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Assessing the Learning Needs of South Carolina Nurses by Exploring their Perceived Knowledge of Emergency Preparedness

Anne Elizabeth McKibbin

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ASSESSING THE LEARNING NEEDS OF SOUTH CAROLINA NURSES
BY EXPLORING THEIR PERCEIVED KNOWLEDGE OF
EMERGENCY PREPAREDNESS

A Dissertation

Submitted to the School of Nursing

Duquesne University

In partial fulfillment of the requirements for
the degree of Doctorate of Philosophy

By

Anne E. McKibbin

August 2010

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Anne McKibbin

2010

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By

Anne E. McKibbin

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ABSTRACT

ASSESSING THE LEARNING NEEDS OF SOUTH CAROLINA NURSES BY EXPLORING THEIR PERCEIVED KNOWLEDGE OF EMERGENCY PREPAREDNESS

By

Anne E. McKibbin

August 2010

Dissertation supervised by Professor L. Kathleen Sekula

Problem: Nurses are first responders to natural or man made disasters and increasing awareness of the central role nurses play in disaster response may prompt nurses to sharpen existing skills and develop new skills needed to competently respond to disaster events.

Purpose: To assess South Carolina nurses' learning needs by exploring their perceived knowledge of emergency preparedness in order to gain a better understanding of nurses' emergency preparedness learning needs and prioritize training efforts based on these needs.

Design and Methods: Boone's Programming Model's concept of planning provided the framework for this study which utilized a descriptive correlational design. The Emergency Preparedness Information Questionnaire was the instrument used to assess

the learning needs of South Carolina nurses. Fifteen hundred potential participants were randomly selected from the South Carolina board of Nursing's database.

Results: Data from 207 eligible survey participants were analyzed and results indicated that study participants have a low level of self-reported emergency preparedness familiarity. Participants reported being most familiar with triage and least familiar with clinical decision making in epidemiology and biological agents. Most participants did not participate in emergency preparedness continuing education programs and participants who did participate in continuing education programs demonstrated a low level of self reported familiarity with emergency preparedness content. Findings also suggested that emergency preparedness content can be tailored to specific demographic variables allowing for a more concentrated focus on the content in which participant's self-reported being least familiar related to a specific demographic variable.

Study participants most preferred attending a one-day weekday, face to face/lecture/seminar training format for obtaining emergency preparedness content.

Implications: This information holds promise for the generation of effective continuing education and training programs. By prioritizing learning needs based on a needs assessment and accommodating learning preferences, a systematic and planned approach to educating South Carolina nurses about this extremely important topic can be implemented and thus significantly strengthen the capabilities of South Carolina nurses to respond competently to disaster events.

DEDICATION

This document is dedicated to the people who mean the most to me in the entire world; my husband, Bill and my two daughters, Haley (22) and Alexandra (12). You all are the cornerstones of my life and you have shown nothing but unconditional love, patience, and support for me, I love you all so very much!

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Cohort 13; it has been a wonderful journey and I am grateful to have had the opportunity to walk hand and hand with you!!

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And finally I want to acknowledge God, who offers each of us a basket of stars and encourages us to create our highest vision and follow our bliss wherever it leads.

TABLE OF CONTENTS

	Page
Abstract.....	iv
Dedication.....	vi
Acknowledgement	vii
List of Tables	xiii
1 Introduction.....	1
1.1 Overview of the Topic	1
1.2 Background of the Study	4
1.2.1 Emergency Preparedness Defined	6
1.2.2 Emergency Preparedness Competencies.....	8
1.3 Statement of Problem.....	10
1.4 Purpose of the Study	12
1.5 Research Questions.....	16
1.6 Definition of Terms.....	17
1.7 Significance to Nursing.....	18
2 Review of the Literature	20
2.1 Introduction.....	20
2.2 Conceptual Framework.....	21
2.2.1 Boone’s Programming Model.....	21
2.2.2 Identifying a Conceptual Framework	26
2.2.3 Using a Self-assessment Tool to Identify Learning Needs: Needs Assessment.....	31

2.3 Emergency Preparedness Information Questionnaire Instrument Development....	33
2.3.1 Emergency Preparedness Information Questionnaire	
Reliability and Validity.....	35
2.3.2 Summary of Studies related to the Emergency Preparedness Information	
Questionnaire	36
2.4 South Carolina and Disasters	37
2.5 Statewide Assessments of Health Care Professionals	43
2.6 Emergency Preparedness Competencies and Continuing Education.....	47
2.7 Preparing the Health Care Workforce.....	52
2.8 Summary and Conclusion.....	59
3 Pilot Study.....	65
3.1 Introduction.....	65
3.2 Research Design and Procedures	65
3.2.1 Sample Selection, Size, and Recruitment	65
3.2.2 Informed Consent Procedures.....	66
3.3 Results of the Pilot Study.....	66
3.3.1 Description of the Participants.....	67
3.4 Findings and Discussion	70
3.5 Recommendations and Other Outcomes.....	71
4 Methods.....	73
4.1 Introduction.....	73
4.2 Research Design.....	73
4.3 Setting	76

4.4 Sample.....	76
4.5 Inclusion Criteria	76
4.6 Procedures for the Protection of Human Subjects	77
4.7 Research Questions.....	78
4.8 Measures	78
4.8.1 Score Interpretation.....	80
4.8.2 Instructions for Use and Administration.....	80
4.9 Procedures for Data Collection.....	81
4.10 Procedures for Data Analysis.....	82
5 Results.....	85
5.1 Introduction.....	85
5.2 Description of Sample.....	86
5.3 Research Question 1	91
5.4 Research Question 2	94
5.5 Research Question 3	95
5.6 Research Question 4:	96
5.7 Research Question 5	97
5.7.1 Nursing Specialty.....	97
5.7.2 Years of Experience.....	100
5.7.3 Highest Degree Attained.....	101
5.7.4 Age.....	103
5.7.5 Region of Employment	103
5.7.6 Emergency Preparedness Continuing Education Hours	107

5.8 Research Question 6	113
5.8.1 Training Format	113
5.8.2 Course Length.....	114
5.8.3 Access to Electronic Training Information.....	115
5.9 Summary	116
6 Discussion and Conclusion	120
6.1 Introduction.....	121
6.2 Demographic Findings.....	121
6.3 Discussion of the Findings.....	123
6.3.1 Research Question 1	123
6.3.2 Research Question 4	125
6.3.3 Research Question 5	127
6.3.3.1 Significant Findings	127
6.3.3.1.1 Nursing Specialties	127
6.3.3.1.2 Region of Employment	129
6.3.3.1.3 Emergency Preparedness Continuing Education Hours	131
6.3.3.2 Non Significant Findings	133
6.3.4 Research Question 6	134
6.4 Significance to the Practice of Nursing	136
6.5 Limitations	139
6.6 Future Research	140
6.7 Conclusion	142
References.....	144

Appendix 1 South Carolina Map	158
Appendix 2 Email Communication: Permission for Use of the Illustration of Slepki’s Concept of Emergency Preparedness.....	160
Appendix 3 Revised Emergency Preparedness Information Questionnaire	162
Appendix 4 Institutional Review Board: Pilot Study Approval Letter.....	170
Appendix 5 Personal Communication: Permission to Collect Pilot Study Data	173
Appendix 6 Approved Institutional Review Board Cover Letter for Pilot Study.....	175
Appendix 7 Duquesne University IRB Study Approval.....	178
Appendix 8 Original Emergency Preparedness Questionnaire.....	180
Appendix 9 Revised Emergency Preparedness Information Questionnaire	187
Appendix 10 Email Communication: Permission for Use of the Emergency Preparedness Information Questionnaire (EPIQ)	195
Appendix 11 Email Communication: Permission for Use of the Revised Emergency Preparedness Information Questionnaire (EPIQ)	197
Appendix 12 Advance-Notice Post-Card.....	199
Appendix 13 IRB Approved Cover Letter	201
Appendix 14 Follow-up Postcard	203

LIST OF TABLES

	Page
Table 3.3.1	67
Table 3.3.2	68
Table 3.3.3	69
Table 3.3.4	70
Table 4.2.1	75
Table 5.2.1	88
Table 5.2.2	90
Table 5.3.1	92
Table 5.4.1	94
Table 5.5.1	95
Table 5.5.2	96
Table 5.6.1	97
Table 5.7.1.1	98
Table 5.7.1.2	99
Table 5.7.1.3	100
Table 5.7.2.1	101
Table 5.7.3.1	102
Table 5.7.5.1	106
Table 5.7.5.2	107
Table 5.7.6.1	109
Table 5.7.6.2	110

Table 5.7.6.3	112
Table 5.7.6.4	113
Table 5.8.1.1	114
Table 5.8.2.1	115
Table 5.8.3.1	116

Chapter 1

1 Introduction

1.1 Overview of the Topic

Disasters such as 9/11 reflected images of commercial airlines slamming into the country's most notable institutions and leaving in its wake a mass number of casualties. This incident ignited great concern about the nation's ability to respond effectively to such events. Then in 2005, the nation was confronted again with two hurricanes that devastated several states and affected more than 1.5 million people (Slepski, 2007). These disastrous events reinforced how inadequately prepared we are to manage disasters. Unorganized physical environments, inadequate personnel and material resources, and personal risks promote the demand for nurses to become better prepared to respond to disasters that may occur naturally, accidentally, or by individuals who would choose to do us harm (Spellman, 2006). Reilly and Markenson (2009) conducted a survey of 31 major metropolitan hospitals and determined that of the hospital's "essential" personnel, physician and nurses; many have not received training in their anticipated role based on the hospital emergency response plan rendering hospitals unable to effectively respond to disaster and public health emergencies. Throughout an emergency event, communities rely on the healthcare system to maintain health and safety and have the ability to treat illnesses and injuries that may occur. Because of the complexity an emergency event may present, efforts to provide health care professionals

who can effectively manage the crisis proposes several challenges. One of the most significant challenges is a lack of planned and systematic emergency preparedness educational opportunities (Buyum, Dubruiel, Torghele, Alperin, & Miner, 2009). Gebbie, Horn, McCollum, and O'Hara (2009) concluded after exploring a nationwide plan to deliver emergency preparedness training to all clinicians in the country, that a strategy which includes practice-oriented, competency-based training is a strategy that will effectively prepare all physicians, nurses, and other licensed clinicians for all types of emergency events. Increasing awareness of the central role nurses play in disaster response may prompt nurses to sharpen existing skills and develop new skills needed to competently respond to disaster events.

There is a growing but underdeveloped body of literature emphasizing efforts to improve the public health systems' knowledge of emergency preparedness with much of the research focusing on the nation's public health infrastructure, developing curricula and training programs, and response capabilities (Garbutt et al. 2008). Less understood in the literature is nurses' knowledge of emergency preparedness. Guided by Boone's programming model, this study assessed South Carolina nurses' learning needs by exploring their perceived knowledge of emergency preparedness.

Boone's programming model is a planned and systematic process for establishing directions and procedures for adult learning programs (Boone et al., 2002). The model encompasses three interdependent and connecting concepts: *planning*, accurately identifying, assessing, and analyzing the expressed needs of the target population; *design and implementation*, designing and implementing a planned program as an educational response to the expressed and analyzed needs identified during the planning process; and

evaluation and accountability, the collection of evidence to validate the achievement of intended outcomes as outlined in the planned program and the reporting of these outcomes along with the resources used to produce the outcomes (Boone et al., 2002).

This study utilized the programming model's concept of planning, the first and most fundamental step in the programming process. Planning includes a thorough assessment of the target population's learning needs and is often accomplished by administering a needs assessment. Chapter two includes a more detailed description of Boone's programming model.

Wisniewski, Dennik-Champion, and Peltier (2004) conducted a study to develop a valid and reliable tool that could be used by states to assess nurses' self-reported knowledge of emergency preparedness. The Emergency Preparedness Information Questionnaire (EPIQ) is the only tool found in the literature designed to comprehensively explore civilian nurses' perceived knowledge of the eight emergency preparedness competency domains and assess their education and training needs (Garbutt, Peltier, & Fitzpatrick, 2008; Wisniewski et al., 2004). To date, the EPIQ has been used in only one large scale descriptive study in Wisconsin and based in part on the initial findings of the study the Wisconsin Nurses Association and the state of Wisconsin are developing appropriate educational opportunities for Wisconsin nurses (Garbutt et al., 2008; Wisniewski et al., 2004). Research is needed to explore nurses' perceived knowledge of emergency preparedness for the purpose of designing and implementing effective emergency preparedness continuing education and training programs.

Nurses encompass the largest percentage of the healthcare workforce and will continue as major players in both local and national level emergency responses as we

move through the 21st century (Gebbie & Qureshi, 2006). In light of the destructive events that have occurred in recent years, nurses from novice to expert must have knowledge related to disaster nursing and management of mass casualty incidents (Patillo, 2003). Knowledge of emergency and disaster preparedness once considered specialty training for military, public health, and emergency room nurses has become a basic competency for the generalist nurse (Patillo, 2003). Baker (2007) emphasized the need for nurses' knowledge of basic competencies as essential for responding successfully to a crisis and describes these competencies as a symbol of a tactical art that encompasses technical skills, didactic information, communication capability, leadership, and critical thinking for decision making. The nurse who can implement basic competencies during a time of crisis will have the ability to bring order to chaos during overwhelming disaster events.

1.2 Background of the Study

There are 2.5 million registered nurses in the United States representing a significant resource that must be used if the nation is to adequately prepare for and manage disasters involving mass casualties (National Nurse Emergency Preparedness Initiative [NNEPI], 2005; Stanley, 2005). Nurses in a wide variety of practice settings may find themselves functioning as front line responders to a natural or man made disaster (Glik, 2007). Stanley (2005) reported that the demand for nurses to respond to natural, man made, and technological disasters without fundamental education or training related to this content in basic nursing education, or in clinical practice is concerning. Nurses are not being taught to address the needs of a changing world and adequately serve the American public (Stanley, 2005). The NNEPI (2005) recognized that few health

care facilities can afford to send all of their nurses to training, yet there is an urgent need for nurses to have basic emergency and crisis preparedness knowledge. Stanley (2005) noted that all registered nurses currently licensed to practice and all nurses educated from this point on should have basic knowledge of emergency preparedness competencies. Emergency preparedness is a critical component of nursing education for experienced nurses, the new graduate registered nurses, and nursing students.

Preparing nurses to serve as first responders by ensuring that they possess the needed knowledge and skills to respond to disasters is gravely needed (Ablah, 2009; Coule & Schwartz, 2009; Gebbie, Horn, McCollum, & O'Hara, 2009; Studnek, 2008). A critical first step in the process of developing emergency preparedness continuing education and training opportunities is to assess the learning needs of nurses by exploring their perceived knowledge of emergency preparedness. Boone's programming model provides a consistent framework for understanding the process when planning and developing continuing education programs (Boone et al., 2002). Needs assessments are considered to be the beginning of any plan for developing continuing education courses and a self-assessment questionnaire is a standard needs assessment strategy (Asadoorian, 2005; Boone, Safrit, & Jones, 2002; Claflin, 2005; DeSilets, 2006; Garbutt et al., 2008; Wisniewski et al., 2004). Hites et al. (2007) emphasized that learning objectives related to emergency preparedness and efforts to ensure a competency based curriculum are influenced by the results of needs assessments.

Fundamental to this effort is a valid and reliable tool to assess the learning needs of nurses by exploring their perceived knowledge of emergency preparedness (Wisniewski et al., 2004). The EPIQ is a valid and reliable needs assessment tool, which

offers the opportunity for self-assessment of emergency preparedness and competencies and identifies the most preferred educational and training preferences (Garbutt et al., 2008; Wisniewski et al., 2004).

1.2.1 Emergency Preparedness Defined

In light of destructive events that have occurred in recent years, there has been an increased interest in defining emergency preparedness amongst various professional disciplines such as emergency management organizations, multiple levels of government, health care professionals, and all branches of the military. Rebmann, Carnico, and English (2002) proposed that emergency preparedness includes planning responses to a wide variety of emergency events resulting from catastrophes such as natural disasters and acts of terrorism. The authors maintained that the ultimate goal of emergency preparedness is to acquire the basic knowledge of interventions which can be implemented following an event and to have the plans to facilitate the appropriate actions.

The World Health Organization (2006) recognizes emergency preparedness to be: Activities and measures taken in advance of an event to ensure effective response to the impact of hazards including the issuance of timely and effective warnings. It was agreed conceptually that emergency preparedness is part of development and that emergency preparedness is an ongoing process. (p. 7)

Emergency preparedness is acknowledged by Bernardo (2001) to be a process reflective of gained knowledge and practiced response behaviors. Seligman (1970) approached the term by stating that “emergency preparedness is characterized by the amount of input which must occur before that output (which is constructed as evidence of

acquisition) reliably occurs” (p. 409). Alexander (2002) defined emergency preparedness to be a position of readiness in which individuals are poised to respond to a disaster, crisis, or other emergency situations. Lastly, Byrne (2006) shared an appreciation of the term emergency preparedness in the following quote:

True emergency preparedness means living well afterwards rather than surviving a bit longer than your unprepared neighbors do or barely eking out an existence.

To do this properly requires a well thought out approach and process that leads to an integrated emergency preparedness plan with the specific objective of surviving a number of threats and prospering afterwards. (¶ 3)

Evidenced by the frequency of its application, the preceding statements demonstrate that there are many definitions of the term emergency preparedness. Within the nursing profession there has been a push to conceptualize the term in order to establish consistency in the way the term will be used and as a basis to describe or explain the phenomenon (Beck & Gable, 2001). A conceptual definition of emergency preparedness is the foundation for developing an operational definition, which will directly affect the advancement of nursing research as the challenge for becoming better prepared to respond to public health threats is recognized (Holcomb, Hoffart, & Fox, 2002). Slepski (2005) analyzed and developed a conceptual definition of emergency preparedness for nursing that serves to clearly define the concept, reflect distinct attributes or characteristics, and delineate boundaries. “Emergency preparedness is the comprehensive knowledge, skills, abilities, and actions needed to prepare for and respond to threatened, actual, or suspected chemical, biological, radiological, nuclear or explosive incidents, man-made incidents, natural disasters, or other related events” (p. 426).

1.2.2 Emergency Preparedness Competencies

Knowledge of emergency preparedness competencies is essential to all health care professionals and has increased in importance after events such as 9/11, Hurricanes Katrina and Rita, the SARS outbreak of 2003, and in the pre-crisis planning of the avian and flu pandemics (Glik, 2007). Emergency preparedness competencies are expressed by Chandler, Qureshi, Gebbie, and Morse (2008) to be statements of anticipated actions combining knowledge, skill, and attitude which can be measured for educational purposes. Emergency preparedness competencies have been referenced in the literature and are considered critical for educating and preparing a health care work force to respond competently to a disaster event. Ablah, Tinius, Horn, Williams, and Gebbie (2008) espoused that having a standardized list of emergency response competencies will assist in the development and evaluation of education and training programs. The authors acknowledged that while emergency preparedness competencies have been developed for specific health professionals, including nurses and public health workers, institutionally oriented community health centers have been overlooked. As a result, the researchers conducted a study to explore the perceptions of community health center (CHC) leaders in New York about emergency preparedness training. Given a list of competencies developed for all clinicians who treat, triage, and communicate with patients, the participants were asked to identify which of the competencies listed were most applicable to CHC clinicians. By determining which of the listed competencies were most applicable to CHC clinicians, researchers were able to present strategies for implementing training programs tailored to meet their needs. This study emphasized the importance of establishing competencies that are relevant to the practitioner and the

development of continuing education and training programs that will prepare clinicians to competently respond to emergency and disaster events (Ablah et al., 2008).

Coule and Schwartz (2009) reviewed and revised disaster education competencies, which became the framework for the National Disaster Life Support Curricula. The researchers submitted that as the body of knowledge and science related to disaster medicine expands, a system to detect competency gaps, revise competencies, and incorporate them into updated training programs will be essential for a skilled and prepared health care work force.

Wisniewski et al. (2004), during the early stages of the project to assess nurses' current state of preparedness and determine education and training priorities, conducted research to identify critical competency dimensions for responding to disaster events. The resulting instrument was the Emergency Preparedness Information Questionnaire containing 44 knowledge based questions reflecting eight emergency preparedness competency dimensions.

Emergency preparedness nursing competencies, as described in the literature, included knowledge related to: (a) detection and response to an event, (b) the role of the nurse in the incident command center, (c) triage, (d) epidemiology and surveillance, (e) isolation, quarantine and decontamination, (f) communication, (g) psychological issues and care of special populations, and (h) accessing critical resources and reporting. Each of these eight competencies is a key component of emergency preparedness and response (American Association of Colleges of Nursing [AACN], 2001; Garbutt et al., 2008; Gebbie and Quereshi, 2002; International Nursing Coalition for Mass Casualty Education [INCMCE], 2003; Wisniewski et al., 2004).

The overall plan for emergency preparedness and response is for nurses to have a basic level of knowledge and skill to adequately respond to a mass casualty incident and effectively manage the crisis (Gebbie & Qureshi, 2006). While nurses may or may not be prepared to lead a response effort they should be prepared to respond as an effective team member.

1.3 Statement of Problem

Nurses are a part of emergency and disaster response efforts and are considered key players during these situations. There is a critical need for appropriate and effective continuing education programs that will provide nurses with basic knowledge of emergency preparedness (AACN, 2001; Agency for Health care Research and Quality [AHRQ], 2002; DeSilets, 2006; Garbutt et al., 2008; Gebbie & Qureshi, 2002; INCMCE, 2003; Wisniewski et al., 2004). Continuing education is considered to be a valuable method for assuring the provision of safe and effective care in a rapidly changing profession (Boone et al., 2002; Claflin, 2005; Masten, 1992). Consistent with Boone's programming model, the American Nurses Association described continuing education to be a planned and structured learning experience developed for the purpose of enhancing the knowledge, skills, and posture of registered nurses in order to advance nursing practice, education, administration, and research with the intention of improving health care to the public (American Nurses Association, n.d.). Emergency preparedness education programs can be developed and tailored to meet the educational needs of specific nurse populations (Garbutt et al., 2008).

There is inherent value to looking at the structure of states in order to understand the state's function in a disaster event because each state has designated organizations for

responding to and managing disaster events and it is a requirement of the National Response Framework (2008). When national catastrophes occur the resources of the nation have to be mobilized to respond immediately. State and local governments will always need to draw support beyond their core of professional emergency responders when faced with a mass casualty disaster event (Carafano, 2005). Specific responsibilities in response to disaster events are the responsibility of state organizations. Each state has an agency which manages the complex functions that must be coordinated in order to respond rapidly and successfully to a crisis. The South Carolina Department of Health and Environmental Control (DHEC) is the state agency in South Carolina which manages the complex functions associated with a crisis within the state and nation wide. Through extensive collaboration with other state agencies, DHEC can implement an emergency “surge” or establish a supplemental healthcare workforce to mobilize and respond immediately to a mass casualty disaster event anywhere in the United States (South Carolina Department of Health and Environmental Control [SCDHEC], n.d.). State response operations will interface with Federal response assets through Emergency Support Function #8 (ESF-8). The ESF-8 is the Health and Medical Services Annex, which provides coordinated assistance to state and local resources in response to medical care needs following a major disaster or during a developing potential medical situation (Department of Health and Human Services, 2008). In addition, the states designated department will communicate with the Centers for Disease Control and prevention (CDC) as well as the Federal Emergency Management Agency (FEMA) (Department of Health and Human Services, 2008). An essential component of the National Response Framework is a state’s capability to respond quickly and effectively to a crisis, which

includes providing a health care workforce that is competent in the most basic competencies of emergency preparedness (Carafano, 2005; National Response Framework, 2008).

Nurse licensure is regulated on a state by state basis with each state assuming the responsibility of licensing and regulating nurses practicing within the state's borders. The mission of each state board of nursing is to assist in protecting the health, safety, and welfare of the public. Continued competence, where nurses bear the responsibility to maintain competency through self-assessment and self-limitation, is a component of each state board of nursing's mission (Gaffney, n.d.). Assessing the learning needs of South Carolina nurses by exploring their perceived knowledge of emergency preparedness is considered a critical first step to designing emergency preparedness continuing education and training programs in order to advance nurses' competencies related to emergency preparedness (Boone et al., 2002). Effective education and training programs contribute to the acquisition of role specific skills and the ability to function effectively during a natural or man made disaster event.

1.4 Purpose of the Study

The purpose of this study was to assess South Carolina nurses' learning needs by exploring their perceived knowledge of emergency preparedness. In doing so, the study identified what level of perceived knowledge nurses have of emergency preparedness, elucidated the competency domains with which nurses are most and least familiar, and determined their training needs. The goal of this study was to gain a better understanding of nurses' emergency preparedness learning needs and prioritize training efforts based on these needs (Ablah, Molgaard, Fredrickson, Wetta-Hall, & Cook, 2005; Boone et al.,

2002; Garbutt et al., 2008; Wisniewski et al., 2004) . The findings from the study will be instrumental in designing and implementing effective emergency preparedness education curricula and continuing education and training programs. It may also facilitate the systematic development of legislative and institutional policies related to emergency preparedness and mass casualty incidents as they influence the health care infrastructure and impact nursing practice, education, research, and regulation (Garbutt et al., 2008; Gebbie & Qureshi, 2006; INCMCE, 2003; Patillo, 2003; Rebmann, 2006; Slepski, 2007; Wisniewski et al., 2004).

There are practical reasons for conducting research specific to South Carolina nurses. States are responsible for responding to and managing disaster events which includes supplying a healthcare workforce competent in the most basic procedures of emergency response (National Response Framework, 2008). Additionally, South Carolina has a significant history of natural disasters and is home to one of the busiest container ports leaving South Carolina vulnerable to terrorist activities. Furthermore, all states have the potential for outbreaks of infectious disease, food and waterborne illnesses, and unintentional man-made disasters.

This research was also a strong test of the EPIQ. The EPIQ has been psychometrically evaluated for reliability and validity in a study assessing Wisconsin nurses' perceived knowledge of emergency preparedness (Wisniewski et al., 2004). Using the EPIQ on another homogeneous population, South Carolina nurses, this study continued to evaluate the tool for reliability and validity. The most practical reason for conducting research specific to South Carolina nurses is the researcher's access to the

target population based on the researcher's location of work as a registered nurse licensed in the state of South Carolina and place of residence.

This study utilized the concept of planning from Boone's programming model as the focus for assessing the learning needs of South Carolina nurses. Planning is the first step and the foundation of the programming model with an objective to accurately identify, assess, and analyze the expressed needs of the target population (Boone et al., 2002). Boone et al. (2002) suggested that in order to provide relevant and effective continuing education programs, the target population should first be carefully assessed.

A needs assessment is considered to be a systematic process for gathering and analyzing information about educational needs with the ability to identify learning needs (Boone et al., 2002; Claflin, 2005; DeSilets, 2007). A self-assessment questionnaire is a standard needs assessment strategy, which can be used to identify specific competencies, assess perceived knowledge of the competencies, and as a result, direct the development of content and learning methods designed to meet the target population's learning needs (Asadoorian, 2005; DeSilets, 2007).

The literature reflects several studies that have assessed learning needs before implementing continuing education and training programs. In a study to develop an understanding of several upstate New York emergency department staff's training needs, Benson and Wetphal (2005) utilized a survey consisting of 41 questions reflecting self-perceived knowledge of content related to biological, chemical, and radiological terrorism. In addition the survey explored their perceived knowledge of the incident command system, personal protective equipment, and decontamination. Results of the needs assessment indicated that emergency department personnel may benefit from

continuing education and training focused on identification and treatment of biological, chemical, and radiological terrorism. The authors concluded that the effectiveness of training is dependent on factors such as assessing the needs of the target audience, the methodology in which training is delivered, and the number of training opportunities offered.

Ablah et al. (2008) used a focus group approach to explore the learning needs of community health center (CHC) clinicians from New York by assessing CHC directors' and administrators' perceptions of emergency preparedness competency training needs and preferred training methods. As a result, competencies for CHC clinicians were identified and priorities for continuing education included CHC individuals' roles and responsibilities, decontamination and containment, and personal preparedness. Little research had been done previously to examine the topic of CHC emergency preparedness, however as a result of this study, competencies for CHC workers were adopted and future training needs were identified.

Ablah, Molgaard, Fredrickson, Wetta-Hall and Cook (2005) in preparation for a study to train Kansas health care professionals to respond to terrorism, conducted a statewide multidisciplinary needs assessment to identify and prioritize training needs and interests. Participants reported standardized protocols and systems for disease recognition and reporting as a learning priority. As a result of the needs assessments, the researchers incorporated the learning needs into the objectives of the workshops that were offered as part of a pretest/posttest study preparing Kansas' health care professionals to respond to terrorism.

Wisniewski et al. (2004) utilized the Emergency Preparedness Information Questionnaire (EPIQ) to assess Wisconsin nurses' current state of preparedness and identify their educational needs. Based in part on the findings of the study, the state of Wisconsin and the Wisconsin Nurses Association responded to these needs through the development of appropriate educational opportunities for the purpose of strengthening Wisconsin nurses' capacity to respond to disaster events in a competent manner.

Health care advocates support conducting a needs assessment of health care professionals prior to developing and implementing continuing education and training programs. The purpose of this study was to assess the learning needs of South Carolina nurses by exploring their perceived knowledge of emergency preparedness as a fundamental first step toward systematically and effectively developing emergency preparedness continuing education and training programs.

1.5 Research Questions

The following research questions provide clarity to the purpose of the study and specifically indicate the phenomenon to be explored.

1. Is the Emergency Preparedness Information Questionnaire a valid emergency preparedness assessment tool?
2. Is the Emergency Preparedness Information Questionnaire a reliable emergency preparedness assessment tool?
3. Is there a relationship between the emergency preparedness dimensions and the overall familiarity with emergency preparedness?

4. What are the self-perceived learning needs of South Carolina nurses as determined by scores on the Emergency Preparedness Information Questionnaire (EPIQ)?
5. Is there a relationship between the perceived knowledge of emergency preparedness and selected demographic variables of nurses?
6. What are the learning and training preferences of South Carolina nurses related to emergency preparedness content?

1.6 Definition of Terms

Basic Knowledge of Emergency Preparedness Competencies. For the purpose of this study, basic knowledge of emergency preparedness competencies will be defined as sufficient knowledge and skill to recognize the potential for a mass casualty incident, identify when such an event has occurred, know how to protect oneself, know how to implement immediate care for those individuals involved, recognize their own role and the actions that must be taken associated with that role; including the limitations of that role, know how to effectively communicate, and know where to obtain supplemental information and resources (Smith, 2006).

Competencies. Competencies are statements of anticipated actions combining knowledge, skill, and attitude which can be measured for educational purposes (Chandler, Qureshi, Gebbie, & Morse, 2008). For the purpose of this study there are eight competencies related to emergency preparedness: (a) detection and response to an event, (b) the incident command center and your role within it, (c) triage, (d) epidemiology and surveillance, (e) isolation, quarantine and decontamination, (f) communication, (g) psychological issues and care of special populations, (h) accessing critical resources and

reporting. Each of these eight dimensions is a key component of emergency preparedness and response (American Association of Colleges of Nursing [AACN], 2001; Garbutt et al., 2008; Gebbie and Quereshi, 2002; International Nursing Coalition for Mass Casualty Education [INCMCE], 2003; Wisniewski, Dennik-Champion, & Peltier, 2004).

Educational Preparation. Educational preparation is defined as the highest nursing degree completed. Nursing degrees include Diploma, Associate, Bachelor, Masters, or Doctoral.

Emergency Preparedness. The theoretical definition of emergency preparedness as developed by Slepski (2005), is the “comprehensive knowledge, skills, abilities, and actions needed to prepare for and respond to threatened, actual, or suspected chemical, biological, radiological, nuclear or explosive incidents, man-made incidents, natural disasters, or other related events” (p. 426).

Perceived Knowledge. For the purpose of this study, perceived knowledge is defined as an individual’s subjective assessment of their knowledge influenced by feelings and experiences known by the individual (Diselets, 2007).

Nursing Specialty. Nursing specialty refers to the primary nursing specialty in which the individual works (Emergency room, public health, academics, surgery, etc).

South Carolina Regions. There are 46 counties within the state of South Carolina, which have been divided into three regions and defined as (1) *Blue Ridge Mountain Region*, (2) *Piedmont Region*, and (3) *Atlantic Coastal Region* (Appendix 1).

1.7 Significance to Nursing

Nurses encompass the largest percentage of the healthcare workforce. They possess competencies and skills in leadership, management, and critical thinking that can

be used to fill a wide range of roles under emergency circumstances (Stanley, 2005). The American Association of Colleges of Nursing (AACN) (2001) and the International Nursing Coalition for Mass Casualty Education (INCMCE) (2003) recognized that all nurses need basic knowledge and skills for a more effective approach in carrying out disaster response plans. Assessing the learning needs of South Carolina nurses by exploring their perceived knowledge of emergency preparedness competencies is necessary for determining their current state of preparedness and developing education and training priorities that will strengthen the capacity of South Carolina nurses to effectively respond to disaster events.

Using the EPIQ to assess the learning needs of South Carolina nurses by exploring their perceived knowledge of emergency preparedness is consistent with the objectives of Boone's concept of planning, the first step in the programming model. Planning is the first step and the foundation of the programming model with an objective to accurately identify, assess, and analyze the expressed needs of the target population (Boone et al., 2002). The EPIQ is a valid and reliable self-assessment tool, which can be used to examine the educational needs of nurses and contribute to the development of appropriate and effective continuing education and training programs (Garbutt et al., 2008; Wisniewski et al., 2004).

This study utilized the EPIQ to assess the learning needs of South Carolina nurses. It is anticipated that the information gathered as a result of the study's findings will serve as valuable knowledge impacting nursing education and training, the practice of nursing, future research, and the development of legislative and institutional policies.

Chapter 2

2 Review of the Literature

2.1 Introduction

The objective of this review was to comprehensively amass information related to nurses' perceived knowledge of emergency preparedness, analyze and synthesize the current scientific evidence, and integrate the information to draw conclusions about the state of knowledge. A review of the literature was conducted using the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Google Scholar, and PubMed @ Duquesne. Key search terms were used to capture the breadth of literature and included preparedness, emergency preparedness, disaster preparedness, nurse, nursing, knowledge, and competency/ies. Due to the lack of available literature related to the topic of interest, the search was not limited by year.

Knowledge of emergency preparedness is essential to all health care professionals and is a key concept in disaster management. Nurses make up the largest percentage of the health care workforce and are a critical component of emergency and disaster response efforts. There is a growing, but underdeveloped body of literature focused primarily on public health workers, resulting in a gap in the literature related to general practicing nurses and their state of preparedness.

The organization of the literature review begins with the conceptual framework that was used to guide the study. The focus then shifts to South Carolina disasters;

revealing literature that has been published on the topic of disaster preparedness within the state of South Carolina, statewide assessments of health care professionals, emergency preparedness and continuing education, and preparing the health care workforce. The last section of the literature review summarizes the research and establishes the need for the study.

2.2 Conceptual Framework

Conceptual frameworks provide a global frame of reference for observing and understanding people and their environment. In addition, conceptual frameworks are used in research to present a frame of reference for a systematic approach to the phenomena of concern (Fawcett, 2005; Tomey & Alligood, 2002). According to Fawcett and Gigliotti (2001) conceptual models have the ability to inform thinking and offer meaning and direction to research. This study is based on Boone's programming model, which was used as a guide to assess the learning needs of South Carolina nurses by exploring their perceived knowledge of emergency preparedness in order to implement a systematic and effective approach to developing continuing education and training programs.

2.2.1 Boone's Programming Model

Boone's conceptual programming model addresses programming in adult education from a holistic systems approach that includes three interdependent and connecting concepts:

1. The concept of *planning* is the first step and the foundation of the programming model with an objective to accurately identify, assess, and analyze the expressed needs of the target population (Boone et al., 2002).
2. The concepts *design and implementation* make up the second step of the programming model with a primary goal of designing and implementing a planned program as an educational response to the expressed and analyzed needs identified and assessed during the planning process (Boone et al., 2002).
3. The concepts *evaluation and accountability* encompass the third and final step in the programming model. This step emphasizes the importance of collecting solid evidence to validate the achievement of intended outcomes outlined in the planned program and the reporting of these outcomes along with the resources used in producing the outcome (Boone et al., 2002).

The conceptual model gives meaning to the study and provides a consistent framework for understanding the many tasks that should be employed when planning, designing, implementing, and evaluating continuing education programs (Boone et al., 2002). According to Boone et al. (2002), programming is planned and systematic for the purpose of insuring the most efficient use of resources as well as designing and effecting successful educational strategies.

This study utilized the programming model's concept of planning as the focus for assessing the learning needs of South Carolina nurses. In Boone's model, planning begins with an analysis of the target population in order to identify, assess, and analyze their learning needs (Boone et al., 2002). Understanding the needs of the target population is a vital step in mapping or characterizing the population. Mapping is defined as a thorough

assessment of the perceived learning needs of the target population (Boone et al., 2002). Boone et al. (2002) elaborated on the term mapping stating that it is not just the demographics of the target population, but it is also an understanding of the perceived learning needs of the target population. Acquiring an understanding of these needs is the most basic level of program planning, without which there is very little probability of successfully meeting the learning needs of the target population (Boone et al., 2002).

Planning is the first step in the programming process and is considered to be the most fundamental step in the process (Boone et al., 2002). The authors asserted that if this step is omitted or not sufficiently completed, the remainder of the programming process will be constructed on a defective base, which will have the potential to adversely affect the final outcome (Boone et al., 2002). The cornerstone of planning is mapping the target population, which includes a thorough assessment of their learning needs. The EPIQ will serve as a tool for mapping South Carolina nurses learning needs by exploring their perceived knowledge of emergency preparedness; a critical first step in the programming process for the development of effective continuing education and training programs. Boone et al. (2002) proposed that only when the needs of the target population have been thoroughly assessed, or mapped, can effective education programming be planned to meet those needs.

Figure 2.1, developed for the purpose of this study, is a depiction of a model based on the planning concept, the first step of Boone's programming model. The model includes objectives outlined in the planning phase. The model begins with the awareness that South Carolina nurses need to gain a basic level of emergency preparedness knowledge in order to effectively respond to disaster events. It also recognizes that

nurses will have varying levels of familiarity related to emergency preparedness content and that nurses may have specific educational preferences for attending continuing education programs. Demographic characteristics of South Carolina nurses such as nursing specialty, years of nursing experience, educational preparation, and region of employment are demographic variables, which must be considered during the programming process of planning (Boone et al., 2002).

The second part of the planning process acknowledges that the researcher realizes the value in meeting the needs of the target population by mapping, or executing a needs assessment (EPIQ) to include the nurses' self perceived knowledge of emergency preparedness, educational preferences, and demographic characteristics. The EPIQ is a valid and reliable assessment tool developed by a coalition of experts who identified eight valid and reliable competency dimensions (Wisniewski et al., 2004). Collecting this information will significantly impact the development of continuing education and training programs and will contribute to the success of meeting the needs of this group (Boone et al., 2002).

The third and final part of the planning process requires the researcher to analyze the information gathered from the needs assessment and synthesize the data into a comprehensive set of continuing education learning needs, which will be vital for continuing and completing the programming process (Boone et al., 2002).

Continuing and completing the programming process, will include designing continuing education and training programs that are effective and appropriate for the target population and can be tailored to meet the educational needs of specific nurse populations (Boone et al., 2002; DiSilets, 2006). In doing so, it will improve nursing

practice by providing a health care work force that is competent in the most basic competencies of emergency preparedness (Carafano, 2005). It may also facilitate the systematic development of legislative and institutional policies as they influence the public health infrastructure and impact nursing education, research, and regulation (Gebbie & Qureshi, 2006; INCMCE, 2003; Patillo, 2003; Rebmann, 2006).

South Carolina Registered Nurse

- A need to gain a basic level of emergency preparedness knowledge to effectively respond to disaster events
- Has knowledge of emergency preparedness ranging from very familiar to not familiar
- May have specific preferences for attending continuing education programs based on availability, education methods, and class scheduling
- age
- Nursing specialty
- Years of nursing experience
- Educational preparation (associate, diploma, baccalaureate, masters, doctorate)
- Region of employment



Researcher

- Meeting the needs of the target population
- Mapping: execution of needs assessment: (Emergency Preparedness Information Questionnaire, EPIQ)
 - Needs assessment
 - Educational preferences
 - Demographic variables (age, nursing specialty, years of nursing experience, educational preparation, region of employment)



Determination of Continuing Education Needs

- Analyzing information gathered from the mapping process: needs assessment, educational preferences, and demographic variables
- Synthesize the data into a comprehensive set of continuing education learning needs

Figure 2.1 Conceptual model for planning emergency preparedness continuing education for South Carolina nurses based on the planning concept in Boone's programming model.

2.2.2 Identifying a Conceptual Framework

A thorough review of the literature was conducted by the researcher to identify a research study framework that is consistent with the purpose of the study, to assess South Carolina nurses' learning needs by exploring their perceived knowledge of emergency preparedness in order to design and implement effective emergency preparedness continuing education and training programs, and guided the research questions:

1. Is the Emergency Preparedness Information Questionnaire a valid emergency preparedness assessment tool?
2. Is the Emergency Preparedness Information Questionnaire a reliable emergency preparedness assessment tool?
3. Is there a relationship between the emergency preparedness dimensions and the overall familiarity with emergency preparedness?
4. What are the self-perceived learning needs of South Carolina nurses as determined by scores on the emergency preparedness Information Questionnaire (EPIQ)?
5. Is there a relationship between the perceived knowledge of emergency preparedness and selected demographic variables of nurses?
6. What are the learning and training preferences of South Carolina nurses related to emergency preparedness content?

Assessing the learning needs of nurses by exploring their perceived knowledge of emergency preparedness is a critical first step in a systematic approach for designing effective continuing education and training programs (Ablah et al., 2008; Boone et al., 2002; Garbutt et al., 2008; Hites et al., 2007; Wisniewski et al., 2004). Currently, the

EPIQ is the only valid and reliable self-assessment tool described in the literature which has been designed to comprehensively assess nurses' perceived knowledge of the eight competency dimensions of emergency preparedness (Garbutt et al., 2008; Wisniewski et al., 2004).

The development of the EPIQ was in response to the critical need for assessing the learning needs and determining the current state of preparedness of nurses (Wisniewski et al., 2004). The Wisconsin Nurses Association (WNA) created the Emergency Preparedness Self-Assessment Survey Task Force to explore competencies related to first responders. The Task Force, through analysis of previous research and discussions, identified 10 potential emergency response competencies. The 10 competencies were found to be consistent with the findings of a qualitative study, which included interviews and focus groups with health care experts to further develop emergency preparedness competencies. After factor and reliability analyses were conducted, eight reliable and valid dimensions were identified; (1) triage and basic first aid, (2) detection, (3) ability to access critical resources and reporting, (4) the incident command system (ICS), (5) isolation, quarantine, and decontamination, (6) psychological issues, (7) epidemiology and clinical decision making, and (8) communication and connectivity (Wisniewski et al., 2004).

Lastly, a coalition of experts which included the WNA Emergency Preparedness Self-Assessment Survey Task Force, Wisconsin Nursing Coalition, Wisconsin Medical Society, University of Minnesota Department of Health Preparedness, Wisconsin Department of Health and Family Services, and Knupp and Watson; a public relations/research firm, formed an emergency preparedness advisory committee to target

the development of a valid and reliable self-assessment tool that could be used by states to determine nurses' perceived knowledge of emergency preparedness competencies. The outcome of this collaborative effort was the 44-item EPIQ survey (Wisniewski et al., 2004). Wisniewski et al. (2004) then conducted a study using the EPIQ to assess Wisconsin nurses' perceived knowledge of emergency preparedness and to determine nurses' most preferred learning format. Based on the information provided in the research study, there was no identifiable theoretical framework used by the researchers to guide the study (Wisniewski et al., 2004). In a secondary analysis, Garbutt et al. (2008) utilized the data from Wisniewski et al. (2004) to further explore the EPIQ tool with scale development and refinement, reliability assessment, scale validation, and evaluation of scale predictability. While Garbutt et al. (2008) does not discuss a guiding framework for the secondary analysis evaluating the EPIQ, she presented a conceptual framework in her unpublished thesis which presented the original report of the data analysis. The conceptual framework presented in her thesis was based on Slepki's (2005) concept analysis of emergency preparedness. Figure 2.2 illustrates Slepki's concept of emergency preparedness. Garbutt's (2007) unpublished thesis focused on the antecedent in Slepki's model, *engagement in the identification of training needs*. This conceptual framework was considered for the current study by the researcher however it was determined by the researcher that given the purpose of the current study to assess South Carolina Nurses' learning needs by exploring their perceived knowledge of emergency preparedness along with the research questions, Boone's programming model would give more meaning and direction to the research and place the research within the context of developing continuing education and training programs. Boone's programming model

provides a systematic framework for planning, designing, implementing, and evaluating continuing education and training programs.

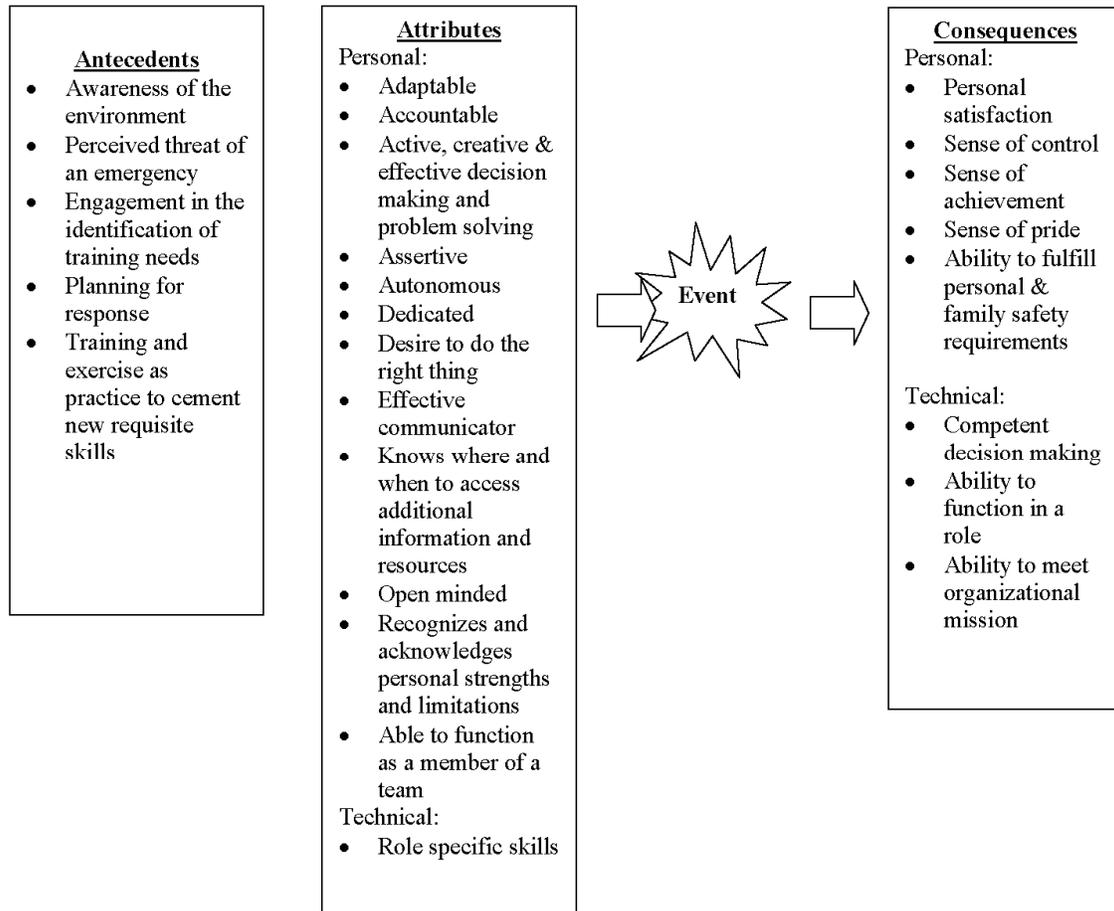


Figure 2.2 From “Emergency Preparedness: Concept Development for Nursing Practice,” by L. Slepski, 2005, *Nursing Clinics of North America*, 40, p. 427. Copyright 2005 by W. B. Saunders. Permission to reproduce this illustration received from the author (Appendix 2).

The EPIQ is a valid and reliable self-assessment tool which can be used to examine the educational needs of nurses and determine their capacity to respond to disaster events in a competent and effective manner (Garbutt et al., 2008; Wisniewski et al., 2004). Self-assessments are consistently recognized in the literature as critical for a

systematic approach to developing continuing education and training programs (Asadoorian & Batty, 2005; Boone et al., 2002; Claflin, 2005; DeSilets, 2006; DeSilets, 2007; Fox & Miner, 1999; Garbutt et al., 2008; Hites et al., 2007; Hopstock, 2008; Wisniewski et al., 2004).

A number of other theories and concepts were explored for their utility. Knowles' adult learning theory (ALT) was considered for the study based on the premise of the theory that learning occurs when there is a recognition that existing knowledge is defective or deficient (Knowles, 1984). Supporting this premise are several tenets of the theory such as *adults are ready to learn when they perceive a need and past experiences influence learning* (Knowles, 1984). With adult learners involved in identifying their own needs and recognizing their own deficiencies in knowledge, a needs assessment should be performed for the purpose of making appropriate decisions regarding educational needs (Cashin, Chiarella, Waters, & Potter, 2008). The ALT recognizes the learner as self-directing with their past experiences serving as a valuable resource and their desire to identify their own learning needs as essential for meeting their educational expectations (Claflin, 2005; Knowles, 1984). Although the researcher carefully considered the ALT as a guiding framework, a more comprehensive exploration of the literature revealed Boone's programming model. Boone's programming model encompasses principles and practices that echo Knowles' ALT (Boone et al, 2002), but provides more meaning and direction to the research by offering a frame of reference for a systematic approach to the phenomenon of concern; assessing the learning needs of nurses by exploring their perceived knowledge of emergency preparedness in order to

implement a systematic and effective approach for developing emergency preparedness continuing education and training programs.

2.2.3 Using a Self-assessment Tool to Identify Learning Needs:

Needs Assessment

Planning is the first step and the foundation of the programming model with an objective to accurately identify, assess, and analyze the expressed needs of the target population (Boone et al., 2002). Boone et al. (2002) suggested that in order to provide relevant and effective continuing education programs, the target population should first be carefully assessed. The authors continued by stating that the assessment should include the target population's perceived learning needs so that the program can be designed to meet those needs and thus be successful.

There is a critical need for appropriate and effective continuing education programs that will provide nurses with basic knowledge of emergency preparedness. Continuing education is considered to be a valuable method for assuring the provision of safe and effective care in a rapidly changing profession (Boone et al., 2002; Claflin, 2005; Masten, 1992). Consistent with Boone's programming model, the American Nurses Association described continuing education to be a planned and structured learning experience developed for the purpose of enhancing the knowledge, skills, and posture of registered nurses so to advance nursing practice, education, administration, and research with the intention of improving health care to the public (American Nurses Association [ANA], n.d.). Within the development of continuing education programs and in keeping with the planning process of the programming model, a learning needs

assessment to identify the learning needs of the target population is the first step (Boone et al., 2002, Maloney & Kane, 1995). For the purpose of this study, learning needs is defined as a discrepancy between the current state of perceived knowledge and what is needed to be known; an inconsistency in what people perceive they currently know or are able to do and what they need to know and be able to do (DeSilets, 2007; Fox & Miner, 1999; Masten, 1992).

A needs assessment is considered to be a systematic process for gathering and analyzing information about educational needs with the ability to identify learning needs (Boone et al., 2002; Claflin, 2005; DeSilets, 2007). A self-assessment questionnaire is a standard needs assessment strategy, which can be used to identify specific competencies, assess perceived knowledge of the competencies, and as a result, direct the development of content and learning methods designed to meet the target population's learning needs (Asadoorian, 2005; DeSilets, 2007).

Self-assessment is an active process of acquiring an awareness of personal learning needs and offers a systematic approach for developing appropriate learning activities based on learning needs (Asadoorian & Batty, 2005). In addition to identifying learning needs, self-assessments have been cited in the literature to initiate participation in the learning process. Research shows that learners will base their decisions to gain new knowledge on their perceptions, despite the accuracy of those perceptions (Fox & Miner, 1999). Others have considered the learner as the most qualified for assessing their own learning needs, which produces the greatest motivation for learning (Boone et al., 2002, Knowles, 1984; Maloney & Kane, 1995, Masten, 1992). Self-assessments have been utilized as an accurate method for identifying learning needs, designing effective

continuing education programs, improving professional competencies, and narrowing the practice-research gap (Asadoorian & Batty, 2005; Claflin, 2005).

Establishing the learning needs of the target population is the critical first step in the programming model (Boone et al., 2002). The EPIQ represents a valid and reliable self-assessment tool, which can be used to examine the educational needs of nurses and contribute to the development of appropriate and effective continuing education programs (Garbutt et al., 2008; Wisniewski et al., 2004).

2.3 Emergency Preparedness Information Questionnaire Instrument Development

The primary consideration of an instrument is whether the instrument is conceptually relevant. To design a useful and accurate instrument, researchers must carefully analyze the research requirements and abide by specific rules (Bannigan & Watson, 2009). The development of the EPIQ was in response to the critical need for assessing nurses' current state of preparedness. This need was based on the demand for preparing nurses for their roles in developing and implementing response plans to large-scale events. Wisniewski et al. (2004) stated "Clearly, the first step toward emergency preparedness is the identification of who needs to know how to do what" (p. 476).

In October of 2001, a resolution was passed by the Wisconsin Nurses Association (WNA) supporting the inclusion of registered nurses in planning initiatives for responding to large-scale emergency events. The WNA partnered with the Wisconsin Division of Public Health and the Wisconsin Nursing Coalition to advance emergency preparedness research for the purpose of identifying critical competency dimensions and training needs of registered nurses (Wisniewski et al., 2004).

The WNA created the Emergency Preparedness Self-Assessment Survey Task Force to explore competencies related to first responders. The Task Force, through analysis of previous research and discussions, identified 10 potential emergency response competencies. These 10 competencies were found to be consistent with the findings of a qualitative study which included interviews and focus groups with health care experts to further develop emergency preparedness competencies. After factor and reliability analyses were conducted, eight reliable and valid dimensions surfaced; (1) triage and basic first aid, (2) detection, (3) ability to access critical resources and reporting, (4) the incident command system (ICS), (5) isolation, quarantine, and decontamination, (6) psychological issues, (7) epidemiology and clinical decision making, and (8) communication and connectivity (Wisniewski et al., 2004).

Lastly, a coalition of experts to include the WNA Emergency Preparedness Self-Assessment Survey Task Force, Wisconsin Nursing Coalition, Wisconsin Medical Society, University of Minnesota Department of Health Preparedness, Wisconsin Department of Health and Family Services, and Knupp and Watson; a public relations/research firm, formed an emergency preparedness advisory committee to target the development of a valid and reliable self-assessment tool that could be used by states to determine nurses' knowledge of emergency preparedness competencies. The outcome of this collaborative effort was the 44-item EPIQ survey (Wisniewski et al., 2004) (Appendix 8).

2.3.1 Emergency Preparedness Information Questionnaire Reliability and Validity

Wisniewski et al. (2004) reported that a factor analysis was conducted on the 44 questions to determine how many dimensions existed. The authors asserted that of importance, except for the reduction of dimensions from 10 to 8 dimensions, the preparedness questions grouped as expected and had high internal reliability. A factor analysis examines interrelationships among variables and disentangles those relationships to identify cluster of variables that are most closely linked together. It is a statistical technique used to (1) estimate factors or latent variables, or (2) reduce the dimensionality of a large number of variables to a fewer number of factors. Factor analysis is frequently used in the development of measurement instruments, particularly those related to variables such as attitudes, knowledge, beliefs, and values (Devon, Block, Moyle-Wright, Ernst, Hayden, et al., 2007).

The second phase of factor analysis is factor rotation and there are two classes of rotation, orthogonal rotation and oblique rotation. Orthogonal rotations maintain the independence of factors; factors are uncorrelated with each other (Cronk, 2008). The Equamax rotation is a commonly used method in orthogonal rotation. The Equamax rotation simplifies the rows and columns of a factor matrix (Cronk, 2008). Wisniewski et al. (2004) submitted the cumulative variance explained from the Equamax factor analysis was 73.5%. The resulting coefficient alphas ranged from .827 to .94 indicating high levels of internal reliability. Coefficient alpha is the most widely used method for evaluating internal consistency and the normal range of values is between .00 and +1.00 (Bannigan & Watson, 2009).

2.3.2 Summary of Studies related to the Emergency Preparedness

Information Questionnaire

Current literature revealed only two studies that have utilized the EPIQ. The questionnaire has only been administered once, by the original researchers. A secondary analysis of the EPIQ, which focused on reliability and validity assessment of the instrument, builds on the initial work of Wisniewski et al. (2004). The primary goal of the Wisniewski et al. study was to develop a valid and reliable emergency preparedness questionnaire while gaining insight into the self-assessed preparedness of Wisconsin nurses. Wisniewski et al. (2004) determined from their study that the EPIQ was a reliable and valid instrument that can be used to assess nurses' knowledge of emergency preparedness competencies; based on the cumulative variance (73.5%) and the resulting coefficient alphas (ranging from .827-.94). Findings of the study showed that Wisconsin nurses are not prepared to respond to large-scale emergency events and the results can be used to assist in the development of competency based emergency preparedness curriculum.

Garbutt, Peltier, and Fitzpatrick (2008) conducted a secondary analysis of the EPIQ data and focused on the reliability and validity of the instrument. The aim was to evaluate the EPIQ for reliability and validity as a measure of nurses' knowledge of emergency preparedness competencies. Based on the results of the following analyses: factor analysis (correlated at .476 or above), Pearson product moment correlations (ranged from .34 ($p < .01$) to .78 ($p < .01$)), coefficient alphas (total score .97), t-tests, and ANOVA (F value of 263.94 ($p < .001$)), the EPIQ was revised to improve the clarity and structure of the instrument. The study confirmed that the EPIQ is a psychometrically

sound instrument to measure nurses' perceived knowledge of emergency preparedness and recommendations were made to test the revised EPIQ. The revised EPIQ was used for this study and included the formatting changes as a result of the pilot study conducted by the researcher (Appendix 9). Permission to use the tool was granted by Peltier, developer of the original EPIQ tool (Appendix 10) and Garbutt, revised tool (Appendix 11).

2.4 South Carolina and Disasters

There is intrinsic value in exploring states for the purpose of determining their readiness to execute response efforts and put into action a health care workforce competent to manage a disaster event as required by the National Response Framework (2008). Effects of catastrophic events often occur on a national level, but response efforts are generated at the state level, leaving individual states responsible for a health care workforce that has knowledge and skills to respond effectively to a disaster event. The research studies presented in this section represent the scope of published research as it relates to South Carolina disasters. Although the studies presented are not directly related to the problem under study, they illustrate that there is awareness in South Carolina of the potential for man-made or natural disasters and the need for mitigation to reduce the effects of trauma related to disasters. Absent in the literature are studies conducted for the purpose of preparing South Carolina's health care workforce to respond to disaster events, rendering the current study, assessing South Carolina nurses' learning needs by exploring their perceived knowledge of emergency preparedness, vital for determining South Carolina's current state of preparedness and developing effective continuing education and training programs. In doing so, this study has the potential to contribute to

South Carolina's capability to respond effectively and competently to a disaster event, an essential component of the National Response Framework (Carafano, 2005; National Response Framework, 2008).

The indiscriminate nature of man-made, natural, and public health disasters compels South Carolina to have people, equipment, and training in place to identify, track, and respond appropriately to emergencies. South Carolina is confronted with natural disasters, which can be divided into weather related and geophysical. The weather related disasters include floods, hurricanes, tornadoes, tropical storms, and winter storms. The Federal Emergency Management Agency (n.d.) provides a historical list of weather related disasters that have occurred in South Carolina and include Hurricane Hugo, 1989; Hurricane Fran, 1996; Hurricane Bonnie, 1998; Hurricane Floyd, 1999; Hurricane Charley, 2004, and Hurricane Ophelia, 2005. Geophysical disasters include earthquakes, tidal waves, and volcanic eruptions (South Carolina Area Health Education Consortium, n.d.).

South Carolina is also faced with man-made disasters. Man-made disasters can be either unintentional: transportation accidents, structural collapse, hazardous material spills, industrial accidents, and explosions; or intentional: civil disturbance, war, and terrorism. Terrorism can include weapons such as small arms, explosives, incendiaries, chemicals, biological, and radiation (South Carolina Area Health Education Consortium, n.d.).

Public Health emergencies such as outbreaks of infectious disease and food and waterborne illnesses present a challenge to the state of South Carolina. Olawsky (2006) described the state's ability to prepare for hurricanes as a familiar activity for the coastal

counties, but preparing for an influenza pandemic is also critical and will require everyone within the health care community to work together to deal with the pandemic.

There is very little research exploring disaster preparedness in South Carolina and the following studies encompass the published research that has been identified. Schier et al. (2007) examined the comprehensive public health investigation that followed the discovery of ricin in a South Carolina postal facility. On October 15, 2003 a canister was found in a postal processing facility in Greenville, SC along with a note threatening to poison the water supplies if certain demands were not met. The primary objective of the article was to describe the various components of the public health investigation for the purpose of assisting in future responses to ricin-related public health threats. The authors found that ricin incidents, similar to the Greenville event, will require a systematic multiagency, multidisciplinary, and comprehensive approach. The approach will include environmental sampling to assess the extent of contamination, epidemiological assessment to determine risk of exposure, and surveillance for clinical illness. Each response activity will require the inclusion of personnel with expertise in the given area. The article neglects to mention the role health care providers will play in the public health investigation, identifying and treating victims that have been affected by ricin poisoning, since most victims would potentially present to local hospitals upon the onset of symptoms, which usually occurs 4-8 hours after exposure to the poison (Centers for Disease Control and Prevention [CDC], 2008).

Richter et al. (2005) recognized a need in South Carolina to conduct a problem-solving event to assess training and research needs and improve readiness in the Port of Charleston. In October of 2003 a 2-day workshop entitled “Coastal Bioterrorism:

Developing Capacities for Protecting Ports and Communities” included 50 participants from the Department of Health and Environmental Control, the US Coast Guard, the SC Sea Grant Consortium, the Savannah River National Laboratory, and the SC Ports Authority. Charleston, SC is home to the nation’s fourth busiest container port, lending concern that terrorists could easily send or bring biological, chemical, radiological, or nuclear weapons undetected through the Port of Charleston. The threat of man-made disasters, combined with the already existing natural threats contributed to the three objectives of the workshop: assessing the training and research needs of the coastal stakeholders, increasing familiarity with resources and protocols during a bioterrorism coastal event, and facilitating communication and interagency networking. Of the 50 participants who attended the workshop, 32 participants responded to the survey. Results of the survey indicated that training needs included those dealing with the Incident command system, resources for training, coordination and interagency operability, and technical training related to specific equipment and specific hazards. Ninety-one percent of the respondents “agreed” that the workshop produced an increased understanding of public health protocols during a bioterrorist attack and 95% of the respondents reported that the workshop allowed them to make contact and network with staff that have similar positions to theirs, but work in different agencies. The authors concluded that although the workshop and evaluation did not test or assess the participant’s ability to respond, manage, and recover from an event, it did serve to identify potential issues, exposed gaps in knowledge and training, and encouraged dialogue amongst participants aimed at solving problems, correcting misconceptions, and promoting cooperation. This study is not directly related to the current study’s focus, but it serves to illuminate the potential for

man-made disasters and illustrates the process for advancing preparedness amongst various organizations associated with the Port of Charleston.

Laditka et al. (2007) conducted an exploratory study of nursing home preparedness in South Carolina. The study intended to examine nursing home administrators' perceptions of disaster preparedness in their facility, obtain their views about preparedness following a large disaster such as Hurricane Katrina, and explore whether administrators' knowledge of shortcomings in preparedness leads them to rethink their views about planning. Participant's were asked to rate their level of satisfaction based on their facility's plan using a Likert scale of 1 to 5, "5" being most highly satisfied, and "1" being least satisfied. A baseline survey was distributed in the summer of 2005 with a post-Katrina survey distributed two weeks after the hurricane in September, 2005. A total of 112 participants completed the baseline survey (58.3% response rate) with only 50 participants completing the post-Katrina survey (26% response rate). The results showed that 93% of the 50 participants reported a high level of satisfaction with their overall ability to protect their residents during and after a disaster. Many of the participants were less satisfied with their preparedness in specific preparedness domains: (1) ability of contacted nursing homes to serve as sheltering homes ($r = 0.32$, $p < 0.001$), (2) ability to shelter evacuated residents ($r = 0.25$, $p < 0.01$), (3) transportation resources ($r = 0.33$, $p < 0.001$), and (4) availability of off-duty staff to care for evacuated residents ($r = 0.31$, $p < 0.01$). The post-Katrina survey revealed that 54% of the participants indicated that the events during and after Hurricane Katrina changed their thinking about disaster preparedness and their facility's current disaster plan. Many of the participants expressed that they feel South Carolina is better prepared

for hurricanes than the Gulf Coast states because of their prior experiences with hurricanes Hugo, Floyd, and Ophelia. Findings suggested that several domains must be considered when planning disaster preparedness in nursing homes; communication, transportation, and the ability to shelter residents evacuated from other nursing homes.

Hardin et al. (2002) tested the effects of a long-term psychosocial nursing intervention developed to decrease mental distress in adolescents following their exposure to Hurricane Hugo. Participants included 1,095 freshmen and sophomores from two South Carolina high schools that were in areas hit by Hurricane Hugo and that served as emergency shelters. The study was designed as a longitudinal, quasi-experimental, field study measuring mental distress every six months over three years. One thousand and ninety-five adolescents completed the baseline survey. Of the 1,095 participants, 545 were randomized to intervention and 550 to the control. The intervention group met once a year for three years for the purpose of increasing the adolescents' understanding of stress and to enhance their self-efficacy and social support. The researchers utilized several measurement tools including the Derogatis Brief Symptom Inventory (BSI), which measures the intensity and prevalence of psychopathological symptoms of mental distress such as depression, anxiety, hostility, or somatization, Coppel's Self-Efficacy Scale, which measures one's belief about the ability to produce desired outcomes, and Coppel's Social Support Scale measuring adolescent's subjective appraisal of the quality of social support available to them. The authors found that for the entire time period of the study mental distress scores ranged from 43.90 to 49.81 with a mean of 46.64. A statistical analysis showed that adolescents in the intervention group had less mental distress over time than the control adolescents ($p = 0.00001$). Results indicated that

participation in the intervention was related to decreased mental distress and that the intervention has the potential for decreasing mental distress in adolescents who have experienced a disaster event. This study demonstrated an important and often overlooked competency of emergency preparedness, evaluating and mitigating psychological issues following a disaster event. The study focused primarily on the adolescents and the intervention, but did not present the qualifications of the nurses performing the interventions and whether or not they received specific training related to the topic.

2.5 Statewide Assessments of Health Care Professionals

When national disasters occur, the resources of the nation must be mobilized to respond immediately. Each state has designated organizations which assume responsibilities for responding and managing disaster events. An essential component of the National Response Framework is a state's capability to respond quickly and effectively to a crisis, which includes providing a health care workforce that is competent in the most basic competencies of emergency preparedness (Carafano, 2005; National Response Framework, 2008). Five studies utilized a statewide approach for assessing health care professionals' state of readiness and continuing education efforts. Ablah, Molgaard, Fredrickson, Wetta-Hall, and Cook (2005) conducted a study designed to prepare Kansas' health professionals to respond to terrorism and emerging infections. Participants included physicians, nurses, laboratory professionals, pharmacists, and emergency medical service personnel. The researchers used a needs assessment to identify and prioritize training needs. As a result, training programs were developed for the training conferences and training occurred in six 2-day workshops across the state from December 3 through 15, 2003. A pretest-posttest and 3-month posttest was used to

evaluate the training conferences. From pretest to posttest all trainees' scores significantly improved ($0.039 > P > 0.001$). From pretest to 3-month posttest scores; nurses', physicians', and nurse practitioners' scores significantly changed ($0.031 > P > 0.001$). The training met many of the health professionals' bioterrorism response training needs and improved their feelings of competence; however this study was limited to bioterrorism only and did not evaluate the participants' perceptions of their ability to respond to other disasters such as natural disasters.

In a follow up study to the Kansas study conducted in 2003, Ablah et al. (2006) qualitatively explored perceptions of participants from the 2003 study using a focus group approach. The purpose of the study was to evaluate the training content and format of the training offered during the first study in 2003. Thirty-one health professionals participated in the focus groups and included nurses, physicians, clinical laboratory scientists, pharmacists, and emergency medical technicians. Results indicated that the participants learned a great deal and felt more confident in their abilities to respond to a bioterrorist event. The participants' expressed that the amount of information presented in the short amount of time was overwhelming and they also reported that training could be improved and more useful if specific disciplines were addressed separately. The participants' response for discipline specific training supports the current study's proposal to assess nurses' learning needs of emergency preparedness for the purpose of developing continuing education and training specific for nurses.

Two studies examined Hawaiian physicians' and nurses' knowledge related to bioterrorism agents for the purpose of determining Hawaii's state of readiness and for the development of continuing education programs. Lanzilotti, Galanis, Leoni, and Craig

(2002) measured Hawaiian doctors' and nurses' level of knowledge and skills related to biological and chemical weapons of mass destruction. The Hawaii Medical Professionals Assessment (HMPA), comprised of 16 questions dealing with a variety of emergency preparedness issues, was utilized in a survey of over 3,000 Hawaiian physicians and nurses in 2001. The study analyzed participants' responses to questions about knowledge and ability and interest in future training. Respondents included 559 of 2,235 physicians and 2,775 of 12,380 nurses. The findings indicated physician (52%) and nurses (51%) reported being most knowledgeable about the biological agent Influenza and least knowledgeable about the biological agent Tularemia, (physicians (5%) and nurses (3%)). With respect to chemical agents physicians reported knowing most about nerve agents (7%) and least about choking agents (65%). Nurses reported knowing most about blood agents (10%) and least about choking (65%) and blistering (64%) agents. Participants of the study expressed the desire for emergency preparedness knowledge and training opportunities. A higher percentage of registered nurses, 85%, were interested in more training and education than were the doctors, 73%. The more knowledge and ability participants reported, the more committed they were to staffing emergency facilities. Identifying physicians' and nurses' knowledge of weapons of mass destruction is essential for targeting continuing education in order to maintain readiness and preparedness. This study assessed preparedness related to weapons of mass destruction and did not assess the readiness of physicians and nurses to respond to other disasters, such as natural disasters.

Katz et al. (2006) developed a survey to assess objective knowledge related to bioterrorism agents and perceived readiness for a bioterrorism event amongst Hawaiian

physicians (n=115) and nurses (n=146). The findings showed that less than 15% reported having knowledge to respond effectively to a bioterrorism event. Greater than 70% expressed willingness to respond and assist the state in the event of a bioterrorist attack. Knowledge-based test scores revealed physicians had a mean correct score of 8.4 ± 1.8 (SD) out of 12 questions (70%) (median = 8). Physicians who perceived themselves able to respond effectively to a bioterrorist event scored significantly higher than physicians who perceived themselves as unable to do so ($p = 0.02$). Nurses had a mean score of 7.2 ± 2.1 (SD) out of 12 questions (60%) (median = 7). Nurses who perceived themselves able to respond effectively to a bioterrorist event scored significantly higher than nurses who perceived themselves as unable to do so. The results of the study contributed to a greater understanding of Hawaiian physicians' and nurses' knowledge of bioterrorism agents and based on the findings, can significantly contribute to the development of continuing education programs. This study focused on knowledge of weapons of mass destruction and did not address knowledge related to other types of disaster events.

Only one study assessed general nurses' perceived knowledge of emergency preparedness. This study was conceived for the purpose of developing a valid and reliable emergency preparedness questionnaire, determining Wisconsin's state of readiness, and gaining insight into the self-assessed preparedness of Wisconsin nurses (Wisniewski et al., 2004). The researchers used a descriptive quantitative approach to evaluate Wisconsin nurses' familiarity with emergency preparedness. The researchers surveyed 877 Wisconsin registered nurses using the Emergency Preparedness Information Questionnaire (EPIQ); a 44-item, competency oriented questionnaire. The EPIQ questionnaire assessed nurses' self reported familiarity with eight dimensions of

emergency preparedness (scale 5=very familiar 1=not familiar). Results indicated nurses had an overall familiarity with emergency preparedness score of 2.29 indicating a low self-perception of knowledge related to emergency preparedness. Survey respondents also indicated the most familiarity with triage (average familiarity score 3.15) and the least familiarity with communication and connectivity (average familiarity score 2.08). Wisniewski et al. found that Wisconsin nurses are not prepared to respond to a disaster event. Determining the educational needs of nurses and developing continuing education programs will significantly contribute to strengthening Wisconsin nurses' abilities to respond to large-scale emergency events in a competent and effective manner.

2.6 Emergency Preparedness Competencies and Continuing Education

Emergency preparedness competencies are defined by Chandler, Qureshi, Gebbie, and Morse (2008) to be statements of anticipated actions combining knowledge, skill, and attitude which can be measured for educational purposes. Competencies can be used to define what a learner needs to know, providing a framework for which to base educational activities (Weiner, 2006). Ablah et al. (2008) espoused that having a standardized list of emergency response competencies will assist in the development and evaluation of education and training programs. Emergency preparedness competencies have been referenced in the literature and are considered critical for educating and preparing a health care work force to respond competently to a disaster event.

Two studies assessed competencies that were performed by responders during response efforts to Hurricanes Katrina and Rita for the purpose of exploring which competencies were most frequently performed during a "live" event. Rogers and Lawhorn (2007) surveyed 726 registered nurses, physicians, nurse practitioners, and

physician associates to determine their roles and involvement in the aftermath of Hurricanes Katrina and Rita. Fifty-six percent of the participants responded that they were engaged in providing health protection and preparation efforts such as immunizations. Forty eight percent provided general clinical care and health surveillance efforts. The participants reported the greatest obstacle to meeting hurricane relief goals was communication (33%). Slepski (2007) utilized an exploratory descriptive study to survey health care providers who worked on-site in disaster response efforts to Hurricanes Katrina and/or Rita regarding the competencies they needed and performed during their disaster response. The sample consisted of 200 health care providers, with the largest categories of respondents being registered nurses (37%) and physicians (24%). Combining both quantitative and qualitative analysis methods, the findings revealed basic clinical care (39%) and triage (26%) as the most frequently performed competencies and only 22% of the respondents reported not knowing a specific skill. The studies revealed basic clinical care, triage, surveillance, and communication as the most frequently used competencies during response efforts to an actual disaster event. The authors concurred that identifying competencies which were performed during an actual disaster event is critical information for designing effective response plans and continuing education and training content.

Hites et al. (2007) described the methods used by the South Central Center for Public Health Preparedness (SCCPHS) when expanding and refining existing competency sets to support learning objectives for public health workers' continuing education courses. An assessment of training needs is utilized as the foundation for creating a competency based curriculum. The SCCPHS identified through the needs

assessment process that some of the training needs were not addressed in the current competency sets, so the organization took steps to expand and refine the competency sets to better meet the needs of public health workers. The technique utilized a course objective-competency matrix to evaluate the degree of combined competency sets related to the course objectives. A modified Q-sort method was used for ranking and assessing the applicability for each competency to each course objective. As a result, the new competency set offers public health trainers and educators a more comprehensive set of competencies to develop continuing education and training programs. This article highlights that the evolving nature and scope of emergency response by public health workers requires an ongoing assessment of competencies for which to base effective emergency preparedness continuing education and training programs.

Ablah, Tinius, Horn, Williams, and Gebbie (2008) used a focus group approach to explore New York community health center leaders' perceptions about emergency preparedness training. Focus groups were audio recorded, transcribed, and reviewed for emerging key themes. Participants identified training topics to include individuals' roles and responsibilities, decontamination and containment, and personal preparedness as priority training needs. To determine competencies applicable to community health center (CHC) clinicians, participants were given a list of competencies developed for all clinicians who treat, triage, and communicate with patients. The competency list was created by the Association of Teachers of Preventive Medicine and the Center for Health Policy at Columbia University School of Nursing. Participants were asked to identify which of the competencies listed were most applicable to CHC clinicians. By determining which of the listed competencies were most applicable to CHC clinicians,

researchers were able to present strategies for implementing training programs tailored to meet their needs. This study emphasized the importance of assessing training needs and establishing competencies that are relevant to the practitioner when developing continuing education and training programs that will prepare CHC clinicians to competently respond to emergency and disaster events (Ablah et al., 2008).

Kerby, Brand, Johnson, and Ghouri (2005) surveyed staff members (n=180) from the Tarrant County Health Department in Oklahoma. Respondents rated their perceived need for training in emergency related competencies. Using Ward's method to combine cases, three rating groups emerged. The low rating group (n=33) rated their need for training as low across all competencies. The moderate rating group (n=81) rated their need for training at a moderate level on most competencies and the high rating group (n=66) reported a high need for training across all competencies. The main finding of the study was that the responses to the survey were influenced by the participant's interest in training; if he or she was interested in training they might report a high need for training in many areas. The ratings for confidence in competencies and the need for training yielded similar results. People with a lower level of confidence for a competency perceived a high need for training. The authors of the study recommended the use of self-assessments for evaluating perceived knowledge of competencies when developing a training plan and an assessment of the workers' objective knowledge as an evaluation of the training plan.

Wisniewski et al. (2004) developed a tool for assessing nurses' learning needs and determining nurses' current state of preparedness based on eight reliable and valid competency dimensions. The Wisconsin Nurses Association (WNA) created the

Emergency Preparedness Self-Assessment Survey Task Force to explore competencies related to first responders. The Task Force, through analysis of previous research and discussions, identified 10 potential emergency response competencies. After factor and reliability analyses were conducted, eight reliable and valid dimensions surfaced; (1) triage and basic first aid, (2) detection, (3) ability to access critical resources and reporting, (4) the incident command system (ICS), (5) isolation, quarantine, and decontamination, (6) psychological issues, (7) epidemiology and clinical decision making, and (8) communication and connectivity. Lastly, a coalition of experts to include the WNA Emergency Preparedness Self-Assessment Survey Task Force, Wisconsin Nursing Coalition, Wisconsin Medical Society, University of Minnesota Department of Health Preparedness, Wisconsin Department of Health and Family Services, and Knupp and Watson; a public relations/research firm, formed an emergency preparedness advisory committee to target the development of a valid and reliable self-assessment tool that could be used by states to determine nurses' perceived knowledge of emergency preparedness competencies. The outcome of this collaborative effort was the 44-item EPIQ survey with a scale ranging from 5 = very familiar to 1 = not familiar. Wisniewski et al. (2004) conducted a needs assessment study using the EPIQ to assess Wisconsin nurses' perceived knowledge of emergency preparedness and determine nurses' most preferred learning format. Researchers surveyed 877 Wisconsin registered nurses. Results indicated nurses had an overall familiarity with emergency preparedness score of 2.29 indicating a low self-perception of knowledge related to emergency preparedness. Results also revealed that nurses were most familiar with triage and basic first aid issues (average familiarity score 3.15) and least familiar with communication and connectivity

(average familiarity score 2.08) and epidemiology and clinical decision making (average familiarity score 2.12). Face to face education was the most preferred learning format (ranking score = 1,715), online web-based courses ranked second (ranking score = 666), and self-instruction ranked third (ranking score = 479). The authors concluded that Wisconsin nurses were not prepared to respond to a disaster event and based in part on the study's findings, the Wisconsin Nurses Association and the state of Wisconsin are developing appropriate continuing education programs.

In a secondary analysis Garbutt et al. (2008) utilized the data from Wisniewski et al. (2004) to further explore the EPIQ tool with scale development and refinement, reliability assessment, scale validation, and evaluation of scale predictability. The aim was to evaluate the EPIQ for reliability and validity as a measure of nurses' knowledge of emergency preparedness competencies. Based on the results of the following analyses: factor analysis (correlated at .476 or above), Pearson product moment correlations (ranged from .34 ($p < .01$) to .78 ($p < .01$)), coefficient alphas (total score .97), t-tests, and ANOVA (F value of 263.94 ($p < .001$)), the EPIQ was revised to improve the clarity and structure of the instrument. The study confirmed that the EPIQ is a psychometrically sound instrument to measure nurses' perceived knowledge of emergency preparedness.

2.7 Preparing the Health Care Workforce

Emergency preparedness is an expectation of the public health workforce, but in the case of a large scale emergency event, response efforts will reach beyond the public health workforce and into the collection of general health care professionals. There is a growing but underdeveloped body of literature focused primarily on public health workers, resulting in a gap in the literature related to general practicing nurses and their

state of preparedness. Nurses encompass the largest percentage of the healthcare workforce and will continue as major players in both local and national level emergency responses as we move through the 21st century (Gebbie & Qureshi, 2006). Knowledge of emergency and disaster preparedness once considered specialty training for military, public health, and emergency room nurses has become a basic competency for the generalist nurse (Patillo, 2003). The following studies present the current literature related to progress that is being made to prepare the health care workforce. The focus of many of the studies is concentrated on the public health infrastructure leaving a gap in the literature related to preparing general health care practitioners and more specifically nurses.

Six studies targeted efforts for delivering emergency preparedness education and training to public health professionals. Two of the studies utilized a pretest-posttest design to evaluate the outcomes of general emergency preparedness training programs. Rottman, Shoaf, and Dorian (2005) conducted a study based on the Adult Learning Theory to evaluate the knowledge gained by public health workers in Southern California after a two day competency-based emergency preparedness training program in spring 2003 and fall 2004. The training program content incorporated seven competencies and introduced material based on a needs assessment, which was performed during the mapping stage of the program to ensure that the training content is meaningful to the personnel and institutional structure. Using a paired *t* test with 463 completed pairs of pretest/posttest knowledge scores, the authors found that the participants scored significantly higher on the posttest, 87.4% than the pretest, 75.5%, which indicates a significant improvement of overall emergency preparedness knowledge ($p < .001$).

Qureshi et al. (2004) reported the impact of a four hour emergency training program for 764 public health nurses in New York City in August of 2001 using a one group pretest-posttest and repeat one month post-test study design. The pre and post testing sought to answer two questions: did the training program increase general knowledge of emergency preparedness and did the training affect the attitudes and behavioral intentions with respect to their willingness to respond to an emergency? Their results, based on a matched pairs *t* test, showed significant gains in overall baseline knowledge of emergency preparedness ($p < .05$), chain of command ($p < .05$), public health nurse functional roles ($p < .001$), and components of a personal emergency plan ($p < .001$). The results related to attitudes and behavioral intentions and their willingness to respond to an emergency showed significant improvements in several areas including sense of responsibility for responding during an emergency, belief that other public health professionals will respond to an emergency, and their belief that their significant other would approve of their response to emergencies. The authors performed pre and post tests documenting that the participants had increased their knowledge base, but there was no evidence that the authors attempted to determine the actual needs of the participants, or the effect of the program on those needs, which by some experts is considered a limitation for updating skills and knowledge (Boone et al., 2002; Fox & Miner, 1999; Hites et al., 2007).

Gershon et al. (2004) utilized a retrospective pretest design to survey the knowledge, attitude, and behaviors of 295 New York City public health clinicians following the completion of a three and one-half hour training program on bioterrorism and related diseases. Participants included physicians ($n = 227$), dentists ($n = 27$),

physician assistants (n = 22), nurses (n = 9), and other (n = 10). The authors, for planning purposes, conducted a needs assessment and evaluated preferred training methods for emergency preparedness programs. Participants expressed interest in obtaining additional training in chemical terrorism (89%), clinical diagnosis of bioterrorism disease (84.2%), infection control aspects of bioterrorism (84.2%) and treatment of bioterrorism disease (81.6%). Traditional lectures (86.5%) were identified as the most preferred format for training; audios and videos were the least preferred (44%). According to the authors, the retrospective pretest design has been shown to be an effective measure of training. Participants self-reported perceptions of competence before and after training were compared. A 37-item questionnaire evaluated the participant's knowledge, beliefs, and confidence related to their ability to diagnose, treat, and report certain class A diseases of bioterrorism. Results indicated that 89% had an increase in confidence for recognizing symptoms of bioterrorism, 75% reported an increase in their confidence to treat bioterrorism victims, and 83% felt confident that they could address bioterrorism concerns. This study presented a program plan utilizing a needs assessment for determining content to include in continuing education programs for public health care professionals, which carried the additional benefit of maximizing time spent on training. The study was limited to public health professionals with nurses representing nine of the 295 respondents. Content of the program addressed topics related to bioterrorism only and did not address topics related to other types of disasters.

Williams (2008) examined the emergency preparedness readiness of all workgroups (n=1,994) within Kentucky's rural public health departments assessing their level of confidence (LOC) and need for training (NFT). The seven workgroups included

technical and support (53%), nursing (30%), environmental (6%), education and information (6%), preparedness planners (3%), leaders and officials (2%), and epidemiology (<1%). The main purpose of the study was to find relationships between workgroup classifications and response variables, LOC and NFT. Participants were surveyed using the Kentucky Public Health Workforce Survey Training Needs Assessment of Emergency Preparedness instrument, a 39 item questionnaire based on generic emergency preparedness competencies. Results revealed that across all workgroups the competency to describe the appropriate action to take and procedures to follow had the lowest average LOC (58%) and the highest NFT (73%). Each workgroup had a high NFT to improve their ability to respond to an emergency situation. The author reported that the results of this study indicated that workgroups within Kentucky's rural health departments will require more public health training specific to each workgroup in order to improve emergency preparedness knowledge and skills to adequately protect the public. The author also cited that one complicating barrier to delivering continuing education and training will be sorting through the workgroups and delivering appropriate content targeted toward their roles in response efforts. This view supports the concept of evaluating specific disciplines independently for determining their learning needs and state of readiness and developing continuing education and training programs.

Two studies focused on public health school nurses' knowledge of bioterrorism to identify educational needs and preferred formats for addressing those needs. By only addressing bioterrorism, the researchers neglect to assess the learning needs of public health school nurses' knowledge of other disasters. Evers and Puzniak (2005) surveyed 167 public health school nurses from three large cities in Missouri attending a seminar on

bioterrorism emergency preparedness. The survey contained 22 questions regarding demographics, bioterrorism preparedness knowledge, and training method preferences. Eight of the 22 questions addressed bioterrorism knowledge. Questions related to identification of bioterrorism agents such as anthrax, smallpox, botulism, and tularemia were assessed. Fifty-five percent of respondents gave appropriate answers when asked about distinguishing characteristics between anthrax and influenza-like illness and when asked if a case of botulism is fatal, only 56.2% answered appropriately. Participants' perceptions of a biological (52.1%) or a chemical (53.1%) attack were unlikely therefore there may be a resistance to training and education. Preferred methods for training included lecture type conferences. The authors concluded that prioritizing educational needs, addressing perceptions that an event is unlikely, and delivering content in the most preferred manner will ensure that the time spent by the public health school nurse is utilized in the most beneficial ways using the most appropriate methods to prepare public health nurses to respond to a bioterrorism emergency event.

Mosca, Sweeney, Hazy, and Brenner (2005) surveyed the bioterrorism disaster preparedness needs of 80 public health school nurses in three northeastern Ohio counties. A 74-item survey was developed to assess public health school nurses' training needs related to the role of the public health school nurse in bioterrorism disaster preparedness. Participants were asked to rate their level of confidence and training need in the skill areas defined by the CDC public health competencies. Sixty percent of the participants responded that they have little to no confidence in their ability to implement skills required to respond to bioterrorism disasters in all competency categories. Responses indicated the competency related to the incident command system required the highest

training need (70%). Sixty-three to seventy percent of the respondents requested additional training related to emergency response, infectious disease, hazardous materials and diagnostic criteria. Seventy-four percent of the respondents indicated classroom instruction as their most preferred method of training.

Two studies utilized a hospital setting to assess hospital personnel's knowledge and awareness of biological and chemical agents related to terrorism. The researchers recognized that health care professionals are responsible and must be proactive in gaining knowledge and skills to deal with potential domestic terrorism events. By prioritizing the learning needs of the participants, more effective continuing education can be implemented. The following studies address bioterrorism only, leaving a deficit in the literature regarding hospital personnel's objective or perceived knowledge of other forms of disasters. Rose and Larrimore (2002) used an exploratory descriptive approach in 2000 to survey the domestic terrorism knowledge (biological and chemical weapons) of 291 nurses, physicians, nursing students, medical students, and hospital security officers at an academic urban medical center. The knowledge scores for all respondents were low with less than one fourth of the knowledge questions answered correctly. Less than 23% reported confidence in providing health care during a chemical or biological terrorism situation and 85% believe a course in terrorism should be included in health related educational programs. Priority for training included biological and chemical agent signs and symptoms, treatment, containment issues, and mass triage protocols and procedures.

Benson and Westphal (2005) assessed hospital emergency department staff (n=230) in the central and capital districts regions of upstate New York. Using a forty-one question survey, the authors collected data from primary care providers (27%),

nurses (61%), and support staff (12%) regarding emergency preparedness training needs. The results of the survey reflected 93% of the respondents thought it was important to be trained at least semi-annually. Fifty-five percent reported that “all” of their past training has been appropriate for their current position to respond to an emergency, while 20% indicated “little to none” of their past training as appropriate for their current position to respond to an emergency. The three most frequently preferred methods of training include hospital in-service, drills, and online courses. The three skills that received the highest agreement amongst respondents were communication with other hospital personnel during an emergency (88%), locating the department’s emergency response plan (86%), and notifying appropriate hospital personnel if an event is suspected (86%). The statement that received the lowest percentage of agreements was identifying signs and symptoms of radiological exposure (40%). Increasing awareness and ensuring that staff can identify signs and symptoms of terrorism is of great importance and depends largely on the number of trainings offered and the methodology by which they are delivered. .

2.8 Summary and Conclusion

With the current state of global affairs, the need for emergency preparedness training for health care professionals has never been greater. Although a number of critical emergency preparedness studies have been accomplished, the literature reveals that a great deal more needs to be done in order to prepare a health care workforce to competently respond to disaster events (Fraser, 2007). Nurses are the largest group of health care providers and play key roles in response efforts however, there is little evidence addressing the learning needs of this population as a means for developing

continuing education and training programs. Gaining an understanding of these needs is the most basic level of program planning and is the critical first step in Boone's programming model (Boone et al., 2002).

In order to provide relevant continuing education programs, it is important to carefully assess the target population utilizing a systematic process. Boone's programming model was used as the conceptual framework giving meaning and direction to the current study, assessing South Carolina nurses' learning needs by exploring their perceived knowledge of emergency preparedness. In addition, it places the research within its intended context of program planning, the initial step in the programming process, which begins with an assessment of the target population in order to identify and analyze their learning needs (Boone et al., 2002). Programming is considered by Boone et al. (2002) to be planned and systematic for the purpose of insuring the most efficient use of resources as well as designing and effecting successful educational strategies. Based on the presented literature, it is clear that many researchers subscribed to the planning process and collected a needs assessment of their target population for the purpose of program planning. Although the systematic process for developing effective educational programs have often been short-cut by individuals who jump into educational interventions as opposed to giving full consideration to the critical steps involved in educational program planning, research supports the use of needs assessments as an important first step in developing continuing education programs.

An examination of the literature related to South Carolina disasters was performed because although the effects of catastrophic events occur on a national level, the response efforts are generated at the state level leaving the individual states

responsible for a health care workforce that has knowledge and skills to respond effectively to a disaster event. The literature confirmed that in South Carolina there is an awareness of the potential for man-made or natural disasters and the need for mitigation to reduce the effects of trauma related to disasters, yet there is an absence of research in the literature related to any efforts to prepare South Carolina's health care workforce to respond to disaster events. The absence of research studies assessing South Carolina's health care workforce renders the current study, assessing South Carolina nurses' learning needs by exploring their perceived knowledge of emergency preparedness, vital for determining South Carolina's current state of preparedness and developing effective continuing education and training programs; strengthening South Carolina's ability to respond effectively to disaster events.

Only three states, Kansas, Hawaii, and Wisconsin, have published studies assessing their health care workforce's current state of preparedness and implement efforts to increase emergency preparedness knowledge and skills. Two of the states, Kansas and Hawaii, focused specifically on bioterrorism leaving a gap in the research related to other forms of disaster events such as natural disasters. Only one state, Wisconsin, conducted a study to assess Wisconsin nurses' current state of preparedness, perceived knowledge of emergency preparedness, and determine their most preferred learning format. There is a lack of research in the literature concerning states' efforts to assess their current state of readiness and implement methods for increasing their health care professionals' knowledge and skills of emergency preparedness. An essential component of the National Response Framework is a state's capability to respond quickly and effectively to a crisis, which includes providing a health care workforce that is

competent in the most basic competencies of emergency preparedness (Carafano, 2005; National Response Framework, 2008). This study assessed the learning needs of South Carolina nurses by exploring their perceived knowledge of emergency preparedness in order to implement a systematic and effective approach to developing continuing education and training programs. In doing so, this study will contribute to strengthening South Carolina's capability to respond to disaster events, advance research related to this topic, and contribute to narrowing the research gap.

Competencies can be used to define what a learner needs to know, providing a framework, or defined standards for which to base educational activities (Ablah et al., 2005; Weiner, 2006). Most of the literature reflected research that utilized competency based methods for conducting assessments, structuring program content, and guiding evaluations. The literature supports training programs that are based on competency standards and meet the needs of the target audience. Some researchers expressed the importance of developing program specific and profession specific competencies, so to deliver content centered on the professions' expected roles during response efforts. The EPIQ is a valid and reliable assessment tool developed by a coalition of experts who identified eight valid and reliable competency dimensions, which can be used to examine the educational needs of nurses (Garbutt et al., 2008; Wisniewski et al., 2004). This study utilized the EPIQ for assessing the learning needs of South Carolina nurses in order to implement effective continuing education and training programs.

The review of literature demonstrated a number of efforts to improve the public health systems' response to disaster situations resulting in very few studies addressing disaster response efforts related to other health care professionals. Although public

health nurses play an important role in response efforts, there is a critical need to prepare the general nurse in the most basic competencies of emergency preparedness. There is a growing but underdeveloped body of literature focused primarily on public health workers, resulting in a gap in the literature related to general practicing nurses and their state of preparedness.

Disasters surprise communities and hit hard. Unfortunately, the incidence of natural and man-made hazards and threats may continue to rise, requiring every nurse to have basic knowledge of emergency preparedness. From this literature review it is imperative that researchers continue preparing a health care workforce that is ready and competent to respond to disaster events. In addition, researchers should acknowledge that an important characteristic of the instructional design methodology is the systematic process used to ensure that instructional objectives and strategies meet the identified educational and training needs. This study used Boone's programming model as the framework for assessing South Carolina nurses' learning needs by exploring their perceived knowledge of emergency preparedness. The research is designed to identify the learning needs of South Carolina nurses, a critical first step in the planning process of the programming model, in order to develop a systematic approach for delivering effective education and training programs. Effective education and training programs will contribute to the acquisition of role specific skills and strengthen the capabilities of South Carolina nurses to respond competently to disaster events. The results of this study may have implications that will facilitate the systematic development of legislative and institutional policies related to emergency preparedness as they influence the health care

infrastructure and impact nursing practice, education, and research (Carafano, 2004; Gebbie & Qureshi, 2006; INCMCE, 2003; Patillo, 2003; Rebmann, 2006).

Chapter 3

3 Pilot Study

3.1 Introduction

As a result of the findings in the literature review, a pilot study was designed to assist the researcher in making informed decisions regarding the feasibility to conduct the larger study.

3.2 Research Design and Procedures

A descriptive, correlational design with a research survey approach was used to identify the self-perceived learning needs of South Carolina registered nurses related to emergency preparedness. Data was collected using the revised Emergency Preparedness Information Questionnaire (EPIQ) (Appendix 3) to obtain a description of the phenomenon of interest and explore the relationships between variables.

3.2.1 Sample Selection, Size, and Recruitment

The study was approved by the Institutional Review Board at Duquesne University (Appendix 4). The pilot study utilized a convenience sample of South Carolina registered nurses attending the South Carolina Nurses Association (SCNA) Annual Meeting on October 25, 2008. The researcher was granted permission by the SCNA to attend the meeting for the purpose of collecting data (Appendix 5). A packet,

which included a coversheet explaining the purpose of the study, contact information to answer participant's questions, information pertaining to confidentiality, and the EPIQ survey was available to the attendees during the meeting. The 44-item EPIQ survey was used as the data-collection instrument due to its ability to obtain data related to the participant's perceived knowledge of emergency preparedness. The researcher was given a booth at the conference where the questionnaire was made available for individuals who chose to participate. The booth also provided space for the participants to complete the questionnaire and supplied a location for the secured collection box.

3.2.2 Informed Consent Procedures

Included in the packet was a cover letter informing individuals that taking the survey was voluntary and completing it indicated consent to participate (Appendix 6). The participant's privacy and anonymity were maintained and participants were asked not to write their names on the survey. Individual identity could not be traced to the survey and all information was treated as strictly confidential. Surveys collected for the study were secured in a locked file accessible only to the researcher.

3.3 Results of the Pilot Study

The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 17.0 Grad Pack. Descriptive statistics were used to describe the basic features of the data.

Twenty-five surveys were distributed to registered nurses attending the South Carolina Nurses Association annual meeting in October, 2008. Twenty-one nurses chose to participate in the study, which resulted in an 84% response rate.

3.3.1 Description of the Participants

The majority of respondents were female (95.2%) and 41 to 50 years of age (52.4%), with a mean and median that fell within 41-50 years of age (see Table 3.3.1).

Table 3.3.1

Gender and Age

	Frequency	%
Gender		
Female	20	95.2
Male	1	4.8
Age		
less than 30	1	4.8
31-40	4	19.0
41-50	6	28.6
51-60	9	42.9
Greater than 60	1	4.8

Nursing education was measured in terms of highest degree attained. Four mutually exclusive categories were available. Ten of the nurses (47.6%) held a master's degree, five (23.8%) held an associate's degree, four (19.0%) held a bachelor's degree, and two of the nurses (9.5%) held a doctoral degree. Educational preparation of the sample is presented in Table 3.3.2.

Table 3.3.2

Nursing Education

Highest Degree of Attainment	Frequency	%
Associate	5	23.8
Bachelor	4	19.0
Master	10	47.6
Doctoral	2	9.5

Eleven primary nursing specialties were represented by the sample. Five respondents' classified public health (23.0%) as their primary specialty of practice, followed by four respondents who classified surgery (19.0%) as their primary specialty of practice. See Table 3.3.3 for the distribution of respondents by primary nursing specialties.

Table 3.3.3

Primary Nursing Specialty

Nursing specialty	Frequency	%
Surgery	4	19.0
Public Health	5	23.8
Emergency Room	2	9.5
Informatics Technology	1	4.8
ICU Pediatrics	2	9.5
Critical Care	1	4.8
Faculty/Academic	1	4.8
Maternal OB	1	4.8
Medical-Surgical	2	9.5
Quality Assurance	1	4.8
Faith Community Nursing	1	4.8

Levels of years as a registered nurse were denoted as follows; four respondents had 5-10 years experience, four respondents had 16-20 years experience, and four respondents had 26-30 years experience with a mean and median of 26-30 years of experience as a registered nurse (Table 3.3.4).

Table 3.3.4

Years as a Registered Nurse

Years as a Registered Nurse	Frequency	%
Less than 5 years	2	9.5
5-10 years	4	19.0
16-20 years	4	19.0
21-25 years	3	14.3
26-30 years	4	19.0
31-35 years	1	4.8
36-40 years	2	9.5
More than 40 years	1	4.8

The majority of respondents (n = 14) chose the internet (66.7%) as the most preferred format for completing a survey. Seven (33.3%) of the respondents chose mail with return postage and none of the respondents chose phone or indicated another preferred method for completing a survey.

3.4 Findings and Discussion

This pilot study was conducted to develop and refine a variety of steps in the research process. The study presented significant implications for the larger study to follow and assisted in identifying design flaws, contributed to the development of data collection and design plans, and allowed the researcher to gain experience with the research process.

Use of a convenience sample of 21 participants limits the applicability of this study to the larger population of all South Carolina nurses. Statistical results, due to a small sample size, may have made a meaningful analysis very difficult and in some cases impossible to determine.

The objective of the pilot study; to explore the research process, gain methodological guidance, and refine a research plan for the larger study to follow was accomplished and recommendations for the larger study to follow are listed below.

3.5 Recommendations and Other Outcomes

The following is a list of recommendations for the larger study as a result of the pilot study:

1. The Emergency Preparedness Information Questionnaire (EPIQ) formatting:
 - A. For each dimension name, create a solid bar in place of the Likert-scale boxes to eliminate participants' potential errors to check the wrong boxes when indicating their perceived level of familiarity.
 - B. Label each page with a Likert-scale heading (very familiar, not familiar, and numbers one, two, three, four, and five) to eliminate the participants' potential confusion of what the numbers indicate (1 = not familiar, 5 = very familiar) and to assist with lessening confusion on data input.
 - C. For demographic variables, collapse the category *years as a registered nurse* from 5 year increments to 10 year increments. The span of this category was too large and the researcher determined that it would not affect the results to collapse the category to include 10 year increments.

- D. Part II of the EPIQ tool: Learning and Training Preferences, the researcher determined that data input and manipulation of the data would be more manageable if the questions were numbered.
- E. Add research question/s targeting the participants' learning preference and reliability and validity of the EPIQ tool.

The pilot study surveyed the participants about the preferred format for completing a survey. The participants chose internet as their first choice and a mailed survey with return postage as their second choice. Due to the researcher's inability to identify a South Carolina organization that reliably collects registered nurses' emails, the second choice of a mailed survey with return postage was utilized for the larger study.

Results of the pilot study helped to refine the research questions and were used to assist in determining a sample size for the larger study to follow.

Chapter 4

4 Methods

4.1 Introduction

The purpose of this study was to assess the learning needs of South Carolina nurses by exploring their self-perceived knowledge of emergency preparedness. Chapters one and two established the study's problem statement, identified the research questions, examined the conceptual framework, and presented a review of the literature. This chapter describes the methodology that was used for this study including a discussion of the research design, participant selection, inclusion criteria, procedure for protection of human subjects, instrument review, process for data collection, and analysis of the data.

4.2 Research Design

The research design for this study was a descriptive, correlational design using a survey to assess the learning needs of South Carolina nurses by exploring their self-perceived knowledge of emergency preparedness. A survey can capture the beliefs, attitudes, opinions, levels of knowledge, or intentions of an individual and is often used in descriptive research to describe the phenomenon under study (Dillman, 2000).

Descriptive research provides a representation or description of characteristics associated with an individual, situation, or group (Burns & Grove, 2005). A descriptive

correlational study is intended to investigate the relationships that exist between variables (Burns & Grove, 2005). Guided by the research questions, assessing the learning needs of South Carolina nurses by exploring their self-perceived knowledge of emergency preparedness was addressed by utilizing a descriptive correlational design because the researcher is interested in a systematic investigation of relationships between variables. The researcher wanted to identify if relationships existed between the dependent variable; scores on the survey instrument assessing South Carolina nurses' self-perceived knowledge of emergency preparedness and the independent demographic variables such as *nursing specialty, years of nursing experience, educational preparation, and region of employment* (see Table 4.2.1).

Table 4.2.1

Table of Variables

Emergency Preparedness Variables	
Incident Command System (8 questions)	
Triage (5 questions)	
Communication and Connectivity (7 Questions)	
Psychological Issues and Special Populations (6 questions)	5 = Very Familiar
Isolation, Decontamination, and Quarantine (5 questions)	4 = Somewhat Familiar
Epidemiology and Clinical Decision Making (4 questions)	3 = Neutral
Reporting and Accessing Critical Resources (4 questions)	2 = Somewhat Unfamiliar
Biological Agents (4 questions)	1 = Not Familiar
Overall Familiarity (1 question)	
Demographic Variables	
Nursing Specialty	Five Categories
Years of Nursing Experience	Range from less than 5 years to 40+
Educational preparation	Diploma, Associate, Bachelor, Masters, Doctoral
Region of Employment	Range from 1 to 3

4.3 Setting

The setting for this study was South Carolina. One questionnaire was mailed to each of the targeted sample population.

4.4 Sample

The sample population for this study was a randomized selection of South Carolina registered nurses who are registered/licensed with the South Carolina Board of Nursing. For the purpose of this study, a registered nurse is an individual who has graduated from a state-approved school of nursing and has passed a state registered nurse licensing examination the National Council Licensure Examination for Registered Nurses (NCLEX).

Two different methods of power analysis were conducted to determine sample size. The first method; a 95% confidence level with a 5% margin of error generated a sample size of 400 participants. The second method considered the results of the pilot study data and also generated a sample size of 400 participants. The pilot study's demographic variables were broken down into two groups and a *t*-test for equality was conducted using the mean and standard deviation for the demographic variables, an alpha of 0.05, and a power of 0.80.

4.5 Inclusion Criteria

One thousand five hundred participants were randomly selected from the South Carolina Board of Nursing's mailing list in anticipation of a 30% response rate.

The inclusion criteria for this study required all participants to be a registered nurse licensed in the state of South Carolina. No other criteria were used for inclusion in the study.

4.6 Procedures for the Protection of Human Subjects

Approval for the study was obtained from Duquesne University's Institutional Review Board (IRB) (Appendix 7). Participation was strictly voluntary and participants had the right to refuse to participate without any consequences for non-participation. The materials were mailed to the prospective participant and participants were informed that by answering and returning the questionnaire, they were giving consent to participate. There was no reward for participation and there were no anticipated risks associated with participation in the study. Benefits may include personal satisfaction derived from contributing to nursing's body of knowledge.

Measures to protect confidentiality and anonymity of the participants was strictly maintained and described to all participants at the onset of the study. Participants were instructed not to place their names on the questionnaire, and not to place a return address on the self-addressed stamped envelope returning to the researcher. Participants were also instructed not to place any identifiers anywhere on the questionnaire. For the questionnaires that were returned with identifying characteristics, the data were not used and the questionnaire was shredded and discarded promptly.

Participants were informed that the questionnaire should take approximately 15 minutes to complete and they may skip any questions they do not choose to answer. Each returned questionnaire was assigned a numerical identifier by the researcher, based

on response order. Information on IRB approval and contact information was included in the survey packet mailed to each prospective participant.

Data is maintained in a secure location in the researcher's home.

4.7 Research Questions

The research questions were presented as follows:

1. Is the Emergency Preparedness Information Questionnaire a valid emergency preparedness assessment tool?
2. Is the Emergency Prepared Information Questionnaire a reliable emergency preparedness assessment tool?
3. Is there a relationship between the emergency preparedness dimensions and the overall familiarity with emergency preparedness?
4. What are the self-perceived learning needs of South Carolina nurses as determined by the scores on the Emergency Preparedness Information Questionnaire?
5. Is there a relationship between the perceived knowledge of emergency preparedness and selected demographic variables of nurses?
6. What are the learning and training preferences of South Carolina nurses related to emergency preparedness content?

4.8 Measures

The questionnaire that was used to answer the research questions in this study was the revised Emergency Preparedness Information Questionnaire (EPIQ), a 44-item questionnaire developed to explore nurses' self-perceived knowledge of emergency

preparedness and assist in establishing where more training is needed (Dennik-Champion, 2003). The EPIQ contains three parts. Part one of the questionnaire consists of forty-three questions related to nurses' self-perceived knowledge of emergency preparedness and one additional question addressing the overall familiarity with response activities/preparedness in the case of a large scale emergency event. Nurses responded to each item using a 5-point Likert scale (1 = not familiar, 5 = very familiar). Part two required nurses to prioritize the top three preferred methods for receiving learning and training on emergency preparedness issues and activities listed in part one of the questionnaire. The assessed options included: (1) face-to-face, (2) online web-based courses, (3) video-conferencing, (4) satellite broadcasts, (5) self instruction, videotapes, (6) newsletters, pamphlets, pocket reference cards, (7) video tapes, (8) audiotapes, and (9) CD/DVD for the computer. Part two also requested nurses to respond with either "yes" or "no" in regards to the amount of time they would spend in training. Selections included taking a course for an academic quarter/semester, attending a 2-3 day workshop/conference, participating in a 2-hour lecture or web-based training, and attending an evening workshop.

Part three of the questionnaire required the nurse to complete demographic and professional data, which was considered in the analysis of the data, generalizing the study findings, and further research efforts. Demographics that were recorded included sex, age, primary nursing specialty, number of years as a registered nurse, highest degree achieved, and city or county in which the participant works.

4.8.1 Score Interpretation

The scoring process for questionnaires with closed-ended questions is straightforward and an important point associated with closed-ended questionnaires is that every question should be treated the same with guidelines identified in advance (Burns & Grove, 2005). The EPIQ is an objective measure containing items that allow the participants little if any latitude in constructing their responses (Burns & Grove, 2005). Each of the 43 questions, plus the additional overall familiarity question included in part one are given a value 1-5, depending on the participant's selection on the scale; 1 = not familiar to 5 = very familiar. Part two, *preferred education methods*, was given an overall ranking score calculated as follows: $(3 * \text{the number of 1}^{\text{st}} \text{ mentions}) + (2 * \text{the number of second mentions}) + (1 * \text{the number of third mentions})$.

4.8.2 Instructions for Use and Administration

In the absence of a formal document explicating information associated with the use of the EPIQ, G. Dennik-Champion (personal communication, June 12, 2008) discussed details about the use of the EPIQ. Dennik-Champion also referenced the EPIQ instrument and the directions provided in the beginning of each the three parts/sections of the questionnaire. Information for use of part one of the EPIQ included directing the participant to indicate their level of familiarity with each activity by selecting a number on the scale ranging from 1 = not familiar to 5 = very familiar. Part two of the EPIQ requires the participant to rank the three most preferred methods for receiving emergency preparedness training by placing the number, next to the preferred method, in the space

provided. Part three, participants will appropriately complete the questions related to professional and demographic data.

4.9 Procedures for Data Collection

Participants for the study were randomly selected by the South Carolina Board of Nursing. This study utilized Dillman's (2000) design method for mailed questionnaires to guide the survey mailing and follow up procedures. All selected participants received a short, personalized, advance-notice post-card informing them that they had been selected to participate in a study and would receive a questionnaire on emergency preparedness within one week (Appendix 12). Approximately one week later, all prospective participants were mailed a personalized Duquesne University IRB approved cover letter with greater detail regarding the study (Appendix 13), the questionnaire, and a self-addressed return stamped envelope. All prospective participants were informed in the cover letter that their return of the questionnaire constituted their consent to participate in the study. Approximately one week following the second mailing, all prospective participants were mailed a follow-up postcard designed to thank the participants for returning the questionnaire and reminding those who hadn't completed and returned the questionnaire that they are an important part of the study and requested that they complete the questionnaire and return it as soon as possible (Appendix 14). The entire data collection period took 6 weeks. Data was maintained in a secure location throughout the study.

4.10 Procedures for Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 17.0 Grad Pack was used to analyze the data. Data from the Emergency Preparedness Information Questionnaire was entered into a database by the researcher for data analysis.

Descriptive statistics including means, standard deviations, frequencies, and percentages were used to summarize the demographic variables gender, age, highest degree earned, years as a nurse, region of work, and emergency preparedness continuing education hours.

Frequency distributions were conducted on each variable to check for accuracy and consistency of the data. A histogram, normal P-P plot of regression, and a ZPred scatterplot were constructed to examine normality, independence, and homogeneity of variance.

Question one: Is the Emergency Preparedness Information Questionnaire a valid emergency preparedness assessment tool? Factor Analysis is a statistical method commonly used to evaluate validity of an instrument (Devon, et al., 2007). Factor analysis with orthoganol (Equamax) rotation procedure was used to answer question one as the first step in the process for determining the validity of the emergency preparedness information questionnaire.

Question two: Is the Emergency Preparedness Information Questionnaire a reliable emergency preparedness assessment tool? Cronbach's alpha was used to examine question two measuring how well each individual item in the EPIQ scale correlates with the sum of the remaining items (Oroviogococchea, Watson, Beortegui, & Remirez, 2010).

Question three: Is there a relationship between the emergency preparedness dimensions and the overall familiarity with emergency preparedness? Analysis of variance (ANOVA) and multiple linear regression were used to analyze question three. Analysis of variance tested the mean differences among the EPIQ's seven domains and question 44, *overall familiarity with emergency preparedness* and compared the variance within and between each of the seven domains. The *F* statistic was used to determine whether the seven domains and question 44, *overall familiarity with emergency preparedness* are significantly different.

Multiple linear regression and Pearson correlation coefficient were also used to examine question three. Multiple linear regression is the estimation of the linear relationship between the dependent variable, *overall familiarity with emergency preparedness* (question 44) and the independent variable, the seven dimensions of the EPIQ. A valuable numerical measure of association between variables is the Pearson correlation coefficient.

Question four: What are the self-perceived learning needs of South Carolina nurses as determined by scores on the emergency preparedness Information Questionnaire? Participants were asked to rate their perceived level of emergency preparedness knowledge using a 5-point Likert scale (1 = not familiar to 5 = very familiar). Average familiarity scores were calculated using descriptive statistics; all measures of central tendency; mode, median, and means, standard deviations, frequencies, and percentages related to the summed dimensional scores for each of the EPIQ's seven dimensions and question 44, *overall familiarity with emergency preparedness*.

Question five: Is there a relationship between the perceived knowledge of emergency preparedness and selected demographic variables of nurses? To further explore the learning needs of South Carolina nurses, bivariate comparisons of the mean scores were performed using one-way analysis of variance (ANOVA) tests with *age*, *highest degree earned*, *years as a nurse*, *region of work*, and *emergency preparedness continuing education hours* as independent variables and the summed scores of the EPIQ's seven domains and question 44, *overall familiarity of emergency preparedness* as the dependent variables. When significant differences in the mean scores were found within an independent variable a post-hoc multiple comparison test was performed.

For independent variables where there were more than two groups, the data were further analyzed using a Scheffé post-hoc multiple comparison test. The Scheffé is a statistical adjustment for multiple comparisons, which performs pairwise comparisons between group means while controlling the overall error rate. The observed significance level is adjusted for the fact that multiple comparisons are done, ensuring that the overall chance of making a Type I error is less than 0.05 (Mendenhall, Beaver, & Beaver, 2006).

Question six: What are the learning and training preferences of South Carolina nurses related to emergency preparedness content? Participants were presented with three sections evaluating learning and training preferences related to emergency preparedness content in Part II of the Emergency Preparedness Information Questionnaire; *training format*, *course length*, and *access to electronic training information*. All data related to this question were analyzed using all measures of central tendency; mode, median, and means, standard deviations, frequencies, and percentages.

Chapter 5

5 Results

5.1 Introduction

This chapter describes the results of data analysis. The chapter begins with an overview of the methodology used for data collection, presents a description of the sample participant's characteristics as gathered from the demographic data, and is followed by a description of the results as they relate to each of the six research questions.

One thousand five hundred potential participants were randomly selected from the South Carolina Board of Nursing's database. Twenty-seven survey questionnaire packets were returned with no forwarding address. Three participant's survey questionnaires were returned with missing data and two participants included return addresses, all five were excluded from data analysis. Data from 207 eligible survey participants was analyzed. A margin of error (5%) was calculated with a confidence level of 95% and using the formula $.5 \times .5 = 0.25/207 = 0.0012077$, square root of $0.0012077 = 0.0347524 \times 2 = 0.06950$ resulting in a margin of error of ± 0.06 ($\pm 6\%$) which represents the degree to which the findings in the sample may vary either positively or negatively from the actual values in the population.

Data from each survey questionnaire was entered into the database SPSS 17.0 for data analysis (SPSS Inc., Chicago Illinois, USA). Normality, independence, and homogeneity of variance were examined by constructing a histogram, normal P-P plot of regression, and a scatterplot (ZPred). Results indicated that the data was normally distributed and all assumptions were upheld.

5.2 Description of Sample

Table 5.2.1 presents a description of the demographics of the study sample. The total sample of South Carolina registered nurses ($n=207$) revealed the following participant characteristics. Two hundred and one participants were female (97.1%) and six participants (2.9%) were male. Almost thirty-two percent ($n=66$) of the participants were between the ages of *51 to 60*, followed by the age groups *41 to 50* ($n = 53$, 25.6%), *31 to 40* ($n = 42$, 20.3%), *over the age of 60* ($n = 28$, 13.5%), and *under the age of 30* ($n = 18$, 8.7%).

The participants were asked to indicate their highest academic degree and years of experience as a registered nurse. Of the 207 participants 44.4% ($n=92$) have a *bachelor's degree*, 26.1% ($n=54$) have an *associate degree*, 23.2% ($n=48$) have a *master's degree*, 4.8% ($n=10$) have a *diploma*, and 1.4% ($n=3$) have a *doctoral degree*. Thirty one percent ($n = 66$) of the participants reported having *21 to 30 years experience as a registered nurse*.

Participants reported the county or city in which they worked. There are 46 counties in the state of South Carolina. The counties are divided into three regions (1) *the Blue Ridge Mountain Region*, (2) *the Piedmont Region*, and (3) *the Atlantic Coastal Region* (Appendix 1). The cities in which participants live were coded into their

corresponding county and then coded to the corresponding region. Forty percent of participants (n=83) reported working in *the Blue Ridge Mountain Region*.

Sixty one percent (n=127) of the participants indicated that they had not participated in any emergency preparedness continuing education courses. Thirty percent (n=62) reported having less than 10 hours of emergency preparedness continuing education courses and 8.7% (n=18) reported having more than 10 hours of emergency preparedness education.

Table 5.2.1

Demographic Characteristics of Participants (N=207)

		Frequency	Percent
Sex			
	Female	201	97.1%
	Male	6	2.9%
Age			
	Under 30	18	8.7%
	31-40	42	20.3%
	41-50	53	25.6%
	51-60	66	31.9%
	Over 60	28	13.5%
Highest Degree Earned			
	Diploma	10	4.8%
	Associate	54	26.1%
	Bachelor	92	44.4%
	Master	48	23.2%
	Doctoral	3	1.4%
Years as a Registered Nurse			
	1-10	52	25.1%
	11-20	46	22.2%
	21-30	64	30.9%
	31-40	45	21.7%
Region of Work			
	Blue Ridge Mountain Region	83	40.1%
	Piedmont Region	65	31.4%
	Atlantic Coastal Region	59	28.5%
Emergency Preparedness CEU's			
	None	127	61.4%
	Less than 10	62	30.0%
	More than 10	18	8.7%

Thirty seven nursing specialties were represented in the data. Research was conducted for the purpose of discovering an empirically sound way to collapse the 37 nursing specialties into categories that would make the analysis meaningful while still

providing an accurate representation of the population. Resources defined ways to specialize in nursing including specializing in *particular settings, particular diseases, organ or body systems, specific populations, and ambulatory care* (United States Bureau of Labor and Statistics, 2009). In addition, resources contributed to the identification and selection of specific specialties that could accurately be categorized as *ambulatory care nursing* (Academy of Ambulatory Care Nursing [AACN], 2010; Hitchcock, Schubert, & Thomas, 2003). Nursing specialties were collapsed into five categories and are listed in Table 5.2.2.

Table 5.2.2

Nursing Specialty Categories

		Frequency	Percent
Ambulatory Care/Community Health	Total	41	19.8%
Dialysis		3	1.4%
Home Health		4	1.9%
Long Term Care		3	1.4%
Rehabilitation		4	1.9%
Hospice		2	1.0%
Radiology		1	0.5%
Endoscopy		1	0.5%
Family Planning		1	0.5%
Infectious Disease		3	1.4%
Mental Health		9	4.3%
Community Health		10	4.8%
Management/Administration/Education	Total	25	12.1%
Administration		8	3.9%
Academic		3	1.4%
Nurse Informatics		2	1.0%
Quality Assurance		1	0.5%
Corporate Compliance		1	0.5%
Health Education & Prevention		2	1.0%
Family Nurse Practitioner		5	2.4%
Case Management		1	0.5%
Faith Community		2	1.0%
Specific Populations	Total	32	15.5%
Maternity/OB		9	4.3%
Women and Children		5	2.4%
Pediatrics		13	6.3%
NICU		3	1.4%
Nursing Home		2	1.0%
Specialized Settings	Total	62	30.0%
PACU		6	2.9%
CCU		12	5.8%
ICU		16	7.7%
ER		13	6.3%
OR/CRNA		15	7.3%
Organ Specialty/Medical-Surgical	Total	47	22.7%
Gastrointestinal		2	1.0%
Cardiac		5	2.4%
Orthopaedics		3	1.4%
Ostomy		1	0.5%
Medical-Surgical		36	17.4%

5.3 Research Question 1: Is the Emergency Preparedness Information Questionnaire a valid emergency preparedness assessment tool?

To assess construct validity, items belonging to eight dimensions of the Emergency Preparedness Information Questionnaire were analyzed by conducting a factor analysis with orthogonal (Equamax) rotation procedure and using 0.5 as the inclusion for a variable into a factor. Eigen values, the amount of variance explained by each factor, >1.0 were scrutinized to determine the number of factors to rotate. Factors loaded best in a seven factor model with twenty-three iterations (Table 5.4.1). Factor loadings are the correlation between the items and the created factor (Bannigan & Watson, 2009). Eight items from two dimensions loaded into one factor. All of the items in this factor explore aspects of biological and chemical agents. Adjusting the EPIQ based on the factor analysis resulted in reducing the number of dimensions from eight to seven and combining the factor labels to best classify the items that caused the factors to cluster. The new factor label, *clinical decision making in epidemiology and biological agents*, emerged from the analysis.

Seven dimensions were derived from the factor analysis. Factors were labeled according to item content and higher loading items. Eight items loaded onto factor 1 (items 41, 43, 33, 32, 40, 42, 34, 35), eight items loaded onto factor 2 (items 3, 4, 2, 1, 7, 5, 6, 8), seven items loaded onto factor 3 (items 14, 17, 15, 19, 16, 18, 20), six items loaded onto factor 4 (items 21, 22, 26, 25, 23, 24), five items loaded onto factor 5 (items 28, 30, 27, 29, 31), five items loaded onto factor 6 (items 12, 13, 11, 9, 10), and four items loaded onto factor 7 (items 36, 37, 38, 39). These seven dimensions explain the most variance in the set of variables or items with the fewest number of factors. The

cumulative variance explained was 78.1%. Table 5.3.1 provides a summary of the factor analysis.

Table 5.3.1

Summary of Factor Analysis Results with Orthogonal Rotation of EPIQ Items (N=207)

	Factor loading	Eigen-value	% of Variance
Factor 1: <i>Epidemiology and Biological Agents</i>		5.373	12.495
41. Modes of transmission for different types of biological agents	0.737		
43. Signs and Symptoms due to exposure to different biological agents	0.733		
33. History and physical assessment surveillance data for creating a high index of suspicion that a patient has been exposed to Category A,B, or C biological agents	0.714		
32. Match antidote and prophylactic medication to specific biological/chemical agents	0.711		
40. Signs and symptoms of anthrax inhalation	0.699		
42. Possible adverse reactions to smallpox vaccinations	0.698		
34. Identify exacerbation of underlying disease due to exposure to a chemical or biological agent, or radiation	0.662		
35. General issues r/t proper handling of the dead during LSEE(ethical, legal, cultural, safety)	0.533		
Factor 2: <i>Incident Command System</i>		5.158	11.995
3. Your agency's preparedness level for responding to a LSEE	0.789		
4. Content of the EOP in your agency	0.763		
2. Physical location you would report to if a LSEE occurred	0.728		
1. To which functional group in the ICS would you be assigned during a LSEE	0.710		
7. Differences between decision-making processed in the ICS for large scale emergency and non emergency situations	0.670		
5. Strategic rationale used to develop the ICS response plan	0.656		
6. Assess and respond to site safety issues for self, co-workers and victims during LSEE	0.638		
8. Tasks that should not be delegated to volunteers during LSEE	0.602		
Factor 3: <i>Communication and Connectivity</i>		4.752	11.052
14. Procedures used to document provisions of care in LSEE	0.719		
17. Effectively present information about degree of risk to various audiences	0.699		
15. Chain of custody during a large scale event	0.680		
19. Appropriate debriefing activities following a LSEE	0.652		

	Factor Loading	Eigen-value	% of Variance
16. Procedures for communicating critical patient information to those transporting patients	0.631		
18. Identify the different abilities of key partners in your EOP	0.612		
20. The process for gaining access to Strategic National Stockpile	0.542		
Factor 4: <i>Psychological Issues and Special Populations</i>		4.649	10.811
21. How to evaluate a teenager to detect post traumatic mental health problems	0.843		
22. Appropriate psychological support for all parties involved in LSEE	0.749		
26. Procedures providing care to children/youth during LSEE in cases where prior consent from parent/guardian is not possible	0.700		
25. Signs of post traumatic stress in patients seen for routine health care following LSEE	0.650		
23. Appropriate care of sensitive/vulnerable patient groups (aged, pregnant women, disabled)	0.608		
24. Provide health counseling/education to patients regarding long term impact of B-NICE (biological, nuclear, incendiary, chemical, explosive)	0.575		
Factor 5: <i>Isolation, Decontamination, and Quarantine</i>		4.752	10.759
28. Your facility's/community's quarantine process	0.773		
30. Decontamination procedures stated in your facility's EOP	0.746		
27. Isolation procedures for persons exposed to biological or chemical agents	0.722		
29. Selection of appropriate personal protective equipment (PPE) when caring for patients exposed to a biological, chemical, or radiological agent	0.710		
31. Impact on the environment from a LSEE	0.652		
Factor 6: <i>Triage</i>		4.626	10.690
12. Basic first aid treatment in LSEE	0.793		
13. How to evaluate the effectiveness of your own actions in LSEE	0.778		
11. How to assist with triage in LSEE	0.771		
9. How to perform a rapid physical assessment of a victim of LSEE	0.743		
10. How to perform a rapid mental health assessment of a victim LSEE	0.640		
Factor 7: <i>Reporting and Accessing Critical Resources</i>		4.597	10.300
36. Diseases that are immediately reportable to the local and state HD	0.813		
37. When to report unusual set of symptoms to the local and state HD	0.790		
38. Determine the appropriate agency to which reportable diseases are to be directed	0.770		
39. Where to quickly access up to date resources about specific B-NICE agents	0.611		
<hr/> <i>Cumulative Variance Explained = 78.1%</i> <hr/>			

5.4 Research Question 2: Is the Emergency Preparedness Information Questionnaire a reliable emergency preparedness assessment tool?

Once the factors were established, reliability analysis was performed. Cronbach's alpha values were used to calculate the seven revised dimensions of the EPIQ to assess the internal reliability of the instrument. Cronbach's alpha of 0.7 or greater can be regarded as adequate (Bannigan & Watson, 2009). The coefficient alphas for each of the seven dimensions were as follows: 0.94 for *incident command system*, 0.92 for *triage*, 0.94 for *communication and connectivity*, 0.93 for *psychological issues and special populations*, 0.94 for *isolation, decontamination and quarantine*, 0.93 for *reporting and accessing critical resources*, and 0.96 for *clinical decision making in epidemiology and biological agents*. The α value for the entire instrument was exceptionally high at 0.98. The coefficient alpha for each dimension is presented in Table 5.4.1.

Table 5.4.1

Alpha Coefficients for the Seven Dimensions of the EPIQ

Factor (Dimension)	Number of Items	Mean	Standard Deviation	Alpha (α)
Incident Command System	8	20.61	9.66	0.94
Triage	5	16.90	5.59	0.92
Communication and Connectivity	7	16.09	7.47	0.94
Psychological Issues and Special Populations	6	14.38	6.25	0.93
Isolation, Decontamination, and Quarantine	5	11.85	6.08	0.94
Reporting and Accessing Critical Resources	4	10.71	4.88	0.93
Clinical Decision Making in Epidemiology and Biological Agents	8	16.35	8.50	0.96
Alpha (α) values for entire instrument 0.98				

5.5 Research Question 3: Is there a relationship between the emergency preparedness dimensions and the overall familiarity with emergency preparedness?

Analysis of variance (ANOVA) was computed to establish if there was a statistically significant relationship between *overall familiarity with emergency preparedness* (question 44) and the seven dimensions. The ANOVA resulted in $F(7,199) = 104.81, p < .01$. Table 5.5.1 shows the results of the ANOVA.

Table 5.5.1

Results of the ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	193.990	7	27.713	104.807	0.001
Residual	52.619	199	0.264		
Total	246.609	206			

Linear regressions were used to determine if there is a relationship between the dependent variable, *overall familiarity with emergency preparedness* (question 44) and the independent variables, the seven dimensions of the Emergency Preparedness Information Questionnaire. The *R Square* was .787 (the fit explains 78.7% of the total variation in the data). The *R Squared* values are estimates of the goodness of fit and measures how successful the fit is in explaining the variation of the data.

Regression coefficients show how strongly each dimension correlates with the dependent variable, *overall familiarity with emergency preparedness* ($p < .01$). The *incident command system* dimension was most predictive of overall emergency preparedness knowledge *Beta* .44 ($p < .01$). *Triage* was least predictive of overall

emergency preparedness *Beta* .20 ($p < .01$). The regression results are listed in Table 5.5.2.

Table 5.5.2

Regression Results

Emergency Preparedness Dimensions	Standard β Coefficient	<i>t</i>	<i>p</i>
Incident Command System	0.44	13.6	0.001
Triage	0.20	6.0	0.001
Communication and Connectivity	0.31	9.4	0.001
Psychological Issues and Special Populations	0.27	8.4	0.001
Isolation, Decontamination, and Quarantine	0.34	10.4	0.001
Reporting and Accessing Critical Resources	0.32	9.9	0.001
Clinical Decision Making in Epidemiology and Biological Agents	0.40	12.2	0.001

R Square = .787 (78.7% of the total variation in the data)

5.6 Research Question 4: What are the self perceived learning needs of South Carolina nurses as determined by scores on the Emergency Preparedness Information Questionnaire?

South Carolina registered nurses were asked to rate their perceived level of knowledge related to emergency preparedness using a 5-point Likert scale (*1=not familiar to 5=very familiar*). Participants reported an *overall emergency preparedness familiarity* (question 44) score of 2.29 (SD = 1.09) indicating a low level of self-reported familiarity with their *overall perceived knowledge of emergency preparedness*. Participants reported being most familiar with *triage*, mean score of 3.39 (SD = 1.12) and least familiar with *clinical decision making in epidemiology and biological agents*, mean

score 2.04 (SD = 1.06). The average familiarity score for each dimension and the overall familiarity score (question 44) is represented in Table 5.6.1.

Table 5.6.1

Average Familiarity Score for Each Dimension and the Overall Familiarity Score (Question 44)

Emergency Preparedness Dimensions	Average Familiarity Score (Mean)	Standard Deviation
Incident Command System	2.58	1.21
Triage	3.39	1.12
Communication and Connectivity	2.29	1.07
Psychological Issues and Special Populations	2.39	1.04
Isolation, Decontamination, and Quarantine	2.37	1.22
Reporting and Accessing Critical Resources	2.68	1.22
Clinical Decision Making in Epidemiology and Biological Agents	2.04	1.06
Overall familiarity with emergency preparedness	2.29	1.09

5.7 Research Question 5: Is there a relationship between the perceived knowledge of emergency preparedness and selected demographic variables?

5.7.1 Nursing Specialty

To examine if there is a relationship between the perceived knowledge of emergency preparedness and nursing specialties a one-way ANOVA was conducted using the five categories of nursing specialties (independent variables) and each of the summed scores of the EPIQ’s seven domains and question 44, *overall familiarity with emergency preparedness*, (dependent variables). The one-way ANOVA analysis revealed that there were no significant differences ($p > .05$) found among nursing specialties related to six of the EPIQ’s summed domains; *clinical decision making in epidemiology and biological agents* ($F(4, 202) = 0.089, p > .05$), *incident command system and your*

role within it ($F(4, 202) = 0.442, p > .05$), communication and connectivity ($F(4, 202) = 0.191, p > .05$), psychological issues and special populations ($F(4, 202) = 1.402, p > .05$), isolation, decontamination, and quarantine ($F(4, 202) = 0.419, p > .05$), and triage ($F(4, 202) = 0.489, p > .05$). However, the one-way ANOVA test demonstrated a significant difference between the mean scores of nursing specialties related to one of the EPIQ's domains, reporting and accessing ($F(4, 202) = 0.026, p < .05$) (Table 5.7.1.1).

Table 5.7.1.1

ANOVA for Nursing Specialties and Reporting and Accessing

EPIQ Domain	Total	Sum of Squares	df	Mean Square	F	P
Reporting and Accessing	Between Groups	16.281	4	4.070	2.835	0.026
	Within Groups	290.033	202	1.436		
	Total	306.314	206			

To determine which of the five nursing specialties had significant differences in their reporting and accessing of critical resources scores, the data were analyzed with a Scheffé post-hoc multiple comparison test. Nurses who reported specialties that were categorized into the *ambulatory care/community health* specialty had significantly higher scores related to the EPIQ domain, reporting and accessing of critical resources, ($M = 3.05, SD = 1.40$) compared to nurses who reported specialties that were categorized into *specialized settings* ($M = 2.30, SD = 1.08$). The results indicated that for the EPIQ scale, *reporting and accessing of critical resources*, ambulatory care/community health nurses had significantly greater familiarity with *reporting and accessing critical information* than nurses in specialized settings. Table 5.7.1.2 presents the results of the Scheffé multiple comparison test for nursing specialties.

Table 5.7.1.2

Scheffé Multiple Comparisons for Nursing Specialty and Reporting and Accessing

Critical Information

Dependent Variable	(I) Categorized Specialties	(J) Categorized Specialties	Mean difference (I-J)	Std. error	P
Reporting and Accessing Critical Information	Ambulatory Care/ Community Health	Management/ Administration/ Education	0.485	0.304	0.638
		Specific Population	0.203	0.282	0.972
		Specialized Settings	0.753	0.241	0.049
		Organ Specialty/ Medical-Surgical	0.278	0.256	0.881
	Specialized Settings	Ambulatory Care/ Community Health	-0.752	0.241	0.018
		Management/ Administration/ Education	-0.268	0.284	0.880
		Specific Population	-0.549	0.261	0.222
		Organ Specialty/ Medical-Surgical	-0.474	0.232	0.248

A one-way ANOVA was calculated to determine if there is a relationship between question 44, *overall familiarity with emergency preparedness* scores and reported nursing specialties. Results indicated that there were no significant differences ($p > .05$) indicating that nurses, by reported specialty, do not differ significantly in their overall perceived knowledge of emergency preparedness (see Table 5.7.1.3).

Table 5.7.1.3

ANOVA for Question 44, Overall Familiarity with Emergency Preparedness, and

Nursing Specialties

Nursing Specialty	N	M	SD	df	F	P
Ambulatory Care/Community Health	41	2.27	1.16	206	0.530	0.714
Management/Administration/Education	25	2.32	1.07			
Specific Population	32	2.28	1.00			
Specialized Settings	62	2.16	1.04			
Organ Specialty/Med-Surg	47	2.47	1.19			

5.7.2 Years of Experience

To examine if there is a relationship between the perceived knowledge of emergency preparedness and nurses' reported *years of experience*, a one-way ANOVA was conducted using the four categories associated with years of experience (independent variables) and each of the summed scores of the EPIQ's seven domains and question 44, *overall familiarity with emergency preparedness*, (dependent variables). *Years of experience* were grouped into four categories, *1-10 years*, *11-20 years*, *21-30 years*, and *31-40 years*. There were no significant differences ($p > 0.05$) found on the summed scores of the EPIQ's seven domains by *years of experience*; *clinical decision making in epidemiology and biological agents* ($F(3, 203) = 1.060, p > .05$), *incident command system and your role within it* ($F(3, 203) = 0.699, p > .05$), *communication and connectivity* ($F(3, 203) = 1.398, p > .05$), *psychological issues and special populations* ($F(3, 203) = 1.688, p > .05$), *isolation, decontamination, and quarantine* ($F(3, 203) = 0.957, p > .05$), *triage* ($F(3, 203) = 0.245, p > .05$), and *reporting and accessing* ($F(3, 203) = 0.743, p > .05$).

A one-way ANOVA was used to determine if there is a relationship between question 44, *overall familiarity with emergency preparedness*, and reported *years of experience*. Results indicated that there were no significant differences ($p > .05$) found on question 44, *overall familiarity with emergency preparedness*, by reported *years of experience* indicating that nurses, by reported *years of experience*, do not differ significantly in their overall perceived knowledge of emergency preparedness (see Table 5.7.2.1)

Table 5.7.2.1

ANOVA for Question 44, Overall Familiarity with Emergency Preparedness, and Years of Nursing Experience

Years of Nursing Experience	N	M	SD	df	F	P
1-10	52	2.21	0.94	206	1.411	0.241
11-20	46	2.09	1.11			
21-30	64	2.50	1.14			
31-40	45	2.29	1.16			

5.7.3 Highest Degree Attained

To explore if there is a relationship between the perceived knowledge of emergency preparedness and nurses' reported *highest degree attained*, a one-way ANOVA was conducted using *highest degree attained (diploma, associate, bachelor, master, and doctoral)* as the independent variables and each of the summed scores of the EPIQ's seven domains and question 44, *overall familiarity with emergency preparedness*, as the dependent variables. The results of the overall ANOVA analysis identified a statistically significant difference between the mean scores of nurses' reported *highest degree attained* related to the EPIQ domain, *clinical decision making in epidemiology and biological agents* ($F(4, 202) = 2.58, p < .05$).

Despite finding a statistically significant difference in the mean scores of nurses' reported *highest degree attained* through ANOVA, the Scheffé post-hoc multiple comparison test failed to identify which groups differed. This result may be due to the variance between groups not being large enough to make a difference and the small differences between groups may have been cancelled in the post-hoc, pairwise comparisons (Mendenhall et al., 2006). Another reason, as explained by Mendenhall et al. (2006), may be related to a large variation in sample size, making it harder to detect significant differences between groups.

A one-way ANOVA was used to establish if there is a relationship between question 44, *overall familiarity with emergency preparedness*, and reported *highest degree attained*. Results indicated that there were no significant differences ($p > .05$) found on question 44, *overall familiarity with emergency preparedness*, by *highest degree attained* indicating that nurses do not differ significantly in their overall perceived knowledge of emergency preparedness based on their *highest degree attained* (see Table 5.7.3.1)

Table 5.7.3.1

ANOVA for Question 44, Overall Familiarity with Emergency Preparedness, and Highest Degree Earned

Highest Degree Earned	N	M	SD	df	F	P
Diploma	10	2.40	1.17	206	1.452	0.218
Associate	54	2.19	1.07			
Bachelor	92	2.25	1.09			
Master	48	2.38	1.08			
Doctoral	3	3.67	1.53			

5.7.4 Age

To conclude if there is a relationship between the perceived knowledge of emergency preparedness and nurses' reported *age*, a one-way ANOVA was conducted using the five categories associated with nurses' reported *age* (under 30, 31-40, 41-50, 51-60, and over 60) as the independent variables and each of the summed scores of the EPIQ's seven domains and question 44, *overall familiarity with emergency preparedness*, as the dependent variables. There were no significant differences ($p > .05$) due to nurses' reported *age* on any of the summed scores of the EPIQ's seven domains; *clinical decision making in epidemiology and biological agents* ($F(4, 202) = 0.470, p > .05$), *incident command system and your role within it* ($F(4, 202) = 0.298, p > .05$), *communication and connectivity* ($F(4, 202) = 0.651, p > .05$), *psychological issues and special populations* ($F(4, 202) = 0.538, p > .05$), *isolation, decontamination, and quarantine* ($F(4, 202) = 0.583, p > .05$), *triage* ($F(4, 202) = 0.313, p > .05$), and *reporting and accessing* ($F(4, 202) = 0.308, p > .05$).

There were also no significant differences ($p > .05$) due to nurses' reported *age* on question 44, *overall familiarity with emergency preparedness* ($F(4, 202) = 0.134, p > .05$).

5.7.5 Region of Employment

To discover if there is a relationship between the perceived knowledge of emergency preparedness and *region of employment*, a one-way ANOVA was conducted using the three categories of nurses' reported *regions of employment*; *mountain region*, *piedmont region*, and *Atlantic coastal region*, as independent variables and each of the

summed scores of the EPIQ's seven domains and question 44, *overall familiarity with emergency preparedness*, as dependent variables. The ANOVA analysis demonstrated statistically significant differences between the mean scores of nurses' reported *region of employment* related to four of the seven EPIQ domains; *clinical decision making in epidemiology and biological agents* ($F(2, 204) = 10.419, p < .05$), *communication and connectivity* ($F(2, 204) = 3.503, p < .05$) *isolation, decontamination, and quarantine* ($F(2, 204) = 7.895, p < .05$), and *reporting and accessing* ($F(2, 204) = 9.621, p < .05$).

A Scheffé post-hoc multiple comparison test between the independent variables, nurses' reported *region of employment*, was conducted to determine which groups had statistically significant differences in their mean scores related to four of the EPIQ's domains; *clinical decision making in epidemiology and biological agents*; *communication and connectivity*; *isolation, decontamination, and quarantine*; and *reporting and accessing*. Nurses who reported the *Atlantic coastal region* as their region of employment had statistically significant lower clinical decision making scores related to *clinical decision making in epidemiology and biological agents* ($M = 1.54, SD = 0.681$) compared to the *mountain region* ($M = 2.18, SD = 1.09$) and the *piedmont region* ($M = 2.33, SD = 1.16$).

Although a statistically significant difference in the mean scores of nurses' reported *region of employment* related to the EPIQ domain, *communication and connectivity*, was discovered by ANOVA, the Scheffé post-hoc multiple comparison test failed to identify which groups differed. This result may be due to the variance between groups not being big enough to make a difference and the small differences between groups may have been cancelled in the post-hoc, pairwise comparisons (Mendenhall,

Beaver, & Beaver, 2006). Another reason the post-hoc test may have failed to identify which groups differed may be related to a large variation in sample size, making it harder to detect significant differences between groups (Mendenhall, Beaver, & Beaver, 2006).

Nurses who reported working in the *Atlantic coastal region* had statistically significant lower scores ($M = 1.91, SD = 0.997$) on the EPIQ domain; *isolation, decontamination, and quarantine*, than nurses who reported working in the *piedmont region* ($M = 2.75, SD = 1.320$).

Nurses who reported the *Atlantic coastal region* as their *region of employment* had statistically significant lower scores related to the EPIQ domain *reporting and accessing critical information* ($M = 2.17, SD = 0.980$) compared to the *mountain region* ($M = 2.72, SD = 1.27$) and the *piedmont region* ($M = 3.08, SD = 1.20$).

The results of the Scheffé post-hoc multiple comparison test indicated that nurses who reported working in the *Atlantic coastal region* had scores that were statistically significant lower ($p < .05$) familiarity scores than nurses who reported working in the *mountain region* and the *piedmont region* related to the following EPIQ domains; *clinical decision making in epidemiology and biological agents* and *reporting and accessing critical information* (Table 5.7.5.1).

Results also indicated that nurses who work in the *Atlantic coastal region* had scores that were statistically significant lower ($p < .05$) familiarity scores than nurses who work in the *piedmont region* related to the following EPIQ domain; *isolation, decontamination, and quarantine* (Table 5.7.5.1).

Table 5.7.5.1

Scheffé Multiple Comparisons for Region of Employment Related to Clinical Decision Making in Epidemiology and Biological Agents; Isolation, Decontamination, and Quarantine; and Accessing Critical Information

Dependent Variable	(I)Region of Employment	(J)Region of Employment	Mean difference (I-J)	Std. error	<i>P</i>
Clinical Decision Making in Epidemiology and Biological Agents	Atlantic Coastal Region	Piedmont Region	-0.785	0.183	0.001
		Mountain Region	-0.637	0.173	0.001
Isolation, Decontamination, and Quarantine	Atlantic Coastal Region	Piedmont Region	-0.839	0.212	0.001
Reporting and Accessing Critical Information	Atlantic Coastal Region	Piedmont Region	-0.919	0.211	0.001
		Mountain Region	-0.555	0.199	0.023

A one-way ANOVA was used to establish if there is a relationship between question 44, *overall familiarity with emergency preparedness*, and reported *region of employment*. Results indicated that there were statistically significant differences found on question 44, *overall familiarity with emergency preparedness*, by reported *region of employment* ($F(2, 204) = 4.88, p < .05$).

A Scheffé post-hoc multiple comparison test was performed and results indicated that nurses who reported working in the *Atlantic coastal region* had statistically significant lower scores ($M = 1.97 SD = 1.02$) related to *overall familiarity with emergency preparedness* than nurses who reported working in the *piedmont region* ($M = 2.57 SD = 1.13$) (Table 5.7.5.2). The findings suggested that nurses who work in the *Atlantic coastal region* are significantly less familiar with the *overall familiarity with emergency preparedness* than nurses who work in the *piedmont region*.

Table 5.7.5.2

Scheffé Multiple Comparisons for Region of Employment Related to Question 44, Overall Familiarity with Emergency Preparedness

Dependent Variable	(I) Categorized Specialties	(J) Categorized Specialties	Mean difference (I-J)	Std. error	P
Question 44, Overall Familiarity with Emergency Preparedness	Atlantic Coastal Region	Piedmont Region	0.603	0.193	.009

5.7.6 Emergency Preparedness Continuing Education Hours

To measure if there is a relationship between the perceived knowledge of emergency preparedness and reported *emergency preparedness continuing education hours*, a one-way ANOVA was conducted using the three categories of reported emergency preparedness continuing education hours (independent variables) and each of the summed scores of the EPIQ’s seven domains and question 44, *overall familiarity with emergency preparedness*, (dependent variables). The *Emergency preparedness continuing education hours* demographic variable requested nurses to report the amount of emergency preparedness continuing education hours they have obtained and was broken down into three categories; *none, less than 10 hours, more than 10 hours*. A one-way ANOVA demonstrated statistically significant differences between the mean scores of reported *emergency preparedness continuing education hours* ($p < .05$) related to all seven of the EPIQ’s summed domains; *clinical decision making in epidemiology and biological agents* ($F(4, 202) = 24.690, p < .05$), *incident command system and your role within it* ($F(4, 202) = 13.321, p < .05$), *communication and connectivity* ($F(4, 202) =$

14.051, $p < .05$), *psychological issues and special populations* ($F(4, 202) = 16.742$, $p < .05$), *isolation, decontamination, and quarantine* ($F(4, 202) = 16.282$, $p < .05$), *triage* ($F(4, 202) = 14.546$, $p < .05$), and *reporting and accessing* ($F(4, 202) = 20.469$, $p < .05$).

A Scheffé post-hoc multiple comparison test was conducted to determine which of the three categories of *emergency preparedness continuing education hours* had significant differences in their scores related to all seven of the EPIQ's summed domains. Statistically significant differences were discovered between almost all three categories of reported *emergency preparedness continuing education hours* related to all seven of the EPIQ's summed domains. The only non-significant scores ($p > .05$) were found between nurses who reported *less than 10 hours* of emergency preparedness continuing education ($M = 3.739$, $SD = 0.937$) and nurses who reported *more than 10 hours* of emergency preparedness continuing education ($M = 4.279$, $SD = 0.703$) related to the EPIQ domain *triage*.

As expected, nurses who reported having *more than 10 hours* of emergency preparedness continuing education had higher scores on all seven of the EPIQ's domains compared to those who reported *less than 10 hours* or *none*. Nurses who reported having *less than 10 hours* of *emergency preparedness continuing education hours* scored higher on all seven of the EPIQ's domains compared to nurses who reported having *no emergency preparedness continuing education hours*. Table 5.7.6.1 lists the means and standard deviations of the three categories of emergency preparedness continuing education hours related to all seven of the EPIQ's summed domains.

Table 5.7.6.1

*Means and Standard Deviations of Emergency Preparedness Continuing Education**Hours Related to the Seven EPIQ Domains*

EPIQ Domains	Continuing Education Hours: None			Less than 10 Continuing Education Hours			More than 10 Continuing Education Hours		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Clinical Decision Making in Epidemiology and Biological Agents	127	1.739	0.857	62	2.296	1.019	18	3.326	1.359
Incident Command System and Your Role Within it	127	2.294	1.182	62	2.847	1.101	18	3.362	0.964
Communication and Connectivity	127	2.051	1.000	62	2.521	1.000	18	3.286	1.065
Psychological Issues and Special Populations	127	2.142	0.981	62	2.610	0.936	18	3.463	1.012
Isolation, Decontamination, and Quarantine	127	2.049	1.140	62	2.710	1.117	18	3.467	1.154
Triage	127	3.104	1.138	62	3.739	0.937	18	4.279	0.703
Reporting and Accessing Critical Information	127	2.315	1.094	62	3.077	1.164	18	3.847	1.128

Table 5.7.6.2 presents the results of the Scheffé pairwise comparisons for the three categories of reported *emergency preparedness continuing education hours*.

Table 5.7.6.2

Scheffé Multiple Comparisons for Reported Continuing Education Hours and the Seven EPIQ Summed Domains

EPIQ Domains	(I) Continuing Education Hours	(J) Continuing Education Hours	Mean Difference (I-J)	Sts. Error	<i>P</i>
Clinical Decision Making in Epidemiology and Biological Agents	None	Less than 10	-0.557	0.148	.001
		More than 10	-1.587	0.241	.001
	Less than 10	None	0.557	0.148	.001
		More than 10	-1.030	0.257	.001
	More than 10	None	1.587	0.241	.001
		Less than 10	1.030	0.257	.001
Incident Command System and Your Role Within it	None	Less than 10	-0.552	0.177	.008
		More than 10	-1.338	0.287	.001
	Less than 10	None	0.552	0.177	.008
		More than 10	-0.785	0.306	.039
	More than 10	None	1.338	0.287	.001
		Less than 10	0.785	0.306	.039
Communication and Connectivity	None	Less than 10	-0.470	0.156	.012
		More than 10	-1.235	0.253	.001
	Less than 10	None	0.470	0.156	.012
		More than 10	-0.765	0.269	.019
	More than 10	None	1.235	0.253	.001
		Less than 10	0.765	0.269	.019
Psychological Issues and Special Populations	None	Less than 10	-0.468	0.150	.009
		More than 10	-1.321	0.244	.001
	Less than 10	None	0.468	0.150	.009
		More than 10	-0.853	0.260	.005
	More than 10	None	1.321	0.244	.001
		Less than 10	-0.853	0.260	.005

EPIQ Domains	(I) Continuing Education Hours	(J) Continuing Education Hours	Mean Difference (I-J)	Sts. Error	<i>P</i>
Isolation, Decontamination, and Quarantine	None	Less than 10	-0.661	0.176	.001
		More than 10	-1.142	0.286	.001
	Less than 10	None	0.661	0.176	.001
		More than 10	-0.757	0.304	.047
	More than 10	None	1.142	0.286	.001
		Less than 10	0.757	0.304	.047
Triage	None	Less than 10	-0.635	0.163	.001
		More than 10	-1.174	0.265	.001
	Less than 10	None	0.635	0.163	.001
		More than 10	-0.539	0.281	.162
	More than 10	None	1.174	0.265	.001
		Less than 10	0.539	0.281	.162
Reporting and Accessing Critical Information	None	Less than 10	-0.761	0.173	.001
		More than 10	-1.532	0.282	.001
	Less than 10	None	0.761	0.173	.001
		More than 10	-0.771	0.299	.038
	More than 10	None	1.532	0.282	.001
		Less than 10	0.771	0.299	.038

Statistically significant differences ($p < .05$) were discovered after conducting a one-way ANOVA to determine if there is a relationship between nurses' reported *emergency preparedness continuing education hours* and question 44, *overall familiarity with emergency preparedness*. See Table 5.7.6.3 for results of the one-way ANOVA.

Table 5.7.6.3

ANOVA for Question 44, Overall Familiarity with Emergency Preparedness, and

Emergency Preparedness Continuing Education Hours

Emergency Preparedness Continuing Education Hours	N	M	SD	df	F	P
None	127	1.96	0.96	206	26.22	0.001
Less than 10	62	2.58	1.00			
More than 10	18	3.61	1.09			

A Scheffé pos-hoc multiple comparison test was conducted to determine which of the three reported *emergency preparedness continuing education hour's* categories had statistically significant differences in their mean scores related to question 44, *overall familiarity with emergency preparedness*. All three categories; *none, less than 10 hours, and more than 10 hours*, had statistically significant results indicating that nurses who reported *more than 10 hours of emergency preparedness continuing education* ($M = 3.61$, $SD = 1.09$) were more familiar with question 44, *overall familiarity with emergency preparedness* than nurses who had *less than 10 hours of emergency preparedness continuing education* ($M = 2.58$, $SD = 1.00$) or nurses who reported having *no hours of emergency preparedness continuing education* ($M = 1.96$, $SD = 0.96$). Nurses who reported *less than 10 hours of emergency preparedness continuing education* ($M = 2.58$, $SD = 1.00$) were more familiar with question 44, *overall familiarity with emergency preparedness* than nurses who reported having *no hours* ($M = 1.96$, $SD = 0.96$). Table 5.7.6.4 presents the results of the Scheffé multiple comparison test.

Table 5.7.6.4

Scheffé Multiple Comparisons for Reported Emergency Preparedness Continuing Education Hours Related to Question 44, Overall Familiarity with Emergency Preparedness

Dependent Variable	(I) Categorized Specialties	(J) Categorized Specialties	Mean difference (I-J)	Std. error	P
Question 44, Overall Familiarity with Emergency Preparedness	None	Less than 10	-0.62	0.15	.001
		More than 10	-1.65	0.25	.001
	Less than 10	None	0.62	0.15	.001
		More than 10	-1.03	0.26	.001
	More than 10	None	1.65	0.25	.001
		Less than 10	1.03	0.26	.001

5.8 Research Question 6: What are the training preferences of South Carolina nurses related to emergency preparedness content?

5.8.1 Training Format

Participants were asked to rank order three (1-3) of their *most preferred methods for receiving emergency preparedness training* out of nine possibilities; *face to face (traditional classroom/lectures/conferences/seminars/workshops), online web-based courses, video conferencing, satellite broadcasts, self-instruction, newsletters/pamphlets/pocket reference cards, video tapes, audio tapes, and CD/DVD for your computer*. Participants preferred, as their first choice, to receive *face-to-face (traditional classroom/lectures/conferences/seminars/workshops)*, 67.6% (n = 140). Participants preferred online web-based courses as their second choice, 27.5% (n = 57) and CD/DVD for your computer as their third choice, 26.1% (n = 54). Table 5.8.1.1 provides the preferred training methods.

Table 5.8.1.1

Preferred Training Methods

Method	First Choice	%	Second Choice	%	Third Choice	%
Face-to face	140	67.6	17	8.2	15	7.2
Online Web-based courses	31	15.0	47	27.5	35	16.9
Videoconferencing	4	1.9	19	9.2	20	9.7
Satellite broadcasts	1	0.5	11	5.3	13	6.3
Self-instruction	7	3.4	28	13.5	33	15.9
Newsletters, pamphlets, pocket reference card	2	1.0	10	4.8	21	10.1
Videotapes	2	1.0	19	9.2	16	7.7
Audio tapes	0	0	3	1.4	0	0
CD/DVD for your computer	20	9.7	43	20.8	54	26.1

5.8.2 Course Length

Participants were presented with six different scheduling options related to course offerings and times and asked to circle *yes* or *no* to the most preferred option. The most preferred class schedule offering was to participate in a *1-day weekday workshop*, which was selected by 85.5% (n = 177), followed by a *2-hour lecture* or *web-based training*, which was selected by 83.1% (n = 172). The least preferred class schedule offering was taking a course for an *academic quarter/semester*, selected by 29% (n = 29). Table 5.8.2.1 presents the preferred class scheduling.

Table 5.8.2.1

Preferred Class Scheduling

Scheduling Options	Yes		NO	
	n	%	n	%
Take a course for an academic quarter/semester	60	29.0	147	71.0
Attend a 2-3 day workshop/conference	131	63.3	76	36.7
Participate in a 2-hour lecture or web-based training	172	83.1	35	16.9
Attend an evening workshop	108	52.2	99	47.8
Attend a one-day weekend workshop	110	53.1	97	46.9
Attend a one-day weekday workshop	177	85.5	30	14.5

5.8.3 Access to Electronic Training Information

Eight *yes* or *no* questions were presented to participants in an effort to explore their access to electronic training information. The questions were used to determine the participant's ability to retrieve and/or use emergency preparedness information related to internet and satellite downlinks. Only one question, *Do you have access to satellite downlinks at work?* provided an option for *uncertain* in addition to *yes* and *no*. Most of the participants reported having internet access at both work (88.9%, n = 184) and home (94.2%, n = 195), but only 43% (n = 89) of participants used internet access to gain information related to bioterrorism and/or emergency preparedness. Table 5.8.3.1 represents responses related to access to electronic training information.

Table 5.8.3.1

Access to Electronic Training Information

Question Related to Access to Electronic Training Information	Yes		Uncertain		No	
	n	%	n	%	n	%
Do you have access to a computer at work?	201	97.1			6	2.9
Do you have access to a computer at home?	195	94.2			12	5.8
Do you have access to the internet at work?	184	88.9			23	11.1
Do you have access to the internet at home?	195	94.2			12	5.8
Do you have access to satellite downlinks at work?	42	20.3	137	66.2	28	13.5
Have you participated in satellite downlinks for training/educational purposes?	57	27.5			150	72.5
Have you used the internet to access information on bioterrorism and/or emergency preparedness?	89	43.0			118	57.0
Does your employer allow work hours to be used for learning/educational opportunities related to your job?	182	87.9			25	12.1

5.9 Summary

This study assessed South Carolina nurses' learning needs by exploring their perceived knowledge of emergency preparedness utilizing a valid and reliable tool. The reliability and construct validity of each of the eight dimensions were analyzed and performed within acceptable standards; cumulative variance explained from the Equamax

factor analysis was 78.1% and the resulting coefficient alphas ranged from 0.92 to 0.96 with a 98% alpha value for the entire instrument indicating high levels of internal reliability. Modifications based on the factor analysis included combining two of the dimensions into one resulting in seven dimensions: *clinical decision making in epidemiology and biological agents; incident command system and your role within it; communication and connectivity; psychological issues and special populations; isolation, decontamination, and quarantine; triage; and reporting and accessing critical information*. Each of the seven EPIQ dimensions had a strong significant impact in explaining overall familiarity ($p < .05$) with an *R Square* of 0.787 (78.7% of the total variation in the data). Combined, the factor analysis, reliability analysis, and regression results indicated that the EPIQ is a reliable and valid tool for assessing emergency preparedness familiarity.

Average familiarity scores were calculated to determine the self perceived learning needs of South Carolina nurses related to the seven EPIQ domains and question 44, *overall familiarity with emergency preparedness*. Results indicated a low level of self-reported familiarity related to question 44, *overall familiarity with emergency preparedness*; score of 2.29 (SD = 1.09). Participants reported being most familiar with *triage*, 3.39 (SD = 1.12) and least familiar with *clinical decision making in epidemiology and biological agents*, 2.04 (SD = 1.06). Average familiarity scores related to the other five EPIQ domains resulted in scores below 3.00 indicating that participants have a low level of self-reported familiarity related to six of the seven EPIQ domains and adequate familiarity with the EPIQ domain, *triage*.

A one-way ANOVA was conducted to determine if there is a relationship between the perceived knowledge of emergency preparedness and selected demographic variables; *nursing specialties, years of experience, highest degree attained, age, region of employment, and emergency preparedness continuing education hours.*

Statistical significance ($p > .05$) was found between the nursing specialties *ambulatory care/community health and specialized settings* related to the EPIQ domain, *reporting and accessing critical information.* This indicates that nurses who reported specialties categorized into *ambulatory care/community health* had significantly greater familiarity with *reporting and accessing critical information* ($M = 3.05, SD = 1.40$) than nurses who had reported specialties categorized into *specialized settings* ($M = 2.30, SD = 1.08$).

The independent demographic variable *region of employment* resulted in statistically significant differences ($p > .05$) between all three regions; *mountain region, piedmont region, and Atlantic coastal region.* Results indicated that nurses who reported working in the *Atlantic coastal region* had statistically significant lower familiarity scores related to the EPIQ domains, *clinical decision making in epidemiology and biological agents* and *reporting and accessing critical information,* than nurses who reported working in the *mountain region* and *piedmont region.* The *Atlantic coastal region* also had statically significant lower familiarity scores related to the EPIQ domain, *isolation, decontamination, and quarantine,* than nurses who reported working in the *piedmont region.*

The analysis also found that nurses who reported working in the *Atlantic coastal region* had significantly less familiarity scores with question 44, *overall familiarity with emergency preparedness*, than nurses who reported working in the *piedmont region*.

Statistically significant differences ($p > .05$) were found between all three categories of nurses reported *emergency preparedness continuing education hours*. As expected, nurses who reported having *more than 10 hours* of emergency preparedness continuing education hours had higher scores on all seven EPIQ domains and question 44, *overall familiarity with emergency preparedness*, than nurses who reported *less than 10 hours of emergency preparedness continuing education hours* and nurses who reported having *no emergency preparedness continuing education hours*.

Results indicated that participants most preferred training format was the *face to face(traditional classroom/lectures/conferences/seminars/workshop)s* and the *1-day weekday workshop* as their most preferred course length.

Chapter 6

6 Discussion and Conclusion

This study was designed to assess the learning needs of South Carolina nurses by exploring their perceived knowledge of emergency preparedness and to add to the existing body of literature on emergency preparedness by examining the following research questions:

1. Is the Emergency Preparedness Information Questionnaire a valid emergency preparedness assessment tool?
2. Is the Emergency Prepared Information Questionnaire a reliable emergency preparedness assessment tool?
3. Is there a relationship between the emergency preparedness dimensions and the overall familiarity with emergency preparedness?
4. What are the self-perceived learning needs of South Carolina nurses as determined by the scores on the Emergency Preparedness Information Questionnaire?
5. Is there a relationship between the perceived knowledge of emergency preparedness and selected demographic variables of nurses?
6. What are the learning and training preferences of South Carolina nurses related to emergency preparedness content?

A summary of findings related to the research questions are discussed in relation to the conceptual framework and the literature review. In addition, this chapter will discuss implications for nursing practice, limitations of the study, and recommendations for further research.

6.1 Introduction

Boone's conceptual programming model was the framework that guided the study. Boone's model focuses on a holistic systems approach for developing adult continuing education programs and encompasses three interdependent and connecting concepts: *planning, design and implementation, and evaluation and accountability* (Boone, et al., 2002). This study utilized the programming model's concept of planning. The planning concept is a critical first step in the programming process for the development of continuing education and training programs and vital to this process is a valid and reliable assessment tool (Asadoorian, 2005; Boone et al., 2002; DeSilets, 2007). The learning needs of South Carolina nurses were explored using the Emergency Preparedness Information Questionnaire (EPIQ) in order to develop effective emergency preparedness continuing education and training programs.

6.2 Demographic Findings

The final sample of two hundred and seven nurses shared similar demographic characteristics with the general population of South Carolina nurses (South Carolina Board of Nursing and Office of Research and Statistics) and with the demographic profiles presented in several research studies related to emergency preparedness as reported in the literature review. The majority of participants were females over the age

of 40. The majority of participants reported an undergraduate degree (bachelor's or associate degree) as their highest degree attained with a large number of participants reporting 21 to 30 years of experience. Most of the study participants reported having no emergency preparedness continuing education hours. Additional demographic data was collected such as primary nursing specialty and South Carolina region of employment for the purpose of adding to the profile of the study sample and used for study analysis.

The majority of studies related to emergency preparedness research have been conducted in health care professionals such as physician, nurses, dentists, pharmacists, and other professionals. Only three studies which have explored health care professional's knowledge of emergency preparedness have culled out and reported registered nurses demographic characteristics. Demographic results of the following studies were consistent with the demographic results of the sample population in this study. Katz and colleagues (2006) in their study surveying Hawaii physicians' and nurses' knowledge of bioterrorism preparedness found that out of 142 nurse participants the majority of participants were female over the age of 40, with no previous bioterrorism training. Evers and Puzniak (2005) explored bioterrorism knowledge among school nurses in Missouri and found that out of 140 participants most respondents were females over the age of 40.

Williams (2008) described the sample population of registered nurses (N = 594) who participated in the study assessing Kentucky's rural public health workforce's state of emergency preparedness. The majority of nurse participants were females over the age of 35 with the majority of participants reporting undergraduate degrees (bachelor's or associate) as their highest degree attained.

6.3 Discussion of the Findings

In order to organize the data and present a framework for discussion, the results of the data related to research questions one, two, and three will be discussed together. The discussion of the remaining questions will be presented independently.

6.3.1 Research Question 1: Is the Emergency Preparedness Questionnaire a Valid Emergency preparedness Assessment Tool?

Research Question 2: Is the Emergency Preparedness Questionnaire a Reliable Emergency Preparedness Assessment Tool?

Research Question 3: Is There a Relationship Between the Emergency Preparedness Dimensions and the Overall Familiarity with Emergency Preparedness?

An important aspect of this study included the assessment of the construct validity and reliability of the EPIQ in order to evaluate the psychometric quality of the instrument and to ascertain that the instrument is measuring what it is meant to measure. One of the main applications of factor analysis is to detect structure in the relationships between variables that classify similar variables together (Mendenhall, Beaver, & Beaver, 2006). Items belonging to the eight dimensions of the Emergency Preparedness Information Questionnaire were explored using factor analysis with orthogonol (Equamax) rotation procedure. It was anticipated in the current study that the EPIQ's dimensions would factor together. However, seven dimensions were derived from the factor analysis and as a result, two dimensions, *epidemiology and clinical decision making* and *biological agents*, were combined due to similar structure in the relationships between the variables.

Both dimensions addressed aspects of biological and chemical agents and were combined into one dimension where the items best fit based on the factor analysis; *clinical decision making in epidemiology and biological agents*.

It was determined that because the factor analysis detected structure in the relationships between the two dimensions (*epidemiology and clinical decision making and biological agents*) and classified the similar items together; without changing the basic elements of the questionnaire, a more reliable arrangement of the tool would be used for data analysis. The seven EPIQ dimensions resulted in a powerful factor analysis. The resulting seven dimensions included: *clinical decision making in epidemiology and biological agents; incident command system; communication and connectivity; psychological issues and special populations; isolation, decontamination, and quarantine; triage; and reporting and accessing critical information*.

Once the factors were established, reliability was examined. The aim of testing the internal consistency reliability was to confirm that the items in the instrument are consistent with one another. The study demonstrated high levels of internal reliability. The concern that the overall internal consistency is highly correlated thereby artificially inflating internal consistency through redundancy does not seem warranted based on the factor analysis, which assesses the relationship among items within each of the domains.

Analysis of variance and linear regressions were used to determine if there was a relationship between the emergency preparedness dimensions and the *overall familiarity with emergency preparedness*. Analysis of variance established a statistically significant relationship between *overall familiarity with emergency preparedness* and the seven dimensions.

Combined, the findings related to the factor analysis, reliability analysis, and regression results indicated that the EPIQ is a valid and reliable instrument for assessing emergency preparedness familiarity and can be used as a needs assessment tool to accurately examine and identify the learning needs of nurses.

6.3.2 Research Question 4: What are the Self-Perceived Learning Needs of South Carolina Nurses Determined by Scores on the Emergency Preparedness Information Questionnaire?

This question explored South Carolina nurses' self-perceived knowledge of emergency preparedness for the purpose of assessing, identifying, and analyzing their learning needs.

Participants demonstrated a low level of self-reported familiarity in their *overall perceived knowledge of emergency preparedness*. Participants were most familiar with *triage* and least familiar with *clinical decision making in epidemiology and biological agents* and *communication and connectivity*. The finding that participants were most familiar with *triage* is consistent with the belief that *triage* is reflective of the historical training of nurses (Wisniewski et al., 2004). *Triage* requires communication skills, assessment skills, and knowledge of the disease process in order to quickly and accurately prioritize treatment. Nursing schools have historically trained nurses in basic triage competencies.

Similar findings were found in a previous study by Wisniewski et al. (2004) using the same tool. Nurse participants reported a low level of self-reported *overall familiarity with emergency preparedness* and reported being most familiar with *triage* and least familiar with *communication and connectivity* and *epidemiology and clinical*

decision making. Mosca, Sweeney, Hazy, and Brenner (2005) found similar results in their findings from surveying 80 public health school nurses' perceived knowledge of bioterrorism and disaster preparedness. The majority of participants acknowledged having little to no confidence in their ability to implement skills necessary for responding to bioterrorism and disaster emergencies. Most respondents reported a high training need in incident command and communications. Rose and Larrimore (2002) determined that a small percentage of their study participants reported having confidence in providing health care during a chemical or biological terrorism event.

Two studies described response activities performed during an emergency event. Rogers and Lawhorn (2007) and Slepski (2007) found that the majority of participants who responded to hurricanes Rita and Katrina most frequently performed duties related to triage, basic clinical care, providing health protection efforts such as immunizations, surveillance, and communication when engaging in response activities. These two studies are valuable for gaining an understanding of the competencies that may be necessary to perform during disaster events. Findings from this current study identified that although the score was relatively low, participants reported being most familiar with the EPIQ's dimension *triage*. There are five EPIQ questions exploring nurses' perceived knowledge of the EPIQ's dimension *triage*, which includes an assessment of nurses' perceived knowledge of basic clinical care. Results also indicated that participants reported a low level of knowledge related to *clinical decision making in epidemiology and biological agents*; which included surveillance as an assessed item in the *clinical decision making in epidemiology and biological agents* subscale, and communication.

Findings from research question four are consistent with the current literature related to emergency preparedness; health care professionals have a self-reported low level of knowledge related to emergency preparedness demonstrating that there is a critical need for emergency preparedness continuing education and training programs. Utilizing the findings from this study to identify and prioritize educational and training needs, such as providing a greater emphasis on content related to *clinical decision making in epidemiology and biological agents; communication and connectivity; and isolation, decontamination, and quarantine*, is essential for developing effective emergency preparedness continuing education and training programs.

6.3.3 Research Question 5: Is there a Relationship Between the Perceived Knowledge of Emergency Preparedness and Selected Demographic Variables of Nurses?

In an effort to continue exploring South Carolina nurses learning needs, a series of ANOVAs and when appropriate, a Scheffé multiple comparison test, were performed to determine if there is a relationship between the perceived knowledge of emergency preparedness and selected demographic variables of the participants; nursing specialties, years of experience, highest degree attained, age, region of employment, and emergency preparedness continuing education hours.

6.3.3.1 Significant Findings

6.3.3.1.1 Nursing Specialties

Nurses who reported working in specialties categorized into *specialized settings* had a significantly lower mean score related to the EPIQ domain, *reporting and*

accessing critical information, than ambulatory care/community health nurses. These findings suggested that *ambulatory care/community health* nurses believe they know more about *reporting and accessing critical information* than *specialized setting* nurses. Slepski (2007) ranked characteristics of *reporting and accessing critical information* as a competency where study respondents felt least prepared. Characteristics of *reporting and accessing* included accessing up-to-date resources and information. Kerby, Brand, Johnson, and Ghouri (2005) determined that characteristics associated with *reporting and accessing critical information* rated high as a need for training by public health participants in their study, evaluating the overall ratings of need for training for the public health workforce. Characteristics of reporting and accessing included locating and accessing federal, state, and local laws/regulations/ordinances/procedures that protect the public's health and protocols for reporting a suspected or actual emergency situation (biological outbreak). Gebbie, Horn, McCollum, and O'Hara (2009) in their research to develop emergency preparedness continuing education for public health workers determined that a fundamental competency for all public health professionals is to know the who, what, and where, of the reporting structure related to emergency events.

Reporting and accessing critical information is one of the basic competencies that nurses must obtain to effectively respond to disaster events. Understanding the reporting structure is vital when coordinating relief efforts. Although there was a significant difference in the mean scores of *ambulatory care/community health* nurses and *specialized setting* nurses related to *reporting and accessing critical information*, the mean score of ambulatory care/community health nurses was still relatively low. This finding is consistent with the literature indicating that a greater emphasis of content

related to *reporting and accessing critical information* should be considered when developing emergency preparedness continuing education programs.

6.3.3.1.2 Region of Employment

Nurses who reported working in the *Atlantic coastal region* demonstrated significantly lower mean scores related to three of the EPIQ domains, *clinical decision making in epidemiology and biological agents; isolation, decontamination, and quarantine*; and *reporting and accessing critical information*, than nurses who reported working in the *mountain and piedmont regions*. A significant difference was also discovered between the mean scores of nurses who reported working in the *Atlantic coastal region* and nurses who reported working in the *piedmont region* related to question 44, *overall familiarity with emergency preparedness*.

Although findings demonstrated that nurses who reported working in the *Atlantic coastal region* had significantly lower mean scores related to the EPIQ domains, *clinical decision making in epidemiology and biological agents; isolation, decontamination, and quarantine*; and *reporting and accessing critical information*, than nurses who reported working in the *mountain and piedmont regions*, the mean scores across all three regions related to these domains are relatively low indicating that consideration should be given to these domains when developing emergency preparedness continuing education programs. Items associated with the three EPIQ domains share similar content related to biological agents indicating that nurses who reported working in the *Atlantic coastal region* have significantly lower mean scores than nurses who reported working in the *piedmont or mountain regions* related to the EPIQ domains with scale items reflecting an assessment of content related to biological agents.

Natural and manmade disasters can occur in any of the three South Carolina regions, but of the three South Carolina regions, natural disasters have occurred and will continue to threaten the *Atlantic coastal region* more so than the *mountain and piedmont regions* due to its proximity to the coastline (South Carolina Area Health Education Consortium, n.d.). The *Atlantic coastal region* is home to the nation's fourth busiest container port, raising concerns that terrorists could easily infiltrate our country and bring in biological, chemical, radiological, or nuclear weapons undetected (Richter et al., 2005). Coule and Schwartz (2009) in their research to develop a framework for disaster medicine in the state of Georgia expressed the critical need to offer training for recognizing and responding to bioterrorism disasters for the purpose of minimizing morbidity and mortality. Ablah, Tinius, Horn, Williams, and Gebbie (2008) placed a high priority on training related to decontamination and isolation. Their study utilized a focus group approach to determine the learning needs of community health clinicians and discovered that an important topic for participants was decontamination and isolation. Participants expressed concern related to their ability to identify, isolate, and clean up after an infected and contagious individual.

Based on the findings of this study and current literature, consideration should be given for a more concentrated focus on content related to clinical decision making in epidemiology and biological agents; *isolation, decontamination, and quarantine*; and *reporting and accessing critical information* when developing emergency preparedness continuing education programs for nurses who have reported working in the *Atlantic coastal region*.

6.3.3.1.3 Emergency Preparedness Continuing Education Hours

A statistically significant difference between the mean scores of reported *emergency preparedness continuing education hours* related to all seven EPIQ domains and question 44, *overall familiarity with emergency preparedness*, was demonstrated as a result of this study. As expected, nurses who reported having *more than 10 hours* of emergency preparedness continuing education had higher scores on all seven EPIQ domains and question 44, *overall familiarity with emergency preparedness*, compared to nurses who reported having *less than 10 hours* of emergency preparedness continuing education, or nurses who reported having *no emergency preparedness continuing education hours*. In addition, the results determined that nurses who reported having *less than 10 hours* of emergency preparedness continuing education had statistically significant higher mean scores related to all seven EPIQ domains and question 44, *overall familiarity with emergency preparedness*, compared to nurses who reported having *no emergency preparedness continuing education hours*.

These findings indicated that nurses who received any *emergency preparedness continuing education hours* reported to be more familiar with emergency preparedness than nurses who reported having *no emergency preparedness continuing education hours*. Similar results were found in a study by Williams (2008) examining the emergency preparedness readiness of all workgroups within Kentucky's rural public health department. Results indicated that participants who reported having the most emergency preparedness training, perceived themselves as the most confident in their knowledge and skills related to emergency preparedness.

Interestingly, when analyzing the findings from this study, many of the mean scores reported by nurses who had emergency preparedness continuing education hours (*less than 10, more than 10*) are relatively low mean scores related to the majority of EPIQ domains. Although this study did not assess participants' emergency preparedness continuing education content, nor did this study assess how the curriculum related to the emergency preparedness content was developed, the literature provided potential reasons for such an occurrence. Ablah et al. (2008) determined from a study utilizing a focus group approach that emergency preparedness training can be overwhelming and time consuming indicating that information presented during a training program related to these circumstances may prevent learning from taking place. Claflin (2005) found that some emergency preparedness continuing education encounters occur on the job while the health care professional is simultaneously providing services. This distraction may obstruct the health care professional's ability to retain the knowledge presented. Ablah et al. (2005) in a study evaluating the perceptions of health care professionals regarding current local issues surrounding terrorism preparedness explored how well participants could recall what they learned in an anti-terrorism training program. Utilizing a focus group approach, the authors determined that content recall was limited to parts that were interesting, or pertinent to job duties. Lastly, Studnek and Fernandez (2008) submitted that it is possible for an individual to receive multiple hours of poor quality training and be as unknowledgeable about the training content as an individual who has no prior training.

The majority of nurses in this study reported having *no emergency preparedness continuing education hours*. Although this study did not assess reasons why nurses did

not engage in emergency preparedness continuing education, the literature provided potential barriers which may have prevented individuals from engaging in continuing education programs. Some of the barriers included lack of funding to compensate for training time, personnel shortages, competing priorities; both job related and personal, and interest level related to the topic being presented (Benson & Westphal, 2005; Coule & Schwartz, 2009; Gebbie et al., 2009; Kerby et al., 2005). In a study by Evers and Puzniak (2005) it was discovered that respondents felt that a biological attack was unlikely, therefore based on the perceived threat level, respondents were less likely to engage in emergency preparedness education and training.

6.3.3.2 Non Significant Findings

Results demonstrated that there were no significant differences in mean scores among the demographic variables *years of experience*, *highest degree attained*, and *age* related to both the seven EPIQ domains and question 44, *overall familiarity with emergency preparedness*. There was also no significant difference in the mean scores of *nursing specialties* related to question 44, *overall familiarity with emergency preparedness*. These findings indicated that participants' reported mean scores associated with each demographic variable; years of experience, highest degree attained, and age do not differ significantly related to all seven EPIQ domains and question 44, *overall familiarity with emergency preparedness*. Findings also revealed that participants' reported *nursing specialty* mean score did not differ significantly related to question 44, *overall familiarity with emergency preparedness*. As a result of these findings, we can conclude that it may not be a priority to consider years of experience, highest degree attained, and age when developing emergency preparedness continuing

education and training programs for South Carolina nurses due to similar mean scores indicating that their learning needs related to these demographic variables are not significantly different.

Congruent with a study by Gershon et al. (2004), evaluating knowledge, beliefs, and confidence regarding clinicians' knowledge of bioterrorism, it was determined that there was no statistically significant relationship between the mean knowledge scores related to educational degree, years of experience, or clinical specialty. Ablah, Molgaard, Fredrickson, Wetta-Hall, and Cook (2005) found no significant difference between age groups scores related to their self-perceived ability to participate in a coordinated multidisciplinary response to a terrorist event. In addition, Ablah et al. (2005) found no significant difference with any demographic variable scores related to participants' self-perceived ability to rapidly and effectively alert the public health system at the community, state, and national levels during a terrorist event.

6.3.4 Research Question 6: What are the Training Preferences of South Carolina Nurses Related to Emergency Preparedness Content:

Evaluating the learning preferences related to the target population is in accordance with the planning process as an important element for meeting the learning needs of the target population. Boone et al. (2004) emphasized that participation of the learner during the planning process, particularly as it relates to needs identification, assessment, and analysis is a critical component for developing continuing education programs.

Participants rank ordered (1-3) their three most preferred methods for receiving emergency preparedness training out of nine possibilities. Participants reported receiving

face-to-face (*traditional classroom/lectures/conferences/seminars/workshop*) as their first choice and most preferred method for receiving emergency preparedness training. *Online web-based courses* was their second most preferred method and *computer CD/DVD* was reported as their third most preferred method for receiving emergency preparedness training. The most preferred class schedule offering was to participate in a *1-day weekday workshop* with a second preference for a *2-hour lecture or web-based training*. The least preferred class schedule offering reported was to take a course for an *academic quarter/semester*. Most participants reported having internet access at both work and home, but less than half used this technology to gain information related to bioterrorism/and or emergency preparedness.

Consistent with the literature, Gershon et al. (2004) discovered that the most preferred training method for emergency preparedness programs reported by study participants was traditional lecture formats. Other preferred formats included written materials, videoconferencing and computerized distance education, and training through audios or videos. Mosca et al. (2005) reported that study participants overwhelmingly preferred traditional classroom instruction for receiving emergency preparedness training. Evers and Puzniak (2005) determined in their findings that respondents preferred local conferences, paper newsletters, and pocket diagnosis cards for training and education. In a study by Coule and Schwartz (2009) it was determined that participants most preferred receiving emergency preparedness training at scheduled medical conferences. Chandler et al. (2008) expressed that face-to-face competency-based training often results in increased knowledge and improved learning outcomes.

Offering a *face-to-face training* format along with a class schedule that can both accommodate the learner, but also allow enough time to present the content in a meaningful way should be considered when developing emergency preparedness continuing education programs.

6.4 Significance to the Practice of Nursing

This study was guided by Boone's conceptual programming model and designed to assess the learning needs of South Carolina nurses by exploring their perceived knowledge of emergency preparedness for the purpose of developing effective continuing education and training programs. Preparing nurses to serve as first responders by ensuring that they possess the needed knowledge and skills to respond to disasters is gravely needed (Ablah, 2009; Coule & Schwartz, 2009; Gebbie, Horn, McCollum, & O'Hara, 2009; Studnek, 2008). The overall plan for emergency preparedness and response is for nurses to have a basic level of knowledge and skill to adequately respond to an emergency event and effectively manage the crisis (Gebbie & Qureshi, 2006). The findings of this study have implications for nursing practice, nursing education, and the development of legislative and institutional policies.

The EPIQ was utilized as the instrument for collecting data. The results of this research study proved to be a strong test of the EPIQ, psychometrically evaluating the tool and determining that it is a reliable and valid tool for assessing perceived knowledge of emergency preparedness in nurses. The implication of this finding suggests that the EPIQ should be considered for assessing the educational and training needs of health care providers as a first step in the process for developing emergency preparedness continuing

education and training programs, which will strengthen the capacity to effectively respond to emergency events and directly impact the practice of nursing.

Analysis revealed that participants reported having a low level of self- perceived knowledge related to their *overall familiarity with emergency preparedness* and basic competencies of emergency preparedness as reflected in the EPIQ's seven domains. Participants reported being most familiar with *triage* and *reporting and accessing critical information* and least familiar with *clinical decision making in epidemiology and biological agents* and *communication and connectivity*. These results indicated that when developing continuing education and training programs an overview of emergency preparedness content is necessary, but emphasis should be placed on areas where participants' indicated being least familiar. Clearly, there is a perceived knowledge deficit related to basic knowledge of emergency preparedness, which holds major implications for nursing practice.

The literature is split on which method, objective or perceived, is the most effective for accurately reflecting actual knowledge or abilities. In a study by Katz et al. (2006) the researchers assessed objective and perceived knowledge of bioterrorism amongst physician and nurses in Hawaii. Results indicated that nurses who perceived that they were able to identify, recognize, and respond to a bioterrorist event scored higher than those who perceived that they were unable to recognize or respond competently to a bioterrorist event. Self-perceived knowledge has been supported in the literature as an accurate method for identifying learning needs, designing effective continuing education programs, improving professional competencies, and narrowing the practice-research gap (Asadoorian & Batty, 2005; Claflin, 2005).

The complications of working in today's extremely busy health care setting greatly impacts nurses' professional development. Survey results along with the literature demonstrated that participants are not willing to devote an extensive amount of time for acquiring the knowledge and skills related to this complex topic, therefore continuing education programs must be developed based on the learning needs of the target audience in order to promote a meaningful and effective learning experience. Findings from this study can be incorporated into the development of continuing education programs for South Carolina nurses by using the results to prioritize their learning needs, thus contributing to the state's capability to respond quickly and effectively to a crisis. In addition, nursing schools may want to reevaluate the areas of concentration and amount of emphasis placed on emergency preparedness content. Education and training opportunities must be made available to nurses to ensure that they are adequately prepared to respond effectively to disaster events.

Legislative and institutional policies should be considered for providing more formal emergency preparedness education and training to nurses in order to improve their knowledge and skills and create a workforce that is competent in the most basic competencies of emergency preparedness. Results of this study are consistent with the body of literature demonstrating that the health care workforce, where nurses encompass the largest percentage, are not adequately prepared to effectively respond to emergency events and the majority of participants reported not participating in any emergency preparedness continuing education programs. The process for developing, implementing, and evaluating emergency preparedness educational programs is daunting, but with the

support of legislative and institutional policies, this task could be confronted in a more systematic approach.

Using Boone's conceptual programming model's concept of planning, an assessment of the target population was completed and learning needs were identified. Based on the findings of this study, continuing and completing the programming process will include designing continuing education and training programs that are effective and appropriate for the target population, tailored to meet the educational needs of South Carolina nurses. In doing so, it will improve nursing practice by providing a health care work force that is more competent in the most basic competencies of emergency preparedness.

6.5 Limitations

There are some recognized limitations to this study. The first limitation of this study is that the results may not be representative of the entire population of South Carolina nurses (35,940) due to the low response rate, despite the strict adherence to many established survey design recommendations. However, it was demonstrated that the demographic findings of the study sample appear to have similar proportions to the demographic description of South Carolina registered nurses and several of the studies reflected in the literature.

The second limitation of this study recognized that the variables analyzed in this study were obtained using a self-report survey, and therefore, contains all of the limitations inherent in this type of study design such as response/recall bias, question misunderstanding, question structure, and /or inaccurate responses. Nonetheless, self-

report via a survey design has been shown to be a reliable and valid method for obtaining information, and given the resources available, this method was the best choice.

A third limitation of this study recognizes that because participation was voluntary, nurses who were not randomly selected, or nurses who received a survey and chose not to participate in the study, may have demonstrated different self-reported knowledge levels of emergency preparedness from the nurses who participated in the study.

A fourth limitation of this study is that participant's perceived knowledge of emergency preparedness may not be consistent with their actual knowledge of emergency preparedness. Research shows that learners will base their decisions to gain new knowledge on their perceptions, despite the accuracy of those perceptions (Fox & Miner, 1999). Others have considered the learner as the most qualified for assessing their own learning needs, which produces the greatest motivation for learning (Boone et al., 2002, Knowles, 1984; Maloney & Kane, 1995, Masten, 1992).

Lastly, it should be recognized that because every facet of life and practice is continuously changing, the results of this study will not remain relevant indefinitely.

6.6 Future Research

Emergency preparedness related to health care professionals is underdeveloped in the literature and thus a potentially rich area for further research. The results of this study identified areas of concern where further research is needed. Consistent with the literature, participants in this study demonstrated a low level of knowledge related to emergency preparedness. In addition, findings in the literature and the current study demonstrated that when asked about continuing education experience the majority of

respondents who participated in the studies reported having no emergency preparedness continuing education and those that reported participating in continuing education programs, demonstrated relatively low scores related to emergency preparedness content. Based on the literature some potential barriers for not participating in emergency preparedness continuing education programs may include lack of funding to compensate for training time, personnel shortages, competing personal and job related priorities, interest level related to the topic being presented, and low perceived threat level (Benson & Westphal, 2005; Coule & Schwartz, 2009; Evers & Puzniak, 2005; Gebbie et al., 2009; Kerby et al., 2005). The literature revealed potential explanations related to why health care professionals who have engaged in continuing education courses fail to retain adequate knowledge of the content. Explanations included the information presented may be overwhelming and time consuming, information is presented during work hours while simultaneously performing work duties, and information retained is limited to interest and job pertinence (Ablah et al., 2005; Ablah et al., 2008; Claflin, 2005). Further research is needed to explore the perceived barriers and strategies for content retention of emergency preparedness information related to health care professionals. Gaining insight into these barriers and strategies may contribute to an increase in participation and knowledge retention related to emergency preparedness.

Perceived threat of a disaster event should be further explored as a possible reason for not engaging in continuing education courses. Results of this study indicated that the majority of nurses reported no continuing education hours and those that reported having emergency preparedness continuing education hours, also reported a low level of emergency preparedness knowledge. In addition, results indicated that nurses who

reported working in the *Atlantic coastal region* had significantly lower scores across several of the EPIQ's domains. This is particularly concerning since of the three regions the *Atlantic coastal region* is the most susceptible to a disaster event. Exploring the topic of perceived threat may uncover valuable information that will contribute to the promotion of emergency preparedness continuing education.

According to the literature only three states have evaluated the readiness and explored the learning needs of their health care work force. Since nurses and other health care professionals are regulated at the state level and states bear the responsibility of coordinating health care professionals in the event of a disaster, states should be engaging in research to determine the readiness of their health care workforce and explore their learning needs for the purpose of strengthening their capacity to respond effectively to emergency events.

Further research will be needed to continue to define the roles nurses will play in response efforts. Unfortunately, it may take the occurrence of disaster events to gain an adequate understanding of the knowledge and skills that are needed in order to perform effectively during emergency events. Emergency preparedness is an ongoing process of assessing knowledge, planning, and organizing; continued research will only enhance this process.

6.7 Conclusion

Knowledge of emergency preparedness was at one time considered specialty training for military, public health, and emergency room nurses, but more recently, in light of destructive events that have taken place, emergency preparedness training has become a basic necessity for the generalist nurse (Patillo, 2003). Nurses in a wide variety

of practice settings may find themselves functioning as front line responders to a natural or man made disaster (Glik, 2007). There is a critical need for appropriate and effective continuing education and training programs that will provide health care professionals with basic knowledge of emergency preparedness (AACN, 2001; Agency for Health care Research and Quality [AHRQ], 2002; DeSilets, 2006; Garbutt et al., 2008; Gebbie & Qureshi, 2002; INCMCE, 2003; Wisniewski et al., 2004).

There is a growing but underdeveloped body of literature emphasizing efforts to improve the public health workforce's knowledge of emergency preparedness however, less understood and under represented in the literature is information related to nurses' knowledge of emergency preparedness (Garbutt et al., 2008). The purpose of this study was to assess South Carolina nurses learning needs by exploring their perceived knowledge of emergency preparedness. The goal for this study was to gain a better understanding of South Carolina nurses' emergency preparedness learning needs and prioritize training efforts based on these needs. In the absence of any prior studies assessing South Carolina nurses and emergency preparedness, the findings from this study provided insight into the current state of readiness and identified the learning needs of South Carolina nurses. Results from this study will be instrumental in designing and implementing effective emergency preparedness continuing education and training programs. In doing so, it may have a direct affect on the practice of nursing by establishing a knowledgeable and skilled workforce capable to respond and function effectively during an emergency event. In addition, the findings from this study may facilitate the development of legislative and institutional policies related to emergency

preparedness, provide direction for future research, and contribute to the existing body of literature.

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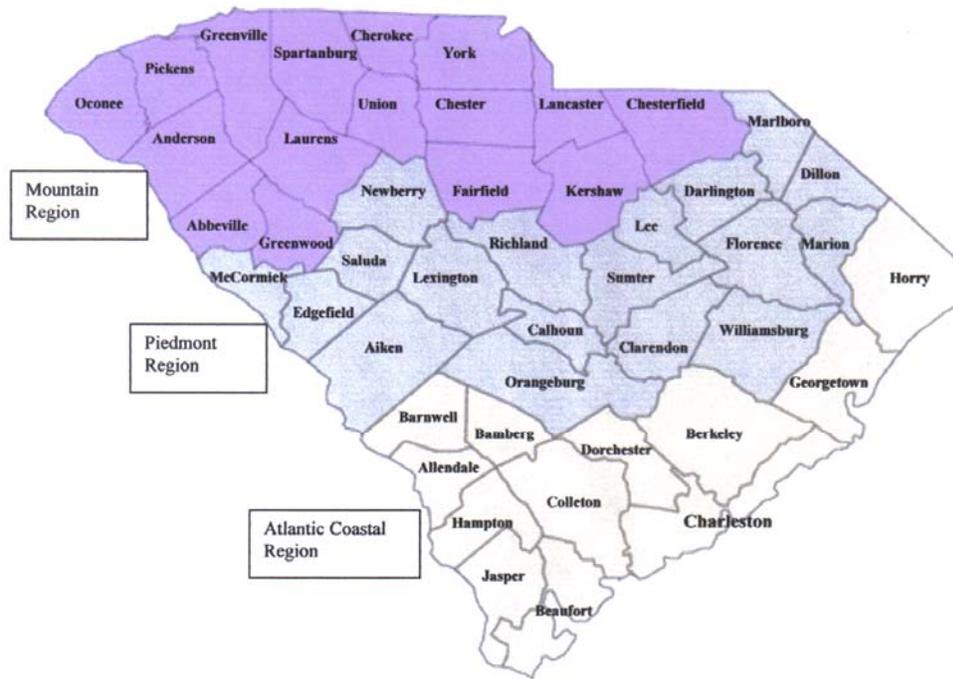
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APPENDIX 1
South Carolina Map



APPENDIX 2

Email Communication: Permission for Use of the Illustration of Slepki's Concept of
Emergency Preparedness

Personal communication from Dr. Lynn Slepki providing permission to use illustration:

Re: Permission to use illustrated version of EP
concept

Friday, April 03, 2009
1:01:32 PM

From: Lynn.Slepski@dhs.gov

To: aemckibbin@comcast.net

Hi Anne.....YEAH!!!!!! Keep going. You're on the home stretch!

Absolutely feel free to use it. Let me know if there is anything that I can do to help you get over the hump.

Lynn

CAPT Lynn A. Slepski, PhD, RN, CCNS
Emergency Management Coordinator
Office of the Under Secretary
National Protection and Programs Directorate
Department of Homeland Security
Washington, DC 20528

Email: Lynn.Slepski@dhs.gov

Desk: (202) 282-9697

Cell: (202) 528-7086

Fax: (202) 447-3888 NEW

Pager (800) 918-6179 or 8009186179@page.metrocall.com

APPENDIX 3

Revised Emergency Preparedness Information Questionnaire

PART I: Familiarity With Emergency Preparedness Terms and Activities

This section addresses how familiar you feel you are regarding specific terms and activities in different emergency preparedness categories. Please indicate your level of familiarity with each activity and term listed below.

The scale ranges from 5 = Very Familiar to 1 = Not Familiar.

Please note that you may not have received prior training and/or previous exposure to many of these activities. Because the goal of this survey is to assess information gaps and training needs, it is important that we identify any and all areas that need to be addressed.

This is not a test and no way reflects on you personally.....so don't worry if you are unfamiliar with certain areas.

163

	Very Familiar			Not Familiar	
	5	4	3	2	1
The Incident Command System (ICS) and Your Role Within It					
1. To which functional group in the Incident Command System would you be assigned during a large scale emergency event.					
2. The physical location where you would report to if a large-scale emergency event occurred.					
3. Your agency's preparedness level for responding to a large scale emergency event.					
4. The content of the Emergency Operations Plan (EOP) in your agency/organization.					
5. The strategic rationale used to develop the ICS response/action plan.					
6. Assess and respond to site safety issues for self, co-workers, and victims during a large -scale emergency event.					
7. Differences between decision-making processed in the <i>Incident Command System</i> for a large-scale emergency event and non-emergency situations					
8. Tasks that should NOT be delegated to volunteers in a large scale emergency event					
Triage					

9. How to perform a rapid <i>physical</i> assessment of a victim of a large-scale emergency event					
	5	4	3	2	1
10. How to perform a rapid <i>mental health</i> assessment of a victim of a large-scale emergency event					
11. How to assist with <i>triage</i> in a large-scale emergency event					
12. Basic first aid in a large-scale emergency event (including oxygen administration and ventilation)					
13. How to evaluate the effectiveness of your own actions in a large scale emergency event					
Communication and Connectivity					
14. The procedures used to document <i>provision of care</i> in a large-scale emergency event					
15. <i>Chain of Custody</i> during a large-scale emergency event					
16. Procedures for <i>communicating</i> critical patient information to those <i>transporting</i> patients					
17. Effectively present information about degree of risk to various audiences					
18. Identify the <i>different abilities</i> of key partners in your Emergency Operations Plan (EOP)					
19. Appropriate <i>debriefing activities</i> following a large-scale emergency event					
20. The process for gaining access to the Strategic National Stockpile (SNS)					
Psychological Issues and Special Populations					
21. How to evaluate a <i>teenager</i> to detect <i>post-traumatic mental health</i> problems					
22. Appropriate <i>psychological support</i> for all parties involved in a large-scale emergency event.					
23. The appropriate care of sensitive/vulnerable patient groups during a large-scale emergency (i.e., aged, pregnant women, and the disabled)					
24. Provide health counseling/education to patients regarding the long term impact of B-NICE (biological, nuclear, incendiary, chemical, and explosive)					
25. Signs of post traumatic stress in patients seen for routine health care following an event					
26. Procedures for providing care to children/youth during a large scale emergency event in cases where prior consent from parent/legal guardian is not possible					
Isolation, Decontamination and Quarantine					
27. Isolation procedures for persons exposed to biological or chemical agents					

28. Your facility's/community's <i>quarantine process</i>					
29. Selection of the appropriate <i>personal protective equipment</i> (PPE) when caring for patients exposed to a biological, chemical, or radiological agent					
30. The <i>decontamination procedures</i> stated in your facility's <i>Emergency Operations Plan</i>					
31. The impact on the environment from a large-scale emergency event					
	5	4	3	2	1
Epidemiology and Clinical Decision Making					
32. Match antidote and prophylactic medications to specific biological/chemical agents					
33. History and physical assessment surveillance data for creating a high index of suspicion that a patient has been exposed to a Category A, B, or C biological agent					
34. Ability to identify the exacerbation of an underlying disease due to exposure to a chemical or biological agent, or to radiation					
35. General issues related to the proper handling of the dead during a large scale emergency event (ethical, legal, cultural, and safety)					
Reporting and Accessing Critical Resources					
36. Diseases that are immediately reportable to the local and state health departments					
37. When to report an unusual set of symptoms to the local and state health department					
38. Determine the appropriate agency to which reportable diseases are to be directed					
39. During an event, where to quickly access up-to-date resources about specific biological, nuclear, incendiary, chemical, explosive agents					
Biological Agents					
40. Signs and symptoms of anthrax inhalation					
41. Modes of transmission for different types of biological agents					
42. Possible adverse reactions to smallpox vaccination					
43. Signs and symptoms due to exposure to different biological agents					
Overall Familiarity					
44. Please provide an assessment of your <u>OVERALL FAMILIARITY</u> with response activities/preparedness in the case of a large-scale emergency event					

PART II: Your Learning/Training Preferences

In this section we are interested in learning more about what formats and times would be *most useful* to you, if you were to be involved in receiving training on the emergency preparedness issues and activities listed in Part I of this survey..

Training Format

Listed below are nine possible methods for receiving Bioterrorism/Emergency Preparedness training. Please read the list and then rank order your THREE most preferred methods.

1. Face-to-face (i.e., traditional classroom/lectures/conferences/seminars/workshops)
2. Online Web-based Courses
3. Video Conferencing
4. Satellite Broadcasts
5. Self Instruction (i.e. self-study booklet with post test)
6. Newsletters, Pamphlets, Pocket reference cards
7. Video Tapes
8. Audio Tapes
9. CD/DVD for your computer

Please select your most preferred method (put above # here) _____

Please select your 2nd most preferred method (put above # here) _____

Please select your 3rd most preferred method (put above # here) _____

Course Length

In regards to the amount of time you would spend in training, would you:

Take a course for an academic quarter/semester? Yes No

Attend a 2-3 day workshop/conference? Yes No

Participate in a 2-hour lecture or web-based training? Yes No

Attend an evening workshop? Yes No

Attend a one-day weekend workshop? Yes No

Attend a one-day weekday workshop? Yes No

Your Access to Electronic Training Information

Do you have access to a computer at work? Yes No

Do you have access to a computer at home? Yes No

Do you have access to the Internet at work? Yes No

Do you have access to the Internet at home? Yes No

Do you have access to satellite downlinks at work? Yes No Uncertain

Have you participated in satellite downlinks for your training/educational purposes? Yes No

Have you used the Internet to access information on bioterrorism and/or emergency preparedness? Yes No

Does your employer allow work hours to be used for learning/educational opportunities related to your job? Yes No

PART III: Professional and Demographic Data

The last set of questions will help us identify the training needs for nurses. Please feel confident that no attempt will be made to determine your identity.

Please check the appropriate box(es)

Sex

Male _____

Female _____

Age

Less than 30 _____

31-40 _____

41-50 _____

51-60 _____

Greater than 60 _____

168

Primary Nursing Specialty/Area of Practice (please specify) _____

Years as a Registered Nurse (please specify) _____

Highest Degree

Diploma _____

Associate _____

Bachelor _____

Master _____

Doctoral _____

Provide the city or county where you work:

City _____

County _____

In what format would you prefer to complete a survey

Mail with paid returned postage _____

Phone _____ Other _____

Internet _____

APPENDIX 4

Institutional Review Board:

Pilot Study Approval Letter

DUQUESNE UNIVERSITY

INSTITUTIONAL REVIEW BOARD
424 RANGOS BUILDING © PITTSBURGH PA 15282-0202

Dr. Paul Richer
Chair, Institutional Review Board
Human Protections Administrator
Phone (412) 396-6326 Fax (412) 396-5176
e-mail: richer@duq.edu

October 23, 2008

Ms. Anne McKibbin
1433 Lettered Olive Lane
Mount Pleasant, SC 29464

**Re: Assessing South Carolina nurses' knowledge of emergency preparedness competencies
(Protocol # 08-114)**

Dear Ms. McKibbin:

Thank you for submitting your research proposal to the IRB. Based upon the recommendation of IRB member, Dr. Linda Goodfellow, along with my own review, I have determined that your research proposal is consistent with the requirements of the appropriate sections of the 45-Code of Federal Regulations-46, known as the federal Common Rule. The intended research poses no greater than minimal risk to human subjects. Consequently, the research is approved under 45CFR46.101 and 46.111 on an **expedited** basis under 45CFR46.110.

The consent form is attached with IRB approval and expiration date. You should use the stamped form as original for copies that you distribute.

The approval must be renewed in one year as part of the IRB's continuing review. You will need to submit a progress report to the IRB in response to a questionnaire that we will send. In addition, if you are still utilizing your consent form in one year, you will need to have it renewed. In correspondence please refer to the protocol number shown after the title above.

If, prior to the annual review, you propose any changes in your procedure or consent process, you must inform the IRB of those changes and wait for approval before implementing them. In addition, if any unanticipated problems or adverse effects on subjects are discovered before the annual review, they must be reported to the IRB Chair before proceeding with the study.

When the study is complete, please provide us with a summary, approximately one page. Often the completed study's Abstract suffices. You should retain a copy of your research records, other than those you have agreed to destroy for confidentiality, over a period of five

years after the study's completion. Thank you for contributing to Duquesne's research endeavors. If you have any questions, feel free to contact me at any time.

Sincerely yours,
Paul Richer, Ph.D.

C: Dr. Linda Goodfellow
Dr. Kathleen Sekula
IRB Records

APPENDIX 5

Personal Communication: Permission to Collect Pilot Study Data

Personal communication from Judith Thompson, Executive Director South Carolina

Nurses Association:

Subject: RE: Data Collection at Annual Meeting in Oct.

From: "Judith Thompson" <judith@scnurses.org>

Date: Tue, September 16, 2008 14:07

To: mckibbina@duq.edu

Priority: Normal

Options: [View Full Header](#) | [View Printable Version](#) | [Download this as a file](#)

To Whom it may concern:

The South Carolina Nurses Association gives permission to Anne McKibbin, graduate student, to offer the opportunity for participating in a survey during the SCNA Annual Meeting, October 25, 2008 . This meeting will take place at the SC Archives and History Building on Parklane Boulevard in Columbia, SC. It is a state building and is fully accessible to those with a variety of disabilities.

Judith Curfman Thompson, IOM
Executive Director
South Carolina Nurses Association

The South Carolina Nurses Association is the professional organization for all Registered Nurses in South Carolina

The South Carolina Nurses Association is a Constituent Member of the American Nurses Association and the Center For American Nurses

APPENDIX 6

Approved Institutional Review Board Cover Letter for Pilot Study



DUQUESNE UNIVERSITY

600 FORBES AVENUE ♦ PITTSBURGH, PA 15282

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Assessing Nurses' Knowledge of Emergency Preparedness Competencies
Using the Emergency Preparedness Information Questionnaire (EPIQ)

- INVESTIGATOR:** Anne E. McKibbin, RN, MSN
Doctoral Student Duquesne University School of Nursing
1433 Lettered Olive Lane
Mount Pleasant, 29464
(843) 388-7732
mckibbina@duq.edu
- ADVISOR:** L. Kathleen Sekula PhD, APRN-BC
Duquesne University School of Nursing
524 Fisher Hall
Pittsburgh, PA 15282
(412) 396-4865
sekula@duq.edu
- PURPOSE:** You are being asked to participate in a research project that seeks to investigate South Carolina nurses' knowledge of emergency preparedness competencies. The purpose of this study is to identify gaps in nurses' knowledge of emergency preparedness competencies, so that emergency preparedness education and training programs can be designed and implemented. Effective education and training programs will contribute to the ability of South Carolina nurses to function competently during a natural or man made disaster event.
- YOUR PARTICIPATION:** You will be asked to complete a brief demographic form and a 44-item Emergency Preparedness Information Questionnaire (EPIQ) survey that is estimated to take 15-25 minutes to complete. Please place all completed surveys in the collection box located at the study's booth.
Many of you will be unfamiliar with the issues and very specific terms you will come across in this survey. While not designed to implement fear or create a feeling of unpreparedness, this survey is important for obtaining data. Informed decisions will be made from the results, leading to increased education and training opportunities.
- RISKS AND BENEFITS** There are no risks greater than those encountered in everyday life. Your participation in the study may benefit the practice of nursing by enhancing our understanding of nurses' knowledge related to emergency preparedness and contribute to the development and

Duquesne University
Institutional Review Board
Protocol #08-114
Approval Date: October 23, 2008
Expiration Date: October 23, 2009

COMPENSATION: You will not be compensated for participating in this study. However, participation in the project will require no monetary cost to you.

CONFIDENTIALITY: Please do not put any identifying information, such as your name, on the questionnaire. Do not place your name or return address on the return envelope. All written materials will be stored in a locked file in the researcher's home. Your response(s) will only appear in statistical data summaries.

RIGHT TO WITHDRAW: You are under no obligation to participate in this study. You are free to withdraw your consent to participate at any time.

VOLUNTARY CONSENT: Taking this survey is voluntary and completing it indicates your consent to participate in the study. Should you have any further questions about your participation in this study, you may call Anne McKibbin at 843-388-7732 or my advisor, Dr. Kathleen Sekula at 412-396-4865, or Paul Richer, PhD, Chair of the Duquesne University Institutional Review Board 412-396-6326).

Duquesne University
Institutional Review Board
Protocol #08-114
Approval Date: October 23, 2008
Expiration Date: October 23, 2009

APPENDIX 7

Duquesne University IRB Study Approval

DUQUESNE UNIVERSITY

Office of Research

424 RANGOS BUILDING © PITTSBURGH, PA 15282-0202

Dr. Paul Richer
Chair, IRB-Human Subjects
Human Protections Administrator
Office of Research
Phone (412) 396-6326 Fax (412) 396-5176
e-mail: richer@duq.edu

November 7, 2009

Dr. Kathleen Sekula
School of Nursing
Duquesne University
Pittsburgh PA 15282

Re: Assessing the learning needs of South Carolina nurses by exploring their perceived knowledge of emergency preparedness (Protocol # 09-112)

Dear Dr. Sekula:

Thank you for submitting the research proposal of your doctoral student, Ms. Anne Mckibbin.

Based on review by IRB representative, Dr. Linda Goodfellow, and my own review, your study is approved as **Exempt** based on 45-Code of Federal Regulations-46.101.b.2 regarding research using anonymous surveys.

The consent form is attached and stamped with IRB approval and one year expiration date. Ms. McKibbin should use the stamped form as original for copies that she distributes or displays.

This approval applies strictly to the submitted protocol. If you and Ms. McKibbin intend to make any changes in procedure you must submit an amended protocol to the IRB Chair and receive approval before initiating them. In addition, if any unforeseen problems or adverse events occur, they should be reported immediately to the IRB Chair before proceeding. In correspondence, please refer to the protocol number shown after title above.

Once the study is complete, provide our office with a short summary (one page) of your results for our records. You or Ms. McKibbin should maintain research records for a period of five years after completion.

Thank you for contributing to Duquesne's research endeavors.

Sincerely yours,
Paul Richer, Ph.D.

C: Ms. Anne Mckibbin
Dr. Linda Goodfellow

APPENDIX 8

Original Emergency Preparedness Questionnaire

PART I: Familiarity With Emergency Preparedness Terms and Activities

This section addresses how familiar you feel you are regarding specific terms and activities in different emergency preparedness categories. Please indicate your level of familiarity with each activity and term listed below.

The scale ranges from 5 = Very Familiar to 1 = Not Familiar.

Please note that you may not have received prior training and/or previous exposure to many of these activities. Because the goal of this survey is to assess information gaps and training needs, it is important that we identify any and all areas that need to be addressed.

This is not a test and no way reflects on you personally.....so don't worry if you are unfamiliar with certain areas.

181

	Very Familiar			Not Familiar	
	5	4	3	2	1
Detection of and Response to an Event					
9. <i>Signs/symptoms</i> of exposure to different biological agents					
10. <i>Signs/symptoms</i> of anthrax inhalation					
11. <i>Modes of transmission</i> for different types of biological agents (i.e. anthrax, smallpox, etc.)					
12. Match antidote and prophylactic medications to specific biological/chemical agents					
13. Possible adverse reactions to smallpox vaccination					
14. <i>Basic first aid</i> in a large-scale emergency event (including oxygen administration and ventilation)					
15. How to <i>evaluate the effectiveness</i> of your own actions during a large-scale emergency event					
The Incident Command System (ICS) and Your Role Within It					
8. The content of the <i>Emergency Operations Plan (EOP)</i> in your agency/organization					
9. To which functional group in the <i>Incident Command System (ICS)</i> you would be assigned during a large-scale emergency event					
10. The <i>physical location</i> where you would report to if a large-scale emergency event occurred					
11. Assess and respond to <i>site safety issues</i> for self, co-workers, and victims during a large-					

scale emergency event					
12. The strategic rationale used to develop the ICS response/action plan					
13. Your agency's preparedness level for responding to a large-scale emergency event					
14. Differences between <i>decision-making processes</i> in the <i>Incident Command System</i> for a large-scale emergency event and non-emergency situations					
15. Tasks that <i>should NOT be delegated to volunteers</i> in a large-scale emergency event					
Ethical Issues in Triage					
16. How to perform a rapid <i>physical</i> assessment of a victim of a large-scale emergency event					
17. How to perform a rapid <i>mental health</i> assessment of a victim of a large-scale emergency event					
18. How to assist with <i>triage</i> in a large-scale emergency event					
19. General issues related to the proper handling of the dead during a large-scale emergency event (ethical, legal, cultural, and safety)					
Epidemiology and Surveillance					
20. History and physical assessment surveillance data for creating a high index of suspicion that a patient has been exposed to a Category A, B, or C biological agent					
21. <i>When to report</i> an unusual set of symptoms to an epidemiologist					
22. Diseases that are <i>immediately reportable</i> to state health departments					
23. Ability to identify the exacerbation of an underlying disease due to exposure to a chemical or biological agent, or to radiation					
Isolation/Quarantine					
24. Isolation procedures for persons exposed to biological or chemical agents					
25. Your facility's/community's <i>quarantine process</i>					
Decontamination					
26. Selection of the appropriate <i>personal protective equipment (PPE)</i> when caring for patients exposed to a biological, chemical, or radiological agent					
27. The <i>decontamination procedures</i> stated in your facility's <i>Emergency Operations Plan</i>					
28. The impact on the environment from a large-scale emergency event					
Communication/Connectivity					
29. The procedures used to document <i>provision of care</i> in a large-scale emergency event					

30. <i>Chain of Custody</i> during a large-scale emergency event					
31. Procedures for <i>communicating</i> critical patient information to those <i>transporting</i> patients					
32. Effectively present information about degree of risk to various audiences					
33. Identify the <i>different abilities</i> of key partners in your Emergency Operations Plan (EOP)					
34. Appropriate <i>debriefing activities</i> following a large-scale emergency event					
35. Use of ALL types of communication devices (phone, fax, email, satellite phones, PDAs, etc.)					
Psychological Issues					
36. Appropriate <i>psychological support</i> for all parties involved in a large-scale emergency event					
37. Provide health counseling/education to patients regarding the <i>long-term impact</i> of <i>B-NICE</i> agents (biological, nuclear, incendiary, chemical, and explosive)					
38. <i>Signs of post-traumatic stress</i> in patients seen for <i>routine health care following</i> an event					
39. How to evaluate a <i>teenager</i> to detect <i>post-traumatic mental health</i> problems					
Special Populations					
40. Procedures for providing care to children/youth during a large-scale emergency event in cases where <u>prior consent from parent/legal guardian</u> is not possible					
41. The appropriate care of sensitive/vulnerable patient groups during a large-scale emergency (i.e., aged, pregnant women, and the disabled)					
Accessing Critical Resources					
42. <i>During an event</i> , where to quickly access up-to-date resources about specific biological, nuclear, incendiary, chemical, explosive agents					
43. Determine the appropriate agency to which reportable diseases are to be directed					
44. The process for gaining access to the Strategic National Stockpile (SNS)					
OVERALL FAMILARITY					
45. Please provide an assessment of your OVERALL FAMILARITY with response activities/preparedness in the case of a large-scale emergency event					

PART II: Your Learning/Training Preferences

In this section we are interested in learning more about what formats and times would be *most useful* to you, if you were to be involved in receiving training on the emergency preparedness issues and activities listed in Part I of this survey..

Training Format

Listed below are nine possible methods for receiving Bioterrorism/Emergency Preparedness training. Please read the list and then rank order your **THREE** most preferred methods.

10. Face-to-face (i.e., traditional classroom/lectures/conferences/seminars/workshops)
11. Online Web-based Courses
12. Video Conferencing
13. Satellite Broadcasts
14. Self Instruction (i.e. self-study booklet with post test)
15. Newsletters, Pamphlets, Pocket reference cards
16. Video Tapes
17. Audio Tapes
18. CD/DVD for your computer

Please select your most preferred method (put above # here) _____

Please select your 2nd most preferred method (put above # here) _____

Please select your 3rd most preferred method (put above # here) _____

Course Length:

In regards to the amount of time you would spend in training, would you:

Take a course for an academic quarter/semester? Yes No

Attend a 2-3 day workshop/conference? Yes No

Participate in a 2-hour lecture or web-based training? Yes No

Attend an evening workshop? Yes No

Attend a one-day weekend workshop? Yes No

Attend a one-day weekday workshop? Yes No

Your Access to Electronic Training/Educational Information

Do you have access to a computer at work? Yes No

Do you have access to a computer at home? Yes No

Do you have access to the Internet at work? Yes No

Do you have access to the Internet at home? Yes No

Do you have access to satellite downlinks at work? Yes No Uncertain

Have you participated in satellite downlinks for your training/educational purposes? Yes No

Have you used the Internet to access information on bioterrorism and/or emergency preparedness? Yes No

Do you currently use the Health Alert Network (HAN)? Yes No

Does your employer allow work hours to be used for learning/educational opportunities related to your job? Yes No

PART III: Professional and Demographic Data

APPENDIX 9

Revised Emergency Preparedness Information Questionnaire

with

Formatting Revisions from Pilot Study

PART I: Familiarity With Emergency Preparedness Terms and Activities

This section addresses how familiar you feel you are regarding specific terms and activities in different emergency preparedness categories. Please indicate your level of familiarity with each activity and term listed below.

The scale ranges from 5 = Very Familiar to 1 = Not Familiar.

Please note that you may not have received prior training and/or previous exposure to many of these activities. Because the goal of this survey is to assess information gaps and training needs, it is important that we identify any and all areas that need to be addressed.

This is not a test and no way reflects on you personally.....so don't worry if you are unfamiliar with certain areas.

188

The Incident Command System (ICS) and Your Role Within It	Very Familiar 5	4	3	2	Not Familiar 1
1. To which functional group in the Incident Command System would you be assigned during a large scale emergency event.					
2. The physical location where you would report to if a large-scale emergency event occurred.					
3. Your agency's preparedness level for responding to a large scale emergency event.					
4. The content of the Emergency Operations Plan (EOP) in your agency/organization.					
5. The strategic rationale used to develop the ICS response/action plan.					
6. Assess and respond to site safety issues for self, co-workers, and victims during a large -scale emergency event.					
7. Differences between decision-making processed in the Incident Command System for a large-scale emergency event and non-emergency situations					
8. Tasks that should NOT be delegated to volunteers in a large scale emergency even.					

Triage					
9. How to perform a rapid physical assessment of a victim of a large-scale emergency event.					
10. How to perform a rapid mental health assessment of a victim of a large-scale emergency event.					
11. How to assist with triage in a large-scale emergency event.					
12. Basic first aid in a large-scale emergency event (including oxygen administration and ventilation)					
13. How to evaluate the effectiveness of your own actions in a large scale emergency event.					
Communication and Connectivity	Very Familiar 5	4	3	2	Not Familiar 1
14. The procedures used to document provision of care in a large-scale emergency event.					
15. Chain of Custody during a large-scale emergency event.					
16. Procedures for communicating critical patient information to those transporting patients.					
17. Effectively present information about degree of risk to various audiences.					
18. Identify the different abilities of key partners in your Emergency Operations Plan (EOP).					
19. Appropriate debriefing activities following a large-scale emergency event.					
20. The process for gaining access to the Strategic National Stockpile (SNS).					

Psychological Issues and Special Populations					
21. How to evaluate a teenager to detect post-traumatic mental health problems					
22. Appropriate psychological support for all parties involved in a large-scale emergency event.					
23. The appropriate care of sensitive/vulnerable patient groups during a large-scale emergency (i.e., aged, pregnant women, and the disabled)					
24. Provide health counseling/education to patients regarding the long term impact of B-NICE (biological, nuclear, incendiary, chemical, and explosive)					
25. Signs of post traumatic stress in patients seen for routine health care following an event					
26. Procedures for providing care to children/youth during a large scale emergency event in cases where prior consent from parent/legal guardian is not possible					
Isolation, Decontamination and Quarantine					
27. Isolation procedures for persons exposed to biological or chemical agents					
28. Your facility's/community's quarantine process					
29. Selection of the appropriate personal protective equipment (PPE) when caring for patients exposed to a biological, chemical, or radiological agent					
30. The decontamination procedures stated in your facility's Emergency Operations Plan					
31. The impact on the environment from a large-scale emergency event					

Epidemiology and Clinical Decision Making	Very Familiar 5	4	3	2	Not Familiar 1
32. Match antidote and prophylactic medications to specific biological/chemical agents					
33. History and physical assessment surveillance data for creating a high index of suspicion that a patient has been exposed to a Category A, B, or C biological agent					
34. Ability to identify the exacerbation of an underlying disease due to exposure to a chemical or biological agent, or to radiation					
35. General issues related to the proper handling of the dead during a large scale emergency event (ethical, legal, cultural, and safety)					
Reporting and Accessing Critical Resources					
36. Diseases that are immediately reportable to the local and state health departments					
37. When to report an unusual set of symptoms to the local and state health department					
38. Determine the appropriate agency to which reportable diseases are to be directed					
39. During an event, where to quickly access up-to-date resources about specific biological, nuclear, incendiary, chemical, explosive agents					
Biological Agents					
40. Signs and symptoms of anthrax inhalation					
41. Modes of transmission for different types of biological agents					
42. Possible adverse reactions to smallpox vaccination					
43. Signs and symptoms due to exposure to different biological agents					
Overall Familiarity					
44. Please provide an assessment of your OVERALL FAMILIARITY with response activities/preparedness in the case of a large-scale emergency event					

PART II: Your Learning/Training Preferences

In this section we are interested in learning more about what formats and times would be *most useful* to you, if you were to be involved in receiving training on the emergency preparedness issues and activities listed in Part I of this survey..

192

1. Training Format

Listed below are nine possible methods for receiving Bioterrorism/Emergency Preparedness training. Please rank order your THREE (1-3) most preferred methods.

- Face-to-face (i.e., traditional classroom/lectures/conferences/seminars/workshops)
- Online web-based courses
- Video conferencing
- Satellite broadcasts
- Self instruction (i.e. self-study booklet with post test)
- Newsletters, pamphlets, pocket reference cards

2. Course Length

Amount of time you would spend in training.

Would you:

- Yes
 No take a course for an academic quarter/semester?
- Yes
 No attend a 2-3 day workshop/conference?
- Yes
 No participate in a 2-hour lecture or web-based training?
- Yes
 No attend an evening workshop?
- Yes
 No attend a one-day weekend workshop?
- Yes
 No attend a one-day weekday workshop?

3. Access to Electronic Training Information

- Yes
 No Do you have access to a computer at work?
- Yes
 No Do you have access to a computer at home?
- Yes
 No Do you have access to the Internet at work?
- Yes
 No Do you have access to the Internet at home?
- Yes
 No
 Uncertain Do you have access to satellite downlinks at work?
- Yes
 No Have you participated in satellite downlinks for training/educational purposes?
- Yes
 No Have you used the Internet to access information on bioterrorism and/or

<input type="checkbox"/>	Video tapes
<input type="checkbox"/>	Audio tapes
<input type="checkbox"/>	CD/DVD for your computer

--

	emergency preparedness?
<input type="checkbox"/>	Does your employer allow work hours to be used for learning/educational opportunities related to your job?
Yes No	

PART III: Professional and Demographic Data

This last set of questions is related to demographic data. Please feel confident that no attempt will be made to determine your identity.

Sex

Male

Female

Highest Degree

Diploma

Associate

Bachelor

Master

Doctoral

Age

under 30

31-40

41-50

51-60

over 60

To date how many

Emergency Preparedness

CEU's do you have?

none

less than 10

more than 10

194

Primary Nursing specialty/area of practice
(please specify)

Years as an RN
(please specify)

If currently working in the healthcare field, provide the city OR county where you work:

If not currently working, indicate city OR county where you live:

APPENDIX 10

Email Communication: Permission for Use of the Emergency Preparedness Information
Questionnaire (EPIQ)

Personal communication from Dr. James Peltier providing permission to use the EPIQ:

From: "Peltier, Jimmy W" <peltierj@uww.edu>
Subject: RE: Request to use EPIQ tool
Date: Thu, April 2, 2009 10:41
To: "mckibbina@duq.edu" <mckibbina@duq.edu>

You have my permission.

-----Original Message-----

From: mckibbina@duq.edu [mailto:mckibbina@duq.edu]
Sent: Thursday, April 02, 2009 9:42 AM
To: Peltier, Jimmy W
Subject: Request to use EPIQ tool

Dr. Peltier

Please send me an email granting me permission to use the Emergency Preparedness Information Questionnaire (EPIQ) for my dissertation research. I have already received permission from Dr. Garbutt to use the "revised" EPIQ and she suggested I also request permission from you.

Thank you.

Anne McKibbin

APPENDIX 11

Email Communication: Permission for Use of the Revised Emergency Preparedness

Information Questionnaire (EPIQ)

Personal communication from Dr. Susan Garbutt providing permission to use the revised

EPIQ:

Revised EPIQ tool

Sunday, July 27, 2008 11:18:00 AM

From: ggarbut1@tampabay.rr.com

To: aemckibbin@charter.net

Cc: sgarbutt@galened.com

Sender: switch@trueswitch.com

Attachments: Garbutt Appendix D Revised EPIQ Tool January2007.doc (103.9KB)

Anne

Attached is the revised EPIQ tool that was developed for my DNP Thesis at Case Western
As stated in my previous email ,I give you permission to use the revised EPIQ in your dissertation
research

Please call my home (727 535 0637) or office (727 577 1497) should you have any questions
about the tool.

Also be sure I have up to date contact information for you so I can send you the article citation
when my results are published.

Dr. Garbutt

APPENDIX 12

Advance-Notice Post-Card

DUQUESNE UNIVERSITY

600 FORBES AVENUE ♦ PITTSBURGH, PA 15282

Date

Dear South Carolina Nursing Colleague:

My name is Anne McKibbin and as a doctoral student in nursing, I am asking for your participation in a research study titled, *Assessing South Carolina Nurses' Level of Knowledge Related to Emergency Preparedness Competencies*. Your name was randomly chosen from the South Carolina Board of Nursing database. Within the next few days, you will receive a request to complete a questionnaire.

Events such as 9/11, Hurricanes Katrina and Rita, and the SARS outbreak of 2003 challenge nurses to obtain basic knowledge related to emergency preparedness. This study is being conducted to learn more about how nurses like you answer questions related to your self-reported knowledge of emergency preparedness. In doing so, continuing education programs can be developed and tailored to meet the education needs of specific nurse populations.

I would greatly appreciate your taking time to complete and return your survey.

Thank you in advance for your contribution to this timely issue.

Sincerely,

Anne McKibbin, RN, MSN
Doctoral Candidate
Duquesne University School of Nursing
McKibbin: IRB Abstract 26

APPENDIX 13

IRB Approved Cover Letter

Duquesne University
Institutional Review Board
Protocol #09-112
Approval Date: November 7, 2009
Expiration Date: November 7, 2010

McKibbin: IRB Abstract 26

DUQUESNE UNIVERSITY

600 FORBES AVENUE ♦ PITTSBURGH, PA 15282

Dear South Carolina Nursing Colleague:

You are being asked to participate in a research project that seeks to assess the learning needs of South Carolina nurses by exploring their perceived knowledge of emergency preparedness. The purpose of this study is to identify gaps in nurses' perceived knowledge of emergency preparedness, so that emergency preparedness education and training programs can be designed and implemented. Effective education and training programs will contribute to the ability of South Carolina nurses to function competently during a natural or man made disaster.

By answering and returning the survey, you are giving consent to participate. Please be aware that participation is totally voluntary and there are no consequences for non-participation. There are no anticipated risks to participation. There is no compensation for participation; however, participation in the research study will require no monetary cost to you.

In order that the results represent South Carolina registered nurses, it is important that each survey be completed in its entirety and returned in the stamp-addressed envelope provided. It should take approximately 15-25 minutes of your time to complete the survey. Care has been taken to assure that the information you provide will be kept confidential and anonymous. In order to assure confidentiality and anonymity, please follow the instructions below.

1. Do not write your name or any identifying information anywhere on the survey.
2. Do not place a return address on the enclosed stamped envelope that you will use to return the completed survey.

If you should have any further questions or concerns about participating in this study, please call the primary investigator and my advisor, Dr. Kathleen Sekula at 412-396-4865, or Anne McKibbin, student co-investigator, at 843-388-7732, or Dr. Paul Richer, Chair of Duquesne University Institutional Review Board at 412-396-6326.

Thank you very much for your participation in this research study.

Sincerely,
Anne McKibbin, RN, MSN
Doctoral Candidate
Duquesne University School of Nursing

APPENDIX 14

Follow-up Postcard

DUQUESNE UNIVERSITY

600 FORBES AVENUE ♦ PITTSBURGH, PA 15282

Dear South Carolina Nursing Colleague:

Recently, you received a survey exploring nurses' perceived knowledge of emergency preparedness. Your name was randomly selected from the South Carolina Board of Nursing.

If you have already completed and returned the Emergency Preparedness Information Questionnaire, please accept my sincere thanks. If not, please do so today. I am very grateful for your help because I believe your response is critical for assessing nurses' perceived knowledge of emergency preparedness, which will effectively contribute to the development of education and training programs; significantly impact the practice of nursing and strengthen the capacity of South Carolina nurses to respond competently to disaster events.

Sincerely,

Anne Mckibbin, RN, MSN
Doctoral Candidate
Duquesne University School of Nursing