d. Have the skill to prepare blood samples for shipping and testing elsewhere

    ○ a, b
    ○ b only
    ○ a, b, d
    ○ all of the above

11. The Center for Disease Control emphasizes which of the following elements to ensure correct donning and doffing of Personal Protective Equipment:
    a. Training, Practice
    b. Competence, Full body coverage with PPE
    c. Oversight for barrier nursing procedures
    d. Direct observation of health care workers during PPE donning and doffing processes

    ○ a, b
    ○ b only
    ○ b, d
    ○ all of the above

For questions 12-16, please indicate True or False:

12. Prior to working with patients with Ebola Virus Disease or other infectious diseases requiring biocontainment, all health care providers must receive training and demonstrated competence in performing donning and doffing of PPE and other infection control measures.

    ○ True
    ○ False

13. The overall safe care of patients with Ebola Virus Disease or other infectious diseases requiring biocontainment must be overseen by an onsite manager at all times.

    ○ True
    ○ False

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Pre Test

14. Each step of PPE donning and doffing must be supervised by a trained observer to ensure strict adherence to the procedure, thus minimizing potential exposure.

    - True
    - False

15. Double gloving is an option for the nurse caring for the patient requiring biocontainment in that it provides an extra layer of safety during direct patient care and during the doffing process.

    - True
    - False

16. If during patient care there is a breach in PPE (e.g., glove tear) the nurse must immediately move to the hot zone to assess the exposure and implement the exposure plan as indicated by hospital policy.

    - True
    - False

17. Key safe work practices include:
    a. Limiting the number of health care workers who come into contact with the patient who is biocontained
    b. Ensuring that practical precautions are taken during patient care, such as keeping hands away from face, preventing needles sticks, and performing frequent disinfection of gloved hands using an alcohol-based hand rub
    c. Managing contaminated fluid spills according to infection control policies
    d. Performing regular cleaning and disinfection of the patient care area surfaces by either the nurse or environmental specialist

    - a, c
    - a, b
    - a, b, c
    - all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Pre Test

Please answer questions # 18, # 19, and #20 based on the following case study:

M. J. is a 42 year old white male who returned from Sierra Leone 2 days ago. He provided care for patients with suspected and confirmed diagnoses of Ebola Virus Disease. He presents to the Emergency Trauma Department with fever of 102°F, chills, general body aches, and vomiting.

18. The intake nurse immediately:
    a. Reports this case to the CDC
    b. Considers this to be a suspected case of Ebola Virus Disease and takes steps to immediately contain the patient
    c. Has the patient remain in the triage area while the Biocontainment Room is prepared
    d. Contacts Security to limit access of patients and visitors to the area in which the patient remains

    - a, b
    - a, c
    - b only
    - all of the above

19. As per protocol for Point of Care Testing, Chemstrip 7 Urine Dipstick is performed for this patient. The initial reading at 1 minute is "trace." Which test pad(s) must be re-read at the 2 minute point?
    a. Glucose
    b. Nitrite
    c. Blood
    d. Leukocyte

    - a, b
    - d
    - a, b, c
    - all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Pre Test

20. The patient MJ begins to experience extreme abdominal pain. Upon examination by the physician, it is determined that he needs to be transferred immediately to the operating room. The nurse immediately prepares the Iso-Chamber in anticipation of patient transfer. The purpose of the Iso-Chamber is to :
    a. Protect the environment
    b. Protect health care workers
    c. Provide temporary emergency isolation
    d. Safely transport biological, chemical, or radiation event victims

    - a only
    - a, b, c
    - a, c
    - all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Post Test

Date:	Name:	Cost Center:

Directions: There is one correct response for each item. Please fill in the circle next to the best response.

1. The Ebola Virus Disease:
   e. Is spread through contact with blood/body fluids of an infected person, or contaminated needles and other objects
   f. Includes the Marburg Virus and Cueva Virus
   g. Is a highly infectious, potentially lethal disease
   h. Is a respiratory disease spread via the airborne route

   ○ a, b, c
   ○ a, c
   ○ a, d
   ○ all of the above

2. Ebola Virus is a member of the:
   e. Tymovirales family
   f. Caudovirales family
   g. Rhadoviridae family
   h. Filoviridae family

   ○ a
   ○ b
   ○ c
   ○ d

3. Standard treatment for suspected Ebola Virus Disease or other highly infectious diseases includes:
   e. Monitoring the patient at home until a confirmed diagnosis of Ebola Virus Disease or other highly infectious disease
   f. Management of fluid and electrolyte imbalances
   g. Maintaining safe oxygen levels and blood pressure
   h. Managing symptoms, such as high fever, vomiting, pain

   ○ a, b, d
   ○ a, b, c
   ○ b, c, d
   ○ all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Post Test

4. Transmission of the Ebola virus can occur:
   e. Between family member and close contacts
   f. Upon contact with dead bodies
   g. Between infected patients and medical staff
   h. Through breaches in barrier nursing and/or reusing medical equipment

   - a, b, c
   - a, c, d
   - a, d
   - all of the above

5. Which statements are true regarding Biocontainment Units:
   e. Provide for containment of extremely pathogenic organisms usually by isolation in a secure room or facility to prevent accidental release to the environment or others
   f. Allow for the provision of treatment affected by bio terrorism or extremely infectious naturally occurring diseases
   g. Provide a means to help contain an outbreak or stop an outbreak
   h. Allow for timely diagnosis and immediate treatment of suspected or confirmed case of highly infectious diseases

   - a only
   - b only
   - a, b, c
   - all of the above

6. Early recognition is critical for infection control. The CDC recommends testing for all persons with onset of fever within 21 days of having a high-risk exposure. High-risk exposure includes the following:
   e. Percutaneous or mucous membrane exposure with body fluids of a person with suspected or confirmed Ebola Virus Disease
   f. Direct skin contact with body fluids of a person with suspected or confirmed Ebola Virus Disease
   g. Participation in funeral rites or other direct exposure to human remains of a person with suspected or confirmed Ebola Virus Disease
   h. Contact with human remains in the geographic area or recently in the geographic area where the outbreak of Ebola Virus Disease is occurring

   - a, c, d
   - b, d
   - a, b, c
   - all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Post Test

7. In addition to Ebola Virus Disease, other highly contagious and deadly infections requiring biocontainment are:
   e. SARS, MERS, Monkeypox
   f. Lassa Fever, severe pneumonia
   g. SARS, MERS, Monkeypox, Lassa Fever, multidrug resistant TB
   h. Lassa Fever, MERS

   ○ a
   ○ b
   ○ c
   ○ d

8. Common symptoms of Ebola Virus Disease are:
   e. Fever, coughing, severe headache
   f. Muscle and joint pain, vomiting, diarrhea
   g. Loss of appetite, shortness of breath, bleeding
   h. Chest pain, a skin rash consisting of discoloration and raised spots

   ○ a, d
   ○ a, b
   ○ a, b, c
   ○ All of the Above

9. Low risk exposure to Ebola Virus Disease includes:
   e. People who spent time in a health care facility where patients who have Ebola Virus Disease are being treated
   f. Health care workers who used appropriate PPE
   g. Employees at the healthcare facility not involved in the care of a patient with Ebola Virus Disease
   h. Individuals in the U.S who had direct contact with bats, rodents, or primates

   ○ a, b, c
   ○ a, b
   ○ a, c
   ○ all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Post Test

10. When cases of the disease appear, health care providers must:
    e. Be able to recognize a case of Ebola Virus Disease or other highly infectious disease
    f. Immediately implement isolation precautions and barrier techniques
    g. Have the capability to request diagnostic tests
    h. Have the skill to prepare blood samples for shipping and testing elsewhere

    - a, b
    - b only
    - a, b, d
    - all of the above

11. The Center for Disease Control emphasizes which of the following elements to ensure correct donning and doffing of Personal Protective Equipment:
    e. Training, Practice
    f. Competence, Full body coverage with PPE
    g. Oversight for barrier nursing procedures
    h. Direct observation of health care workers during PPE donning and doffing processes

    - a, b
    - b only
    - b, d
    - all of the above

For questions 12-16, please indicate True or False:

12. Prior to working with patients with Ebola Virus Disease or other infectious diseases requiring biocontainment, all health care providers must receive training and demonstrated competence in performing donning and doffing of PPE and other infection control measures.

    - True
    - False

13. The overall safe care of patients with Ebola Virus Disease or other infectious diseases requiring biocontainment must be overseen by an onsite manager at all times.

    - True
    - False

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Post Test

14. Each step of PPE donning and doffing must be supervised by a trained observer to ensure strict adherence to the procedure, thus minimizing potential exposure.

    - ○ True
    - ○ False

15. Double gloving is an option for the nurse caring for the patient requiring biocontainment in that it provides an extra layer of safety during direct patient care and during the doffing process.

    - ○ True
    - ○ False

16. If during patient care there is a breach in PPE (e.g., glove tear) the nurse must immediately move to the hot zone to assess the exposure and implement the exposure plan as indicated by hospital policy.

    - ○ True
    - ○ False

17. Key safe work practices include:
    a. Limiting the number of health care workers who come into contact with the patient who is biocontained
    b. Ensuring that practical precautions are taken during patient care, such as keeping hands away from face, preventing needles sticks, and performing frequent disinfection of gloved hands using an alcohol-based hand rub
    c. Managing contaminated fluid spills according to infection control policies
    d. Performing regular cleaning and disinfection of the patient care area surfaces by either the nurse or environmental specialist

    - ○ a, c
    - ○ a, b
    - ○ a, b, c
    - ○ all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Post Test

Please answer questions # 18, # 19, and #20 based on the following case study:

M. J. is a 42 year old white male who returned from Sierra Leone 2 days ago. He provided care for patients with suspected and confirmed diagnoses of Ebola Virus Disease. He presents to the Emergency Trauma Department with fever of 102°F, chills, general body aches, and vomiting.

18. The intake nurse immediately:
    e. Reports this case to the CDC
    f. Considers this to be a suspected case of Ebola Virus Disease and takes steps to immediately contain the patient
    g. Has the patient remain in the triage area while the Biocontainment Room is prepared
    h. Contacts Security to limit access of patients and visitors to the area in which the patient remains

    - a, b
    - a, c
    - b only
    - all of the above

19. As per protocol for Point of Care Testing, Chemstrip 7 Urine Dipstick is performed for this patient. The initial reading at 1 minute is "trace." Which test pad(s) must be re-read at the 2 minute point?
    e. Glucose
    f. Nitrite
    g. Blood
    h. Leukocyte

    - a, b
    - d
    - a, b, c
    - all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center

Care of the Patient Requiring Biocontainment

Biocontainment Post Test

20. The patient MJ begins to experience extreme abdominal pain. Upon examination by the physician, it is determined that he needs to be transferred immediately to the operating room. The nurse immediately prepares the Iso-Chamber in anticipation of patient transfer. The purpose of the Iso-Chamber is to :

    e. Protect the environment
    f. Protect health care workers
    g. Provide temporary emergency isolation
    h. Safely transport biological, chemical, or radiation event victims

    - a only
    - a, b, c
    - a, c
    - all of the above

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Donning Personal Protection Equipment (PPE)

	Critical Elements	*Met*	*Not Met*
1.	Performs donning in a clean area	☐	☐
2.	Ties hair up and back from face	☐	☐
3.	Performs hand hygiene	☐	☐
4.	Applies boot covers	☐	☐
5.	Dons surgical cap/hair cover	☐	☐
6.	Dons gown	☐	☐
7.	Applies N95 respirator	☐	☐
8.	Performs a fit check of the respirator	☐	☐
9.	Applies face shield	☐	☐
10.	Applies standard gloves	☐	☐
11.	Applies long cuff nitrile gloves over the standard gloves	☐	☐
12.	Utilizes donning partner for assistance	☐	☐

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Doffing Personal Protection Equipment (PPE)

No.	Critical Elements	*Met*	*Not Met*
1.	Uses chlorox bleach wipe to clean long cuff nitrile gloves. Uses second chlorox wipe to open the door to the decontamination room	☐	☐
2.	Steps out of patient room into decontamination room with trash receptacle at door	☐	☐
3.	Removes the long cuff nitrile gloves using glove-in-glove technique and discards in trash	☐	☐
4.	Unties gown	☐	☐
5.	Maintains clean gown sleeves over gloved hands, gathers the gown, keeping dirty surfaces to the inside	☐	☐
6.	Discards gown in the trash	☐	☐
7.	Removes the inner gloves using glove-in-glove technique	☐	☐
8.	Performs hand hygiene	☐	☐
9.	Applies new pair of gloves	☐	☐
10.	Appropriately removes the leg/boot covers one at a time	☐	☐
11.	Steps into decontamination room	☐	☐
12.	Removes the standard patient care gloves using glove-in-glove technique and discards in trash	☐	☐
13.	Utilizes doffing partner	☐	☐
14.	Places N95 in trash	☐	☐
15.	Removes the surgical cap	☐	☐
16.	Places surgical cap in trash	☐	☐
17.	Performs hand hygiene	☐	☐
18.	Applies new pair of gloves	☐	☐
19.	Applies new pair of gloves	☐	☐
20.	Removes scrubs and showers	☐	☐

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Doffing Personal Protection Equipment (PPE)

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Iso-Chamber

	Critical Elements	*Met*	*Not Met*
1.	Unpacks chamber	☐	☐
2.	Unfolds chamber	☐	☐
3.	Identifies foot end by Velcro	☐	☐
4.	Inspects visually the chamber for any signs of visible damage (tears, cracks)	☐	☐
5.	Inspects all ports and hand tightens as necessary	☐	☐
6.	Prepares 6 filter canisters by removing seals	☐	☐
7.	Screws 3 filter canisters into outside of the 3 red head-end port caps, hand tightens	☐	☐
8.	Screws 3 filter canisters into inside of the 3 red head-end port caps, hand tightens	☐	☐
9.	Installs blower on foot end of chamber (points exhaust port up)	☐	☐
10.	Feeds velcro straps through slots on sides of blower	☐	☐
11.	Connects battery cables	☐	☐
12.	Tests power by pushing on/off switch	☐	☐
13.	Connects blower hoses	☐	☐
14.	Turns on blower and checks blower operation	☐	☐
15.	Connects oxygen	☐	☐
16.	Places patient in open Iso-Chamber	☐	☐
17.	Completely zips chamber closed	☐	☐
18.	Checks for air flow	☐	☐
19.	Uses black straps to lift patient	☐	☐
20.	Checks airflow ever 15 to 30 minutes using airflow indicator	☐	☐
21.	Observes float (must stay above Pass Line)	☐	☐
22.	Does not leave airflow indicator tube in blower	☐	☐
23.	Keeps a 6 D cell alkaline batteries available with the Iso-Chamber while in use	☐	☐
24.	Post transportation, disinfects and all accessories by wiping down with the hospital approved disinfectant	☐	☐
25.	Repacks accessories	☐	☐
26.	Documents in the electronic record the destination, time of transportation to and from the destination, patient tolerance, other pertinent specific patient information	☐	☐

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Iso-Chamber

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Biocontainment Simulated Drill

Scenario #: _____

	Critical Elements	*Met*	*Not Met*
1.	Role identification of team members	☐	☐
2.	Appropriate staging/preparation of the hot zone	☐	☐
3.	Donning of PPE as per protocol • Primary Caregiver • Secondary Caregiver • Trained Observer	☐ ☐ ☐	☐ ☐ ☐
4.	Entry into Hot Zone as per protocol	☐	☐
5.	Process for receiving care of the patient as per protocol	☐	☐
6.	Assessment, triage, and registration as per protocol	☐	☐
7.	IV insertion and lab draws as per protocol	☐	☐
8.	Adherence to EVS procedures in the Hot Zone	☐	☐
9.	Exit from Hot Zone to Warm Zone as per protocol	☐	☐
10.	Doffing of PPE as per protocol • Primary Caregiver • Secondary Caregiver • Trained Observer	☐ ☐ ☐	☐ ☐ ☐
11.	Cleaning of PAPR as per protocol	☐	☐
12.	Cleaning of radio as per protocol	☐	☐
13.	Adherence to ES procedures in the Warm Zone	☐	☐
14.	Waste removal as per protocol	☐	☐
15.	Exit from Warm Zone as per protocol	☐	☐
16.	Recovery procedure as per protocol	☐	☐
17.	Continuous monitoring of team members in Hot Zone and Warm Zone	☐	☐
18.	Manages exposure per protocol.	☐	☐
Hand Hygiene (count # times): *Observed Occurrences:* _____ *Opportunities:* _____			

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Biocontainment Simulated Drill

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Laboratory Test
Antigen/Antibody Combo

	Critical Elements	*Met*	*Not Met*
1.	Tears one strip from the right and remove cover. (Assay should be initiated within 2 hours after removing the protective foil cover from each test)	☐	☐
2.	Places one strip inside the workstation on a flat surface	☐	☐
3.	Inverts blood tube 5-10 times and using the precision pipette, add 50 microliter of whole blood to the Sample Pad	☐	☐
4.	Waits 1 minute and add one drop of Chase Buffer to the Sample Pad	☐	☐
5.	Reads the Test Result between 20 and 30 minutes after the after the addition of the Chase Buffer. (Does not read the test after 30 minutes) Note: The control line should appear for all results. If it does not appear, the results are invalid and should be repeated	☐	☐
6.	Ensures control line appears for all results. If it does not appear, the results are invalid and should be repeated	☐	☐

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Laboratory Test
Beckman AcT Diff

	Critical Elements	*Met*	*Not Met*
Running Quality Controls			
1.	After warming tube to room temperature, mixes each control tube 8 times by gently rolling between hands	☐	☐
2.	Selects select the "**QA**" icon on the Main Screen	☐	☐
3.	Selects the "**4C PLUS RUN**" icon on the QA screen,	☐	☐
4.	Selects the correct control level: **L** – for Low **N** – for Normal **H** – for High	☐	☐
5.	Gently inverts the control tube twice. Does not shake	☐	☐
6.	Places the control sample in the tube holder and closes the door	☐	☐
7.	When tube holder door opens, removes the control vial and returns to the refrigerator	☐	☐
8.	Notes results, which appear on the screen	☐	☐
9.	Repeat steps 4-11 for each required control level	☐	☐
Running a Specimen			
1.	Draws blood in a purple top tube. Does not refrigerate sample	☐	☐
2.	Mixes each control tube 8 times by gently rolling between hands	☐	☐
3.	On the main screen selects **Closed Vial Whole Blood** mode	☐	☐
4.	On the Main screen selects the **Sample Results Screen** icon	☐	☐
5.	Enters patient ID, selects **Save**	☐	☐
6.	Gently inverts sample tube twice. Does not shake	☐	☐
7.	Places sample into holder on lower right corner	☐	☐
8.	Closes the door	☐	☐
9.	When the door opens removes the tube	☐	☐
10.	Communicates the results to the buddy to ensure documentation in EPIC Note: Results appear on the screen	☐	☐

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Laboratory Test
Beckman AcT Diff

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Laboratory Test
BD Veritor System for Rapid Detection of Flu A and B

	Critical Elements	*Met*	*Not Met*
1.	Removes a reagent tube, test device and pipette from the kit and label with patient's name	☐	☐
2.	Removes the cap from the tube and discard	☐	☐
3.	Adds 300 microliter of vortexed sample to the tube using the pipette	☐	☐
4.	Presses the attached tip firmly onto the tube	☐	☐
5.	Mix thoroughly using Vortex	☐	☐
6.	Inverts tubes and adds 3 drops to the test device sample well	☐	☐
7.	Runs test run for 10 minutes before inserting into reader	☐	☐
8.	Power-on the reader when the test is ready. When prompted, inserts the test device into the reader and reads the results on the screen (Note: Test results must not be read visually)	☐	☐

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Laboratory Test
BinaxNow Malaria Test

	Critical Elements	*Met*	*Not Met*
1.	Uses blood specimen from lavender top tube	☐	☐
2.	Applies 15 microliters of specimen to purple pad	☐	☐
3.	Adds 2 drops of Reagent A to white pad below the purple pad	☐	☐
4.	Allows blood sample to run the full length of the test strip	☐	☐
5.	Waits 1 minute and adds additional drop of Reagent A if blood sample does not flow the entire length of the test strip	☐	☐
6.	Adds 4 drops of Reagent A to wash pad on the top left side of the device	☐	☐
7.	Removes adhesive and closes device by pressing firmly	☐	☐
8.	Reads test 15 minutes after closing the device	☐	☐
9.	Interprets result as per package insert guide	☐	☐

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Laboratory Test
Piccolo Xpress Chemistry Analyzer

	Critical Elements	*Met*	*Not Met*
1.	Draws blood specimen in a green top tube	☐	☐
2.	Analyzes within 60 minute of draw Note: To prevent hemolysis does not shake or refrigerate	☐	☐
3.	Removes top of tube	☐	☐
4.	Using the Piccolo 100µl volume pipette, firmly attaches a tip	☐	☐
5.	With index finger or thumb, pushes the pipette button & holds it down for sample pickup	☐	☐
6.	Immerses the tip 2-3 mm below the surface of the sample	☐	☐
7.	SLOWLY releases the button to pick up the sample. Pauses and removes pipette from the sample tube	☐	☐
8.	Ensures there are no air bubbles or gaps in the tip	☐	☐
9.	Places pipette tip into the disc chamber, tilts the disc to 45° with the sample port above the fill line	☐	☐
10.	Pushes the plunger down with a slow, continuous motion. Does not overfill sample chamber	☐	☐
11.	Presses the power button to turn the analyzer on	☐	☐
12.	Presses analyze on the touchscreen to open the disc drawer	☐	☐
13.	Places the disc in the recessed area in the drawer	☐	☐
14.	Presses **CLOSE** on the touchscreen	☐	☐
15.	Selects sample type **Patient**	☐	☐
16.	Enters patient ID number, then presses **Done** Note: When finished processing, touch screen states analysis complete	☐	☐
17.	To view results presses **Recall** icon	☐	☐
18.	Communicates results to Buddy to document in EPIC	☐	☐
19.	Presses **OPEN** remove the disc & discard	☐	☐

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Laboratory Test
Piccolo Xpress Chemistry Analyzer

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Laboratory Test
Urine Pregnancy Test by Quidel Quickvue

	Critical Elements	*Met*	*Not Met*
1.	Describes the purpose of the test	☐	☐
2.	Demonstrates compliance with Standard Precautions; wears gloves	☐	☐
3.	Explains how often each individual must	☐	☐
4.	Explains what supplies are needed to perform this test & where to get them	☐	☐
5.	Explains the proper storage for the TEST KITS and CONTROLS (including the Expiration date & dating the kit when opened)	☐	☐
6.	Describes the 2 types of Quality Controls (Internal & External) used in this test	☐	☐
7.	Describes the type of specimen	☐	☐
8.	Explains the STEPS of the test procedure	☐	☐
9.	States the # of drops of urine needed & where to apply them	☐	☐
10.	States how long to wait before test results can be read	☐	☐
11.	Explains how to read both INTERNAL QC's & what to do if they do not perform as expected	☐	☐
12.	Explains where the RESULT is read on the REACTION UNIT and how to interpret it	☐	☐
13.	States the lowest detectable amount of bHCG that can be detected by this test kit	☐	☐
14.	Explains False Negatives and False Positives (including DILUTE Urines)	☐	☐
15.	Explains how to document the patient's result and all control results	☐	☐
16.	Explains that all QUESTIONABLE results should be confirmed with a Serum bHCG level	☐	☐

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Laboratory Test
Urine Pregnancy Test by Quidel Quickvue

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Competency Validation Checklist
Laboratory Test

	Critical Elements	*Met*	*Not Met*
1.	Describes the purpose of the test	☐	☐
2.	Demonstrates compliance with standard precautions; wears gloves	☐	☐
3.	Explains how often each individual must be revalidated	☐	☐
4.	Explains what supplies are needed to perform this test	☐	☐
5.	Explains the proper storage for the test strips	☐	☐
6.	Explains what QC protocol their area follow	☐	☐
7.	Describes the type of specimens which are used for this test	☐	☐
8.	Describes the proper technique for immersing the test strip in the urine	☐	☐
9.	States the amount of time needed to wait prior to reading the test strip	☐	☐
10.	States the fact that if leukocytes are initially read as "trace" the test pad must be re-read at 2 minutes	☐	☐
11.	Explains procedure for documenting patient and/ or QC results	☐	☐
12.	Describes normal values	☐	☐
13.	Explains drug and chemical interferences	☐	☐

Comments:

Student Name (please print):
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment

Guidelines for Simulation Exercises and Critical Thinking Exercises

- Simulation exercises and critical thinking exercises are designed to provide experiential learning for nurses who care for patients requiring biocontainment
- All simulation exercises and critical thinking exercises are based on a case study representative of a possible event in the clinical setting
- Roles and responsibilities of participants in simulation exercises are:
    - RN: active role in caring for the patient and performing skills, initiates actions in response to the simulated case, participates in the debriefing session
    - Trained Observer: observes each step of the donning and doffing procedures and other procedures and techniques used by the nurse during the delivery of care to the patient, participates in the debriefing session
    - Facilitator: provides the case scenario, guides discussion during debriefing, resolves questions, provides feedback, completes performance checklist
- Roles and responsibilities of participants in critical thinking exercises are:
    - RN: participates in discussion and explains actions to be taken in caring for the patient, based on the case scenario and learner objectives, offers feedback to other participants and facilitator
    - Trained observer: Participates in discussion and explains actions to be taken based on case scenario, role responsibilities, and learner objectives. Offers feedback to study participants and facilitator.
    - Facilitator: provides the case scenario, guides discussion according to the scenario and learner objectives, resolves questions, provides feedback
- Participation is key to a meaningful learning experience
- All participants receive information at the same time
- Participants are asked to perform or respond based on knowledge, skills, and capabilities and the case scenario
- The learning environment is open, low-stress, no-fault, and safe
- Participants offer recommendations intended to improve responses, actions, and the overall learning experience
- Participants are respectful of others in light of diverse learning styles, and variations in knowledge and skill sets
- Each simulation exercise is followed by a debriefing session
- Evaluation of each simulated exercises and critical thinking exercises are based on the learner objectives for the particular exercise

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment
Case Scenarios

1. **Simulation Exercise**:
   M.W. is a 28 year old male who spent the last 2 weeks in Liberia visiting relatives. Prior to boarding a flight back to the U.S.A., he felt feverish and experienced body aches. He took Tylenol prior to the flight, which did not help his symptoms. During the flight he took Motrin. Upon arrival at the U.S.A airport, he felt feverish and had one episode of vomiting and diarrhea. He was screened at the airport for potential Ebola Virus Disease (EVD), met criteria for suspected EVD, and sent via ambulance to the U. S. Acute Care Medical Center for follow up medical treatment.

   Participants will demonstrate:
   a. Procedures for preparing to receive the patient
   b. Donning PPE with trained observer
   c. Admission of the patient and placement into biocontainment

2. **Simulation Exercise**:
   M. W. is currently being cared for in biocontainment. On day #2 vomited on the floor and soiled his bed linens, but was free of fever. On day #3, it was confirmed that he did not have EVD, was free of previous symptoms, and was discharged to home.

   Participants will demonstrate:

   a. Safe handling of body fluids, linens, equipment, personal belongings
   b. Environmental procedure for managing a spill (vomit) and disposal of same
   c. Discharging a patient from the biocontainment unit
   d. Doffing PPE with trained observer

3. **Simulation Exercise**:
   S. J is a 37 year old female who returned to the U. S. A. 2 days ago from Sierra Leone. During the night she became ill with a fever of 102.5 F, abdominal pain, and diarrhea with bloody discharge. She was admitted with a diagnosis of suspected Lassa Fever and was placed in biocontainment. Upon examination by a surgeon, it was determined that the patient requires emergency surgery.

   Participants will demonstrate:

   a. Donning PPE with trained observer
   b. Safe handling of body fluids, linens, equipment, personal belongings
   c. The procedure for transporting the patient to the OR using the Iso-Chamber

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment
Case Scenarios

4. Critical Thinking Exercise:

S. Q. is a 14 year old girl who recently traveled to Liberia with her parents and 18 month old brother to visit her grandmother. She returned 6 days ago to the U. S. A. For the past 2 days she has experienced fevers between 101.5 and 103. S. Q. presents to the ER with a temperature of 102, generalized body aches, and signs of dehydration (lethargy, weakness). She is admitted to the biocontainment unit with suspected EVD.

Participants will discuss the following:

a. Immediate precautions to be put into action
b. Admission procedure
c. Team member responsibilities
d. Assessment, nursing priorities and actions
e. Laboratory testing requirements
f. Concerns/actions re: family members experiencing potential exposure
g. Growth and development considerations
h. Psychosocial considerations
i. Family considerations
j. CDC notification procedures
k. Psychosocial considerations

5. Simulation Exercise:

P. C. is a 50 year old male missionary who arrived to the U. S. A from West Africa 3 days ago. He was transported to the ER via ambulance and presents with a fever of 103, chills, vomiting, and lethargy. Upon examination by the ER physician, it is determined that P. C. is to be admitted to the biocontainment unit with suspected EVD.

Participants will demonstrate:

a. Procedures for preparing to receive the patient
b. Donning PPE with trained observer
c. Admission of the patient and placement into biocontainment
d. Safe handling of body fluids, linens, equipment, personal belongings
e. Laboratory test procedures (point of care testing, collection of specimens)
f. Documentation in electronic medical record
g. Doffing with trained observer

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment
Case Scenarios

6. **Simulation Exercise:**

B. T. is a 54 year old female patient who traveled from Liberia and became unconscious during the flight to the U. S. A. after several severe episodes of vomiting. The pre-screening procedure at the airport determined that she met criteria for suspected Lassa Fever. B. T. was transported to the ER via ambulance for medical treatment and biocontainment.

Participants will demonstrate:

a. Procedures for preparing to receive the patient
b. Donning PPE with trained observer
c. Admission of the patient and placement into biocontainment
d. Safe handling of body fluids, linens, equipment, personal belongings
e. Laboratory test procedures (point of care testing, collection of specimens)
f. Cannulation of a vessel for intravenous fluid administration using PPE and precautions as per policies
g. Documentation in electronic medical record
h. Doffing with trained observer
i. Procedures for notification to the CDC

7. **Simulation Exercise:**

K. S. is a 40 year old woman with a family and business in Liberia. She arrived in the ED via ambulance with a fever of 101.5, chills, abdominal pain, and muscle aches. K. S. denies contact with any individual with EVD, but did have contact with a friend who later was diagnosed with malaria. As she meets criteria for suspected EVD, she is admitted and placed in biocontainment.

Participants will demonstrate:

a. Procedures for preparing to receive the patient
b. Donning PPE with trained observer
c. Admission of the patient and placement into biocontainment
d. Safe handling of body fluids, linens, equipment, personal belongings
e. Laboratory test procedures (point of care testing, collection of specimens)
f. Cannulation of a vessel for intravenous fluid administration using PPE and precautions as per policies
g. Documentation in electronic medical record
h. Doffing with trained observer
i. Procedures for notification to the CDC

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment
Case Scenarios

8. **Critical Thinking Exercise:**

C. M. is a 24 year old male who presents to the ER with a fever of 102 F, complaining of weakness and abdominal pain. The patient is confused and cannot provide details of his illness. His wife tells the ER clerk that he returned from Liberia last week. The clerk notifies the charge nurse immediately.

Participants will discuss the following:

a. Immediate precautions to be put into action
b. Admission procedure
c. Team member responsibilities
d. Assessment, nursing priorities and actions
e. Laboratory testing requirements
f. Concerns/actions re: family members experiencing potential exposure
g. CDC notification procedures

9. **Critical Thinking Exercise:**

H. P. is a 6 year old male who presented to the ER with a fever of 103, lethargy, weakness, and crying. His parents revealed to the nurse that they just returned from a trip to West Africa, denying any contact with individuals with EVD. Because the patient meets criteria for EVD, he is admitted and placed in biocontainment. Although his parents are able to observe their son through the observation window, they are visibly upset.

Participants will discuss the following:
a. Immediate precautions to be put into action
b. Admission procedure
c. Team member responsibilities
d. Assessment, nursing priorities and actions
e. Special growth and development
f. Psychosocial considerations
g. Family considerations
h. Laboratory testing requirements
i. Concerns/actions re: family members experiencing potential exposure
j. CDC notification procedures

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment
Case Scenarios

10. Simulation Exercise:

L. Y. is a 36 year old male who is brought in by ambulance from the airport with a fever of 103.5, chills, lethargy, generalized pain, and diarrhea with bleeding from the rectum.

The admitting nurse was told that he became quite ill on the flight from Sierra Leone. As the patient was without a family member, there was no other history statements. The patient is admitted and placed in biocontainment on day #1. On day #2, the patient's condition worsens and he expires. Immediately post expiration, notification is received confirming the diagnosis of EVD.

Participants will demonstrate:

a. Procedures for preparing to receive the patient
b. Donning PPE with trained observer
c. Admission of the patient and placement into biocontainment
d. Safe handling of body fluids, linens, equipment, personal belongings
e. Laboratory test procedures (point of care testing, collection of specimens)
f. Cannulation of a vessel for intravenous fluid administration using PPE and precautions as per policies
g. Post mortem care
h. Documentation in electronic medical record
i. Doffing with trained observer
j. Procedures for notification to the CDC
k. Procedure for transportation to morgue using the Iso-chamber

Appendix A (Continued)

U.S. Acute Care Medical Center
Care of the Patient Requiring Biocontainment
Case Scenarios

Case Scenario #:	
Student being evaluated:	
Other Students participants:	

	Critical Elements	*Met*	*Not Met*
1.	Identifies immediate precautions to be put into action	☐	☐
2.	Describes admission procedure specific to the scenario	☐	☐
3.	Assigns team member responsibilities	☐	☐
4.	Explains key components of the patient assessment	☐	☐
5.	Identifies nursing priorities	☐	☐
6.	Explains nursing actions based on priorities	☐	☐
7.	Identifies growth and development needs as indicated (if applicable)	☐	☐
8.	Describes psychosocial considerations	☐	☐
9.	Describes family considerations	☐	☐
10.	Explains laboratory testing requirements	☐	☐
11.	Discusses safety measures specific to the case scenario	☐	☐
12.	Lists steps in the CDC notification process	☐	☐

Comments:

Student Signature:
Unit:
Date:

Validator Signature:
Date:

Appendix A (Continued)

U.S. Acute Care Medical Center
Debriefing Checklist

Case Scenario #:	
Student being evaluated:	
Facilitator:	

How well did the simulation exercise mimic an actual clinical situation?

Did the simulation accomplish the purpose?

What did the participants learn from the experience?

What was done well?

What could have been done better?

What safety issues arose and how were they resolved?

Feedback and discussion

Appendix B

From: Welsh, J. Darlene [mailto:jdwels00@uky.edu]
Sent: Friday, May 27, 2016 5:06 AM
To: Occhiuzzo, Denise
Subject: RE: permission to use NCSES

You have my permission to use the NCSES for your work.
Regards,
Darlene

_____

Darlene Welsh, PhD, MSN, RN
Associate Professor of Nursing
BSN Program Director
Assistant Dean Undergraduate Faculty Affairs
University of Kentucky, College of Nursing
427 CON Building, 751 Rose Street
Lexington, KY 40536-0232
Office Phone: 859-323-6620
CON FAX: 859-323-1057
E-mail: jdwels00@uky.edu

From: Occhiuzzo, Denise
Sent: Thursday, May 26, 2016 7:36 PM
To: Welsh, J. Darlene <jdwels00@uky.edu>
Subject: permission to use NCSES

Good evening Dr. Welsh:

I am writing to ask permission to use the NCSES as part of my research study required for completion of my EdD degree from Walden University. I am studying the whether or not there is a relationship between professional practice self-efficacy and characteristic of nurses that care for patient with highly infectious diseases requiring biocontainment. Your tool is a good fit for my study and I am enthusiastic about the potential to use it.

I look forward to your response.

Regards and wishing you a happy holiday weekend.

Denise

Appendix C

The POWER Procedure
Fisher's z Test for Pearson Correlation

Fixed Scenario Elements

Distribution	Fisher's z transformation of r
Method	Normal approximation
Number of Sides	2
Null Correlation	0
Number of Variables Partialled Out	0
Nominal Alpha	0.05

Computed N Total

Index	Corr	Nominal Power	Actual Alpha	Actual Power	N Total
1	0.3	0.80	0.0500	0.800	84
2	0.3	0.85	0.0500	0.851	96
3	0.3	0.90	0.0500	0.901	112
4	0.3	0.95	0.0500	0.950	138
5	0.4	0.80	0.0500	0.802	46
6	0.4	0.85	0.0500	0.856	53
7	0.4	0.90	0.0500	0.902	61
8	0.4	0.95	0.0500	0.951	75
9	0.5	0.80	0.0499	0.814	29
10	0.5	0.85	0.0499	0.852	32
11	0.5	0.90	0.0500	0.901	37
12	0.5	0.95	0.0500	0.954	46
13	0.6	0.80	0.0497	0.813	19
14	0.6	0.85	0.0498	0.854	21
15	0.6	0.90	0.0499	0.901	24
16	0.6	0.95	0.0499	0.956	30
17	0.7	0.80	0.0492	0.816	13
18	0.7	0.85	0.0495	0.876	15
19	0.7	0.90	0.0496	0.917	17
20	0.7	0.95	0.0498	0.956	20

Appendix D

The POWER Procedure
Fisher's z Test for Pearson Correlation

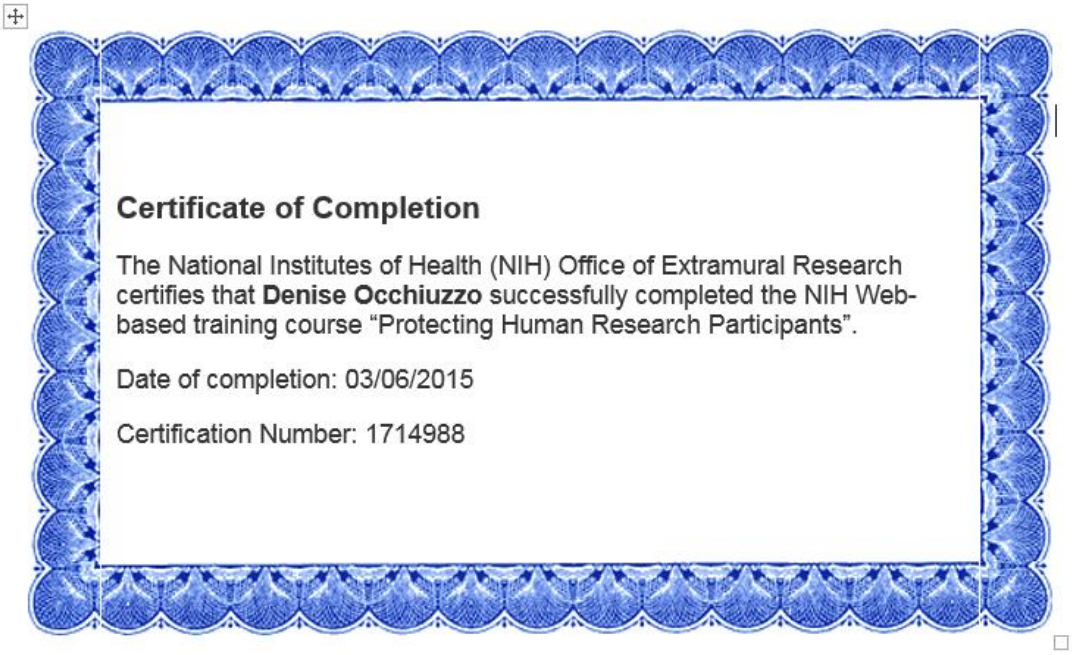
Fixed Scenario Elements

Distribution	Fisher's z transformation of r
Method	Normal approximation
Number of Sides	2
Null Correlation	0
Number of Variables Partialled Out	7
Nominal Alpha	0.05

Computed N Total

Index	Corr	Nominal Power	Actual Alpha	Actual Power	N Total
1	0.3	0.80	0.0500	0.800	91
2	0.3	0.85	0.0500	0.851	103
3	0.3	0.90	0.0500	0.901	119
4	0.3	0.95	0.0500	0.950	145
5	0.4	0.80	0.0500	0.802	53
6	0.4	0.85	0.0500	0.856	60
7	0.4	0.90	0.0500	0.902	68
8	0.4	0.95	0.0500	0.951	82
9	0.5	0.80	0.0499	0.814	36
10	0.5	0.85	0.0499	0.852	39
11	0.5	0.90	0.0500	0.901	44
12	0.5	0.95	0.0500	0.954	53
13	0.6	0.80	0.0497	0.813	26
14	0.6	0.85	0.0498	0.854	28
15	0.6	0.90	0.0499	0.901	31
16	0.6	0.95	0.0499	0.956	37
17	0.7	0.80	0.0492	0.816	20
18	0.7	0.85	0.0495	0.876	22
19	0.7	0.90	0.0496	0.917	24
20	0.7	0.95	0.0498	0.956	27

Appendix E



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Denise Occhiuzzo** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 03/06/2015

Certification Number: 1714988

Appendix F

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COURSEWORK REQUIREMENTS REPORT*

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

- **Name:** Denise Occhiuzzo
- **Email:**
- **Institution Affiliation:**
- **Institution Unit:**
- **Phone:**

- **Curriculum Group:** Social & Behavioral Research - Basic/Refresher
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course

- **Report ID:**
- **Completion Date:** 22-Apr-2016
- **Expiration Date:** 22-Apr-2018
- **Minimum Passing:** 85
- **Reported Score*:** 99

REQUIRED AND ELECTIVE MODULES ONLY	DATE COMPLETED
Belmont Report and CITI Course Introduction (ID: 1127)	17-Dec-2015
History and Ethical Principles - SBE (ID: 490)	21-Apr-2016
Defining Research with Human Subjects - SBE (ID: 491)	17-Dec-2015
The Federal Regulations - SBE (ID: 502)	21-Apr-2016
Basic Institutional Review Board (IRB) Regulations and Review Process (ID: 2)	21-Apr-2016
Assessing Risk - SBE (ID: 503)	21-Apr-2016
Informed Consent - SBE (ID: 504)	21-Apr-2016
Privacy and Confidentiality - SBE (ID: 505)	21-Apr-2016
Research with Prisoners - SBE (ID: 506)	21-Apr-2016
Research with Children - SBE (ID: 507)	21-Apr-2016
Research in Public Elementary and Secondary Schools - SBE (ID: 508)	21-Apr-2016
Students in Research (ID: 1321)	21-Apr-2016
Internet-Based Research - SBE (ID: 510)	21-Apr-2016
Research and HIPAA Privacy Protections (ID: 14)	21-Apr-2016
Vulnerable Subjects - Research Involving Workers/Employees (ID: 483)	22-Apr-2016
Conflicts of Interest in Research Involving Human Subjects (ID: 488)	22-Apr-2016
Hackensack University Medical Center (ID: 12915)	17-Dec-2015

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

Verify at: https://www.citiprogram.org/verify/index.cfm?verify=bdaf3f46-c906-4339-91c2-63fda98f8429

Appendix G

id	YrsExp	HOverDeg	LfSupp	SpCert	NoDrills	FqDrills	Nopt	SE
1	8	3	BLS-PALS	y	5	1	1	160
2	20	2	BLS-ACLS-PALS	y	4	1	2	152
3	18	3	BLS-ACLS-PALS	y	2	1	0	133
4	40	3	BLS-PALS	y	30	3	4	150
5	6	2	BLS-ACLS-PALS	y	6	1	2	150
6	32	3	BLS-ACLS	n	10	1	2	142
7	32	2	BLS-ACLS	y	16	1	2	153
8	32	3	BLS	y	2	1	0	137
9	10	2	BLS-ACLS-PALS	n	12	1	0	144
10	30	2	BLS-PALS	n	12	1	0	153
11	35	3	BLS	y	6	1	5	160
12	15	3	BLS-ACLS	y	35	1	3	160
13	9	2	BLS-ACLS-PALS	y	3	1	0	32
14	29	2	BLS-ACLS-PALS	y	8	1	1	154
15	7	2	BLS-ACLS-PALS	y	12	1	2	138
16	21	2	BLS-ACLS-PALS	y	6	1	2	156
17	18	2	BLS-PALS	y	2	1	0	142
18	2	2	BLS-PALS	n	5	1	0	144
19	5	2	BLS-PALS	y	8	1	1	145
20	22	2	PALS	n	6	1	0	130
21	28	1	BLS-ACLS-PALS	n	15	1	2	142
22	30	2	BLS-ACLS	y	12	1	4	154
23	29	3	BLS-ACLS-PALS	y	300	3	3	153
24	20	2	BLS-ACLS-PALS	y	8	1	1	123
25	2	2	BLS-ACLS-PALS	n	15	1	1	139
26	5	2	BLS-PALS	n	8	1	2	112
27	16	3	BLS-ACLS	y	6	2	3	149
28	7	2	BLS-ACLS-PALS	n	20	1	0	160
29	28	3	BLS-ACLS-PALS	y	15	1	0	159
30	19	2	BLS-PALS	y	10	1	0	152
31	31	3	BLS-ACLS	y	2	1	0	158
32	6	3	BLS-ACLS-PALS	y	4	1	0	153
33	30	2	BLS-ACLS-PALS	y	6	1	0	149
34	22	2	PALS	n	8	1	0	142
35	30	3	BLS	y	4	1	0	115
36	30	3	BLS	y	1	1	0	147

								159
37	32	3	BLS	y	200	3	5	
38	30	3	BLS	y	2	1	0	159
39	20	2	BLS-ACLS-PALS	y	8	1	1	154
40	11	3	BLS	y	15	1	0	146
41	40	3	BLS	y	10	1	0	158
42	38	1	BLS-ACLS	y	10	1	2	139
43	20	3	BLS-ACLS	y	3	1	0	136
44	16	1	BLS-ACLS-PALS	n	4	1	4	133
45	30	2	BLS-PALS	n	10	1	0	136
46	11	2	BLS-ACLS-PALS	y	12	1	0	160
47	9	2	BLS-PALS	n	12	1	1	160
48	5	2	BLS-PALS	n	12	1	2	112
49	3	2	BLS-PALS	y	8	1	0	80
50	36	2	BLS-ACLS-PALS	y	2	3	0	140
51	29	2	BLS-ACLS	y	6	3	0	149
52	9	2	BLS-ACLS-PALS	y	2	1	0	108

Note. Years of nursing experience =YrsExp; Highest Overall Degree = HOverDeg; Life support certifications = LfSupp; Presence of Specialty Certifications = SpCert; Number of Drills = NoDrills; Frequency of Drills = FqDrills; Number of biocontainment patients in the past two years = Nopt; and SE = total NCSES Score. For Highest Overall Degree, 1 = Associate Degree, 2 = Bachelor's Degree, 3 = Master's Degree, and 4 = Doctoral Degree. For frequency of drills, 1= Quarterly, 2= Every 6 Weeks, and 3 = Monthly

Appendix H

From: <Research Staff>
Subject: You're Invitation to participate in a Research Study

Dear <XXXX>,

You are invited to participate in a research study.

Research Title: Professional Development and the Self-Efficacy of Nurses who Care for Patients Requiring Biocontainment

Research Purpose: To determine whether there is a relationship between professional development characteristics and professional practice self-efficacy of nurses who care for patients requiring biocontainment.

About Your Eligibility: You are being invited to participate in this study because you have been identified as a nurse member of the <U.S. Acute Medical Center> biocontainment response team.

Voluntary Nature of the Study: The study is voluntary. You are free to accept or decline the invitation. You may withdraw your participation from the study at any time by not submitting the survey. There will be no penalty to you, and you will not be treated differently for not participating in this survey. Your performance evaluation and employment status will not be affected regardless of whether or not you participate.

Study procedures: This email is part of a process called "informed consent" to allow you to understand this study before deciding whether to participate. If you agree to take part in this study, you will be asked to complete an online survey (accessible by clicking on the link at the end of this email) that will take approximately 10 -15 minutes to complete. The survey will be available for two weeks. **The last day to participate will be <XXXXX>.**

Benefits: Although you may not directly benefit from this research, your participation in the study may lead to new knowledge about professional development characteristics, professional practice self-efficacy, and education plans designed to meet the needs of nurses who care for patients requiring biocontainment.

Risks: There are no known risks associated with this research study. If you use your own device to complete the survey, you will be responsible for the fees normally associated with your data plan. (i.e., If you use your cell phone and Verizon is your data provider, your usual Verizon data charges will apply).

Payment: You will not receive any payments or incentives for participating in this study.

Privacy: The information will be collected in an anonymous manner, meaning no one will know whether you participated in this study. Even the researcher will not know who you are. The anonymous information will be kept confidential. Data free of identifiers will only be accessible to the researcher, the research staff at <U.S. Acute Care Medical Center>, and Walden University. If necessary, it might also be made available to the institutional review boards and agencies responsible for the protection of human subjects.

About the researcher: This study is part of a student's doctoral study project. The student is also an employee at <U.S. Acute Care Medical Center>. The researcher has controlled for any potential conflicts of interest in the design and conduct of this study.

Contacts and Questions: The <U.S. Acute Care Medical Center> is sending the survey on the researcher's behalf. If you have questions about this project or if you have a research-related problem, you may contact <the research staff>, research coordinator, at XXX-XXX-XXXX.

<U.S. Acute Care Medical Center> is the institutional review board of record and is overseeing the data collection for this project. This project was reviewed and approved by both the <U.S. Acute Care Medical Center> Institutional Review Board and the Walden Institutional Review Board. If you have any questions concerning your rights as a research subject, you may contact the <U.S. Acute Care Medical Center> Research Integrity Office at XXX-XXX-XXXX or a Walden University Research Participant Advocate at 612-312-1210.

Completion of the survey indicates your agreement to participate in the study. To protect your privacy, no consent signature is requested. Please keep this email for your records.

Follow this link to the survey: Take the survey

Thank you for your participation!

Appendix I

From: <Research Staff>
Subject: You're Invitation to participate in a Research Study

Dear <XXXX>,

This is a reminder that you have been invited to participate in the below research study. The deadline for participation is XXX. Please consider participating in this research study if you have not already done so.

Research Title: Professional Development and the Self-Efficacy of Nurses who Care for Patients Requiring Biocontainment

Research Purpose: To determine whether there is a relationship between professional development characteristics and professional practice self-efficacy of nurses who care for patients requiring biocontainment.

About Your Eligibility: You are being invited to participate in this study because you have been identified as a nurse member of the <U.S. Acute Medical Center> biocontainment response team.

Voluntary Nature of the Study: The study is voluntary. You are free to accept or decline the invitation. You may withdraw your participation from the study at any time by not submitting the survey. There will be no penalty to you, and you will not be treated differently for not participating in this survey. Your performance evaluation and employment status will not be affected regardless of whether or not you participate.

Study procedures: This email is part of a process called "informed consent" to allow you to understand this study before deciding whether to participate. If you agree to take part in this study, you will be asked to complete an online survey (accessible by clicking on the link at the end of this email) that will take approximately 10 -15 minutes to complete. The survey will be available for two weeks. **The last day to participate will be <XXXXX>.**

Benefits: Although you may not directly benefit from this research, your participation in the study may lead to new knowledge about professional development

characteristics, professional practice self-efficacy, and education plans designed to meet the needs of nurses who care for patients requiring biocontainment.

Risks: There are no known risks associated with this research study. If you use your own device to complete the survey, you will be responsible for the fees normally associated with your data plan. (i.e., If you use your cell phone and Verizon is your data provider, your usual Verizon data charges will apply).

Payment: You will not receive any payments or incentives for participating in this study.

Privacy: The information will be collected in an anonymous manner, meaning no one will know whether you participated in this study. Even the researcher will not know who you are. The anonymous information will be kept confidential. Data free of identifiers will only be accessible to the researcher, the research staff at <U.S. Acute Care Medical Center>, and Walden University. If necessary, it might also be made available to the institutional review boards and agencies responsible for the protection of human subjects.

About the researcher: This study is part of a student's doctoral study project. The student is also an employee at <U.S. Acute Care Medical Center>. The researcher has controlled for any potential conflicts of interest in the design and conduct of this study.

Contacts and Questions: The <U.S. Acute Care Medical Center> is sending the survey on the researcher's behalf. If you have questions about this project or if you have a research-related problem, you may contact <the research staff>, research coordinator, at XXX-XXX-XXXX.

<U.S. Acute Care Medical Center> is the institutional review board of record and is overseeing the data collection for this project. This project was reviewed and approved by both the <U.S. Acute Care Medical Center> Institutional Review Board and the Walden Institutional Review Board. If you have any questions concerning your rights as a research subject, you may contact the <U.S. Acute Care Medical Center> Research Integrity Office at XXX-XXX-XXXX or a Walden University Research Participant Advocate at 612-312-1210.

Completion of the survey indicates your agreement to participate in the study. To protect your privacy, no consent signature is requested. Please keep this email for your records.

Follow this link to the survey: Take the survey

Thank you for your participation!

Appendix J

From: <Research Staff>
Subject: You're Invitation to participate in a Research Study

Dear <XXXX>,

In an effort to give more biocontainment team members a chance to participate in this research study, we have extended the deadline to participate to <XXXX>. Please consider participating if you have not already done so!

Research Title: Professional Development and the Self-Efficacy of Nurses who Care for Patients Requiring Biocontainment

Research Purpose: To determine whether there is a relationship between professional development characteristics and professional practice self-efficacy of nurses who care for patients requiring biocontainment.

About Your Eligibility: You are being invited to participate in this study because you have been identified as a nurse member of the <U.S. Acute Medical Center> biocontainment response team.

Voluntary Nature of the Study: The study is voluntary. You are free to accept or decline the invitation. You may withdraw your participation from the study at any time by not submitting the survey. There will be no penalty to you, and you will not be treated differently for not participating in this survey. Your performance evaluation and employment status will not be affected regardless of whether or not you participate.

Study procedures: This email is part of a process called "informed consent" to allow you to understand this study before deciding whether to participate. If you agree to take part in this study, you will be asked to complete an online survey (accessible by clicking on the link at the end of this email) that will take approximately 10 -15 minutes to complete. The survey will be available for two weeks. **The last day to participate will be <XXXXX>.**

Benefits: Although you may not directly benefit from this research, your participation

in the study may lead to new knowledge about professional development characteristics, professional practice self-efficacy, and education plans designed to meet the needs of nurses who care for patients requiring biocontainment.

Risks: There are no known risks associated with this research study. If you use your own device to complete the survey, you will be responsible for the fees normally associated with your data plan. (i.e., If you use your cell phone and Verizon is your data provider, your usual Verizon data charges will apply).

Payment: You will not receive any payments or incentives for participating in this study.

Privacy: The information will be collected in an anonymous manner, meaning no one will know whether you participated in this study. Even the researcher will not know who you are. The anonymous information will be kept confidential. Data free of identifiers will only be accessible to the researcher, the research staff at <U.S. Acute Care Medical Center>, and Walden University. If necessary, it might also be made available to the institutional review boards and agencies responsible for the protection of human subjects.

About the researcher: This study is part of a student's doctoral study project. The student is also an employee at <U.S. Acute Care Medical Center>. The researcher has controlled for any potential conflicts of interest in the design and conduct of this study.

Contacts and Questions: The <U.S. Acute Care Medical Center> is sending the survey on the researcher's behalf. If you have questions about this project or if you have a research-related problem, you may contact <the research staff>, research coordinator, at XXX-XXX-XXXX.

<U.S. Acute Care Medical Center> is the institutional review board of record and is overseeing the data collection for this project. This project was reviewed and approved by both the <U.S. Acute Care Medical Center> Institutional Review Board and the Walden Institutional Review Board. If you have any questions concerning your rights as a research subject, you may contact the <U.S. Acute Care Medical Center> Research Integrity Office at XXX-XXX-XXXX or a Walden University Research Participant Advocate at 612-312-1210.

Completion of the survey indicates your agreement to participate in the study. To protect your privacy, no consent signature is requested. Please keep this email for your records.

Follow this link to the survey: Take the survey

Thank you for your participation!