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Considering the Perspective of Emergency Management Professionals Regarding Radiological Response and School Resiliency

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CONSIDERING THE PERSPECTIVE OF EMERGENCY MANAGEMENT
PROFESSIONALS REGARDING RADIOLOGICAL RESPONSE AND SCHOOL
RESILIENCY

by

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Dedication

       This journey is dedicated to my family from whom I draw my strength, taught me the meaning of hard work, served as role models, forged my values, and whose unconditional love made this possible. To my brother, Ken, for keeping me grounded. Finally, to my mother, Geneva, who believes that I can do anything and without her love and support, I could have achieved nothing.

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Abstract

The purpose of the study is to consider the perspective of emergency management professionals regarding need for a radiological response plan and its implications to school resiliency. This study utilizes a three-round, Modified Delphi Method to provide structure for the group process, elicit experts' opinions, and build consensus regarding radiological response and school resiliency. The experts' opinions are analyzed at the conclusion of each round and synthesized to create considerations for school systems for a school-system-based radiological-specific response plan. The recommendations align existing school system's capabilities, roles and responsibilities with required emergency response actions necessary to protect the health and safety of faculty, staff, and students during a disaster such as the release of radioactive substances. Emergent themes surfacing during this study include: (1) training, (2) all-hazard planning, (3) communication, (4) collaboration, (5) medical response, and (6) protective actions. The results and recommendations from this study have generalizability for future practice and implementation of emergency management in a school setting, business and industry and for other local, state federal and tribal organizations. The major finding from this study indicates that an all-hazards plan is sufficient for response to a radiological-specific emergency event.

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Chapter One: Introduction

Disasters have been part of history since the beginning of time. Natural disasters such as earthquakes, floods, tornados, hurricanes and tsunamis have impacted millions of people and the environment in which they live. Today the world is also confronted by technological disasters. The emergency management community, as a whole, struggles with how to improve emergency response functions. As worldwide industrialization occurred so did the associated technical hazards as evidenced by the accidental release of radiological materials in Chernobyl in 1986—the world's worst nuclear disaster. The U.S. Department of Health and Human Services (2005) reported that this release killed 30 people immediately, forced the evacuation of 135,000 people and caused health and psychological problems for many others (p. 117).

Terrorist attacks are another issue that the emergency management community must confront. The bombing of the World Trade Center in 1990, the bombing of the Murray Building in Oklahoma City in 1995 by a domestic terrorist, and the infamous attacks on the World Trade Center in 2001, brought the world of terrorism to the shores of the United States. Bombings in Spain, England and the rest of the world are constant reminders that resiliency is important. Additionally, terrorists used a chemical release—sarin gas—in the Tokyo subway in 1995, killing 13 people, severely injuring 50 and causing temporary vision problems for nearly 1000 subway passengers.

The purpose of this Modified Delphi Method was to utilize the perspective of emergency management professionals regarding school resiliency and the four phases of emergency management—preparation, mitigation, response and recovery—to determine

what elements should be included in a school system-based radiological response framework. The data were analyzed, evaluated and assembled into emergent themes with considerations for evaluating, enhancing or developing an all-hazards plan for a school system that addressed atypical disasters, specifically events involving radiological materials.

These four phases of emergency management are based upon the National Incident Management System (NIMS) which is the standardized process used throughout the United States by the emergency management community. For purposes of this study the four phases of emergency management were defined in the context protecting the health and safety of faculty, staff and students and maintaining school resiliency. The definitions were as follows: (1) *preparedness* identified resources that could be used to respond to an incident; (2) *mitigation* focused on reducing the impact of an event on school resiliency: (3) *response* addressed actions taken to minimize damage; and (4) *recovery* restored the school to pre-incident operation.

> Although schools may or may not be the target of terrorist attacks, unexpected events can affect them. On September 11, 2001, two terrorist piloted airplanes deliberately crashed into the World Trade Center and killed scores of innocent people. Within the Trade Center's vicinity were four elementary schools and three high schools. Thousands of students experienced the dust cloud from the collapsing building. Many students became frightened witnesses, and others became anxious. At the outset of human disaster, their school had a lot of decisions to make. This illustration of an immediate and unanticipated decision making process is why each school, school district, and community needs to be ready and have a School/Community Crisis Plan in place (Tramonte, 2007, p. 4).

What is an all-hazards plan and why is it important to have one in place? An all-hazards plan is a description of provisions for response to an emergency situation or event. It contains a brief, clear, and concise description of the overall emergency organization, designation of responsibilities and procedures including notifications involved with response to any or all aspects of a potential credible emergency that may impact the conduct and continuity of operations (COOP). All-hazards plans are designed to improve organizational resiliency after a manmade disaster to move the organization more quickly toward response and recovery and return to normalcy (Kahan, Allen, & George, 2009). From a federal government perspective all-hazards planning require officials to prepare response-specific recommendations to maximize resources; to maintain critical governmental operations during catastrophic events such as earthquakes, hurricanes, and terrorist attacks; and to protect the health and safety of employees, residents of their states or reservations, and the environment. An all-hazards plan is a set of essential elements that federal state, local and tribal authorities as well as private business and industry leaders use a guide in the four phases of emergency management—preparation, mitigation, response and recovery— for a manmade disaster. Included among those entities needing an all-hazards plan are school systems.

Many school systems developed all-hazards plans and participated in some aspect of COOP either locally or at a state level. For the most part school all-hazards plans focused on fire and tornado drills, weather-related emergencies, intruder and active shooter drills and bus transportation events. In the western part of the United States earthquake drills were a standard component of an emergency preparedness program. However all-hazards plans were necessary for responding to an atypical event such as a terrorist attack; weapons of mass destruction detonation; or a chemical, biological or radiological event. Developing an

all-hazards plan required planners to analyze the resilience of the organizational system—in this case, a school system. Resilience, as defined by the Department of Homeland Security (DHS) "is the ability of systems, infrastructure, government, business, and citizenry to resist, absorb and recover from or adapt to an adverse occurrence that may cause harm, destruction, or loss of national significance"(Kahan, George, & Allen, 2009, p. 5). A loss of national significance can be described as the release of radioactive substances that have the potential to impact school systems. Resilience encompassed a wide array of interrelated systems known as *hard* and *soft* resilience. Hard resilience addressed "institutions and infrastructures and [referred] to their structural; technical; mechanical; and cyber systems' qualities, capabilities, capacities, and functions. Soft resilience, in contrast, [referred] to the aspects of resilience related to family, community, and society focusing on human needs, behavior, psychology, relationships and endeavors" (Kahan, George, & Allen, 2009, p. 6). Hard and soft resilience were integral components of all-hazards planning and were designed to protect the health and safety of the students, staff and faculty. Based on the definitions of hard and soft resilience school all-hazards plans tended to concentrate on soft resilience issues such as student, staff, faculty, parents, and the community. Although hard and soft resilience were typically addressed separately, one cannot exist without the other. School systems must recognize the relationship between hard and soft resilience and plan accordingly. During natural disasters institutions and communities "grow together in understanding the nature of catastrophic events and recognizing their roles and responsibilities in managing consequences of severe adversity" (Kahan et al., 2009, p. 6). Working together these systems grew and learned about the importance of their interrelationships and interdependence. From the public and private sectors the systems learned that "the ability of

critical systems and key functions to fully recover from a catastrophe [depended] on the actions of staff, contractors, volunteers and ordinary individuals" (Kahan et al., 2009, p. 6). All of these elements contributed to the development of an all-hazards plan. School system all-hazards plans should address hard and soft resilience by determining "critical systems and their functions . . ." (Kahan et al., 2009, p. 6) that were central to their operation, especially during an emergency event that involved the manmade release of radioactive substances. Incorporating both hard and soft resilience components allowed schools to pre-identify "key functions of critical systems, both human and technical" (Kahan et al., 2009, p. 6) into planning efforts. All-hazards plans focused on the four phases of emergency management— preparation, mitigation, response, and recovery—toward critical areas that contributed to the return to *normalcy*.

Planning becomes an overwhelming and time-consuming task for administrators of school systems who were inexperienced in developing all-hazards plans. A school system's all-hazards plan addressed actions the school would take during an emergency event with specific attention focused on identifying and developing solutions to maintain operations while protecting staff and students. All-hazards plans complied with best industry practices while assuring the safety of staff and students. Additionally, the all-hazards plan was the authorized plan the school systems followed during emergency events. The plan defined emergency management procedures and individual roles and responsibilities.

Over time crises such as the threat of domestic and international terrorism have become issues that all schools can and should prepare to address. Changing terrorization throughout the world necessitated the development of all-hazards plans to address atypical threats such as the detonation of radiological dispersion devices (RDD) by terrorists groups

in the United States and other manmade disasters. Since the threat of terrorism continues consideration must be given to assessing and developing all-hazards plans that describe, in detail, roles, responsibilities and critical functions necessary for protecting students and staff during a manmade disaster. Whether their focus was international, national, state, or local the world's issues have arrived at the local level and must be addressed.

> Local and international events have put school principals in the position of needing to continually emphasize and reassure students, staff members, and communities that school still provides an environment of normalcy and routine in everyday lives of students and staff members (Brunner & Lewis, 2004, p. 1).

As the world's cultures continued to evolve, so did the need for school all-hazards plans to evolve. Although some of these topics for all-hazards plans were relatively new, with the advent of increasing terrorist activities around the world, preparing for atypical terrorism-sponsored events—biological, chemical, or radiological—has become more commonplace. Marcus, Dorn and Henderson (2005) noted the following,

> A key al-Qaeda operative seized in Pakistan recently offered an alarming account of the group's potential plans to target the U.S. with weapons of mass destruction, senior U.S. security officials tell *Times (of India)*. Sharif al-Masri, an Egyptian who was captured in late August (2004) near Pakistan's border with Iran and Afghanistan, has told his interrogators of 'al-Qaeda's interest in moving nuclear materials from Europe to either the U.S. or Mexico,' according to a report circulating among U.S. government officials. Masri also said al-Qaeda has considered plans to 'smuggle nuclear materials to Mexico, then operatives would carry material into the U.S.,' according to the report, parts of which were read to *Times (of India)*.

[T]he most likely means of attack would come in the form of a 'suitcase [size] tactical nuclear bomb.' Such bombs are estimated to have an explosive strength of approximately '10 kilotons' and could weigh less than 35 pounds… A bomb of that strength could easily level Manhattan and spread lethal radiation throughout the New York City metro area. Several of the 'suitcase nukes' are already inside the U.S. Some could have been smuggled in overland from Canada or Mexico, or shipped from overseas via container ships (p. 61).

Why are government agencies concerned about the detonation of an RDD in the United States? In *Radiological Dispersal Device Incident Response Planning: Overview,* the International Atomic Energy Agency (IAEA) found that more

. . . than 100 countries have inadequate control and monitoring to prevent the threat or misplacement of radiation sources" (DHS, ND, p. 2). IAEA reports ". . . that every year hundreds of radioactive sources are abandoned, lost, misplaced, stolen, or removed without authorization throughout the world" (DHS, ND, p. 2).

Since the end of the Cold War and the breakup of the Soviet Union, hundreds of radioactive sources have disappeared or were improperly protected in newly independent states. Since 9/11 terrorists showed an interest in RDDs and have attempted to procure materials to manufacture dirty bombs. A partial timeline of dirty bomb-related incidents is illustrated in Figure 1.

1995 Chechen separatists plant a dirty bomb in a Moscow park.

2001 dirty bomb design discovered in home of al- Qaeda official.

2002 U. S. interrogators informed that al-Qaeda was planning a dirty bomb attack in the United States.

2002 al-Qaeda operative arrested for allegedly preparing a dirty bomb attack in the United States.

2003 documents seized indicating al-Qaeda successfully built a dirty bomb.

Figure 1. Partial timeline of reported dirty bomb-related incidents.

Atypical disasters presented a credible scenario with the potential to severely impact the United States. In the example given—New York City—there were 1.7 million students in 1,700 schools served by the New York City Department of Education (2011). Are the New York City Department of Education and other government agencies and school systems across the country prepared to respond to a threat of an RDD? The release of radiological materials was complex and required every leader, especially school leaders, to understand the potential vulnerability to these types of events. Because of the vulnerability of school systems, it was important for leadership to be prepared during each of the four phases of emergency management: preparation, mitigation, response, and recovery. Now was the time to develop leaders to direct and respond to atypical events. "On matters of leadership decision making and agency interaction, precise plans and refined models have yet to be uniformly established, tested and deeply-ingrained" (Marcus et al., 2005, p. 43). Leadership, in this study, was viewed as a crucial function and further discussed in the literature review.

The emergence of nontraditional threats such as the manmade release of radioactive substances, either from an RDD, a release from a nuclear reactor, transportation event or a facility storing, manufacturing or processing radioactive substances, compelled school

systems to plan for and develop capability and capacity to respond to these threats. *Schools and Terrorism: A Supplement to the Report of the National Advisory Committee on Children and Terrorism* (2004) stated,

> Little information is available to help school officials understand what remediation actions are needed to ensure the safety of school property after a terrorist event, especially an event involving biological, chemical, or radiological agents. Nor is there guidance for schools about when it is safe to reopen damaged school buildings, or those impacted by biological, chemical, or radiological agents.

School systems continued to experience an identity crisis concerning the development of an all-hazards approach to emergency preparedness. Medical officials were especially concerned about the impact of radiation exposure on children. The American Academy of Pediatrics policy statement in (2003) called for plans that "create algorithms for evacuation of children and their rapid reunification with parents," (p. 1462) as well as a plan with medical directives. The Academy advised schools to stockpile potassium iodide (KI) tablets to protect the thyroid from exposure to radioactive materials. This required schools systems to have supplies of the medication on hand and trained personnel to dispense it.

Since the events of 9/11, emergency management officials at all levels strongly urged business and industry, government entities and schools to expand the scope of emergency preparedness to include the potential for biological, chemical and radiological events. More attention was given to collaboration and communication, now known as National Incident Management System (NIMS), especially where a multijurisdictional response was required.

Whose responsibility was it to develop emergency plans; the school boards; the superintendents; teachers; community response organizations such as law enforcement, fire,

emergency management; and public health? The ultimate answer was all of the above. All-hazards plans should be coordinated with local, state and federal entities to ensure that seamless integration and activation occurred during an emergency event. Daily principals and superintendents addressed a multitude of emergency events within the school system that forced them to activate and implement the system's emergency plan; such as the case in New York City on September 11, 2001. Patrick Burke, the principal of New York's High School of Economics and Finance, located one block away from the World Trade Center, indicated that he was grateful for the shelter drills held four times a year.

> The drills were always seen as a carryover from the Cold War. Suddenly, on September 11, there was a need for it. They really paid off; there was no panic. Students knew what to do, and that reduced the sense of fear (Bowman & Johnston, 2001, para. 9).

> For the typical school emergencies, school systems and personnel were adequately prepared to contribute to response and recovery in support of the local emergency management agency efforts. However, in less traditional response and recovery efforts, such as a release of radioactive substances, a bias is that school systems were less prepared to provide effective response due to the uniqueness of atypical events. Mitroff and Anagnos (2001) suggested that organizations and their leaders were far too narrow in their definitions of emergencies to formulate an effective response. They also suggested that organizations prepared for crises more effectively if they assessed the risk in each of the following seven categories: (1) economic, (2) information, (3) physical, (4) human resources, (5) reputational, (6) psychopathic acts, and (7) natural disasters. Since 9/11 emergency preparedness took on heightened importance for schools. Because emergency preparedness was critical for school

systems, and since school systems lacked expertise in this area, the U.S. Department of Education developed and released a model crisis management planning resource to assist schools with development and implementation (Brickman, Jones, & Groom, 2004).

Statement of the Problem

The majority of all-hazards school plans were specifically focused on scenarios involving events such as natural disasters, active shooters or intruders and intervention programs. As a result this left school systems vulnerable to atypical events like manmade disasters—specifically the release of radiological substances. The literature review confirmed that the release of radioactive substances and its impact was an issue that school systems were unprepared to address. Planning for an all-hazards emergency response approach required cooperation and collaboration with a variety of community professionals and assets to develop practical guidelines reduce the impact hazards have on school systems.

Research Question

The goal of this study was to answer the following question:

RQ1: Considering the perspective of emergency management professionals regarding school resiliency and the four phases of emergency management—preparation, mitigation, response and recovery—what elements should be included in a school system-based radiological response framework?

Evidence suggested school resilience to atypical event such as a release of radiological, chemical or biological substances was limited. In other words, schools were vulnerable to potential terrorist attacks. Findings from the National Association of School Resource Officers (SROs) (2005) (Figure 2) showed 92.6% of SROs felt schools were "soft targets" (p. 12) to terrorist attacks. This limited resilience suggested that the capability and

capacity of schools to maintain operational readiness and to protect their students and staff was inadequate. To accomplish resilience schools must know the essential elements in an all-hazards plan. These essential elements were identified by a panel of subject experts, analyzed and categorized according to relevance and importance to a school system and then assembled into a framework to be utilized by school systems to enhance, evaluate or develop an all-hazards plan, specifically for a radiological response.
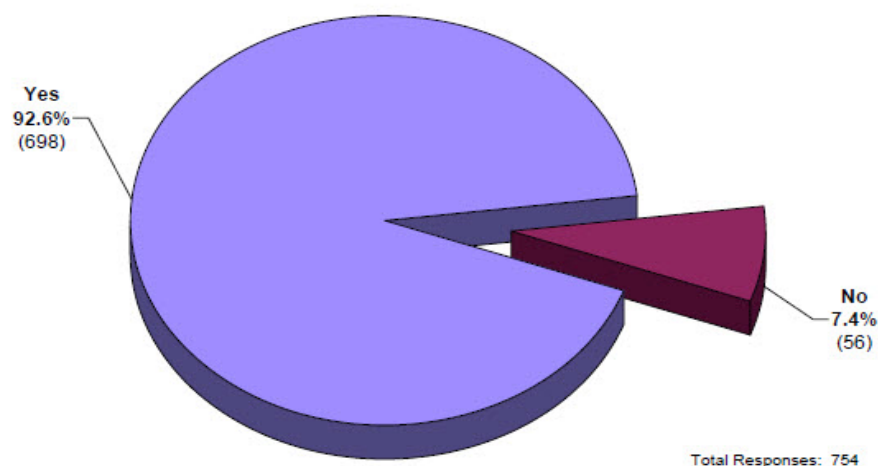
Figure 2. SRO's perceptions of school as potential terrorist targets, adapted from NASRO (2005) survey, p.12.

Significance of the Study

The significance of this study was to compile an agreed-upon list of elements using a Modified Delphi Method that comprised an all-hazards emergency plan, added to the body of knowledge regarding school preparedness and provided a useful tool for schools and communities. This may be the earliest attempt to quantify data related to a school system-based radiological response framework.

Purpose of the Study

The purpose of this study was to collect, from literature and a panel of subject matter experts, an agreed-upon list of essential elements that could be included as components for a school system-based radiological response framework to enhance school resiliency in the event of a manmade disaster. The study added to the body of knowledge and became a useful tool for schools that might be impacted by a manmade disaster. The purpose of this study was to provide school administrators with considerations for enhancing an all-hazards plan for atypical emergency response events, specifically the release of radioactive materials. The results of this study were *generalizable* to business and industry, local, state or tribal authorities, who may need to develop all-hazards plans to enhance organizational resiliency.

Definition of Acronyms

AAR   After Action Reports

AHRQ   Agency for Healthcare Research and Quality

CDC   Centers for Disease Control and Prevention

DOE   Department of Energy

DHS   Department of Homeland Security

GAO   Government Accounting Office

HSPD   Homeland Security Presidential Directive

MOA/MOU   Mutual Aid Agreement/Memorandum of Understanding

NASRO   National Association of School Resource Officers

NIMS   National Incident Management System

NRC   Nuclear Regulatory Commission

NRF   National Response Framework

SRO   School Resource Officers

Definition of Terms

Contamination was the act of contaminating or polluting; including (either intentionally or accidentally) unwanted substances or factors (WordNet, n.d.).

Continuity of Operations Plan (COOP) referred to the preparations and institutions maintained by the United States government, providing survival of federal government operations in the case of catastrophic events (GAO, 2007, p. 5)

Crisis management included the planning, preventive, and response activities for addressing the causes of a terrorist incident; these activities include proactive measures for: prevention; crisis mitigation, operational response; and, criminal prosecution (Emergency Management Issues Special Interest Group, 1990).

Emergency Management Agency (EMA) is an organization that acts as an agent of the local authority (council) to carry out the council's statutory powers and obligations under Section 11 of the Emergency Management Act (Basic Emergency Management Course, 2009).

Emergency plan was a document within emergency management programs that describe the provisions for response to an emergency. It contained a brief, clear, and concise description of the overall emergency organization, designation of responsibilities, and procedures, including notifications, involved in coping with any or all aspects of a potential credible operational emergency (Emergency Management Issues Special Interest Group, 1990).

Emergency planning was the identification of hazards and threats, hazard mitigation, development and preparation of emergency plans and procedures, and identification of personnel and resources needed for an effective response. (Emergency Management Issues Special Interest Group, 1990).

Emergency response was the application of resources to mitigate consequences to workers, the public, the environment, and the national security, and the initiation of recovery from an emergency (Emergency Management Issues Special Interest Group, 1990).

ERCM (Emergency Response and Crisis Management) was established in October 2004 by the U.S. Department of Education's Office of State and Drug-Free Schools to support schools and school districts in the development and implementation of comprehensive emergency and crisis response plans (Center for Safe Schools, 2006).

Evacuation is a protective action that calls for the controlled relocation of personnel from a hazardous or potentially hazardous area (Emergency Management Issues Special Interest Group, 1990).

Event is any real-time occurrence or significant deviation from planned or expected behavior that could endanger or adversely affect people, property, or the environment (Emergency Management Issues Special Interest Group, 1990).

Expert is someone widely recognized as a reliable source of or skill whose faculty for judging or deciding rightly, justly, or wisely is accorded authority and status by their peers or the public in a specific well-distinguished domain (Webster's Revised Unabridged Dictionary, 1913).

FEMA (Federal Emergency Management Agency) is an independent agency of the federal government with a mission to reduce life and property and protect our Nation's

infrastructure through an emergency management program of mitigation, preparedness, response (Emergency Management Issues Special Interest Group, 1990).

First responder is the first trained personnel to arrive on the scene of a hazardous materials incident usually officials from local emergency services, such as firefighters and Police (Emergency Management Issues Special Interest Group, 1990).

Incident is any deviation from normal operations or activities that have the potential to result in an emergency (Emergency Management Issues Special Interest Group, 1990).

Incident Command System (ICS) is the emergency response organization at the event scene designed to deal with command, control and coordination issues in advance (Emergency Management Issues Special Interest Group, 1990).

Lessons learned is a "good work practice" or innovative approach that is identified and shared, or an adverse work practice or experience that is shared to avoid recurrence (Emergency Management Issues Special Interest Group, 1990).

Potassium iodide (KI) is a white crystalline compound used as a source of iodine to treat thyrotoxic crisis and to prevent thyroid cancer in the event of overexposure to nuclear radiation (Your Medical Dictionary, 2011).

Loco parentis is a person who, though not the natural parent, has acted as a parent to a child and may thus be liable to legal obligations as if he/she were a natural parent (Legal Dictionary, n.d.).

Protective Actions are physical measures, such as evacuation or sheltering, taken to prevent potential health hazards resulting from a release of hazardous materials to the environment (Emergency Management Issues Special Interest Group, 1990).

RDD (Radiological Dispersion Device), also known as a *dirty bomb*, is designed to scatter dangerous and sub lethal amounts of radioactive materials over a general area (Federal Emergency Management Agency, n.d.).

Recovery is action taken after a facility has been brought to a stable or shutdown condition to return the facility to normal operation (Emergency Management Issues Special Interest Group, 1990).

Release is any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or otherwise disposing of substances into the environment (Emergency Management Issues Special Interest Group, 1990).

Resilience is the positive ability of a system or company to adapt itself to the consequences of a catastrophic failure caused by power outage, a fire, a bomb or similar event (Continuity Central, 2011).

Responses are activities to address the immediate and short-term effects of an emergency or disaster. Response includes immediate actions to save lives, protect property, and meet basic human needs (Emergency Management Issues Special Interest Group, 1990).

Risk is the probability of an undesired result such as theft, loss, damage, or injury will occur (Emergency Management Issues Special Interest Group, 1990).

Shelter-In-Place is a protective action that calls for personnel to move into or remain indoors; close doors and windows; turn off air conditioners, heaters, and air handling units that draw in outside air (Emergency Management Issues Special Interest Group, 1990).

WMD (Weapons of Mass Destruction) is any explosive, incendiary, or poison gas, bomb, grenade, rocket, and/or any weapon that is designed to release radiation or

radioactivity at a level dangerous to human life (Emergency Management Issues Special Interest Group, 1990).

Summary of Chapter One

This study determines if there was a need for school systems to prepare a response plan to address manmade disasters. A literature review indicated a need to address this topic, supported the necessity for this study and validated the methodology. Chapter 2 addressed the issue in six subject matter-related categories: (1) school preparedness and response; (2) leadership and organizational management; (3) U.S. government and emergency response; (4) industry crisis planning and response; (5) preparedness and emergency management; and (6) reviewed methodology-specific literature and its validity of a Modified Delphi Method.

Leaders must understand and possess the capabilities to effectively address ever-changing priorities and issues during a disaster. Leaders need the capability to prepare for, respond to, and recover from both physical and psychological trauma associated with an emergency event. Leadership played a role in guiding preparedness, response and recovery. Effective leaders needed to be well-versed in decision making as it relates to protecting staff, faculty and students. Specifically, leaders needed to address decision making, conflict management and resolution, special needs populations, in addition to other issues resulting from an emergency event. Leadership and resilience were crucial for all four phases of emergency management—preparedness, mitigation, response and recovery.

Chapter Two: Literature Review

The literature review laid the groundwork to answer the research question; informed the researcher about what is known about the topic, how the research was conducted, what was missing from the research, who conducted the research; and presented the latest research findings. Booth and Beile (2005) argued that both the education community and student researchers should place more emphasis on the literature review process. They contended that true purpose of the literature review was to build on scholarship and research of those who came before and rebuild a firm research foundation. Furthermore, they argued that the literature review process accomplished several objectives (1) the literature review provided an opportunity to learn and strengthen one's knowledge base about a particular field of study during the pre-dissertation process, and thereby helped the researcher define and justify the scope of the research; (2) it placed the literature in the proper context—be it scholarly or historical; (3) it reported and examined research methods to determine if claims were substantiated; (4) it allowed the researcher to determine what is known and what was needed; and (5) it allowed the reviewer to internalize and examine the research with a different and/or new perspective.

Creswell's 1994 research defined a literature review with three criteria, it (1) presented results of similar studies, (2) related the current study to ongoing literature dialogue, and (3) provided a comparison of the study to other studies conducted in a similar area. Three key messages were gleaned: first, more attention must be devoted to the literature review from the perspective of students, faculty advisors, and dissertation chairs as well as librarians, by teaming these entities during the pre-dissertation phase. Second, was to

understand and develop a working knowledge of the historical studies, literature and methodology. Third, to develop higher quality dissertations with consistent standards for literature review, as presented with Hart's rubric.

School systems confronted a myriad of issues on a daily basis. In addition to educating children, school systems dealt with issues previously addressed by parents, the community, or religious organizations. These issues extended the original mission of schools—to educate—far beyond the scope of what and how school systems and their staff were trained to perform. Not only did school systems need to prepare for natural disasters, they addressed issues such as noncustodial parents; molestations; pandemic illnesses; school violence and gangs, including school shooters; and the threat of domestic and international terrorism. The globalization of world politics was at the front door of educational institutions rather than in a faraway land. It was critical for school systems to become more resilient and develop the capacity and capability to respond to an event that interrupted the continuity of operations. School resiliency took on a heightened meaning. The daunting tasks of emergency preparedness for school systems were unparalleled. In larger urban and metropolitan areas, schools needed to prepare to cope with and address chemical, biological, and nuclear threats and the potential physical and psychological impacts these had on school systems.

Over the past ten years schools progressed from fire drills through active shooter drills to actual evacuation because of terrorist attacks. Slayings at Columbine and Paducah High Schools, and at Northern Illinois and Virginia Technological universities, prompted educational institutions to review and revise their school and safety plans. Intentional destruction by domestic terrorism in Oklahoma City killed preschool children. International

terrorism exhibited at the World Trade Center, the Pentagon and in the countryside of Pennsylvania, exposed the need for American institutions to prevent, prepare, respond and recover from unique, atypical emergency events. The challenge for school systems was to address more complex crises such as a response to a manmade release of radioactive substances. To better understand how school systems prepared to respond to a radiological emergency literature that described the radiological response from the school system perspective was reviewed.

An extensive data collection process was conducted using a combination of the following keywords: *emergency management, emergency preparedness, crisis response, crisis planning, crisis management, Delphi Method, schools, planning and leadership*. Database searches generated a large number of documents, articles, and publications. Each publication was reviewed and prioritized based on relevance to the research question. As the literature review process unfolded, seven categories emerged (1) school preparedness and response, (2) leadership and organizational management, (3) U.S. government and emergency response, (4) industry crisis planning and response, (5) leadership in emergency management, (6) preparedness and emergency management, and (7) the Delphi Method. These seven categories served as the organizational foundation for Chapter 2. The review was derived from searching ERIC, ProQuest, Google Scholar, Worldcat databases and educational trade publications. Materials included peer-reviewed articles from *Journal of Homeland Security and Emergency Management*, *American Academy of Pediatrics, Chinese Medical Journal, The Electronic Journal of Business Research Methodology, Journal of Information Technology Education, The Australian Journal Emergency Management*, U.S. government publications and the *RAND Corporation* publications.

School Preparedness and Response

Are We Prepared (2008) provided a comprehensive view of school emergency preparedness focused on health-related response. Several salient points were made that are applicable across the emergency management process. Community schools were considered integral components of their area and therefore should be included and participate in the emergency planning process. Existing school plans addressed only the traditional scenarios and response to natural disasters, school violence, and noncustodial parents, but should also address how the school fits in with the larger public health and emergency management response to a community-wide event. For example, schools might be required to engage in some unique task to respond to a terrorism event, such as administering potassium iodide [KI] in the event of radiation exposure. School systems needed to be involved in collaborative, community-wide planning efforts with partners who would be proponents of preparedness, response, mitigation, and recovery processes ("Taking the lead in an emergency," 2007). Seeger's *Crisis and Organizational Communication* (2004) research indicated that organizations needed to develop a plan of action rather than live in denial of an "it-won't-happen-here" mentality.

An emergency event greatly impacted the resilience of school systems and the populations they served. Schools were unique because of the range of services and populations they served. Green (2007) provided the following statistics to show the uniqueness of schools and ways that they may be involved or impacted during an emergency event. Fifty-three million students attended more than 119,000 public or private schools, where more than six million teachers or staff are employed. At any point in time more than one-fifth of the U.S. population was located in schools (Green, 2007). During business hours

the school served as *loco parentis* for children requiring supervision and temporary guardianship. Schools were placed where trained individuals cared for, educated, and supervised children (Green, 2007). Schools often served as shelters, distribution centers, triage sites and command centers. Clearly, gaps existed between schools and their involvement in emergency preparedness. Were schools prepared to shelter the student population onsite? Were adequate supplies such as food, water, and medication available? Were schools and their staff prepared to be self-sustaining for 72 to 96 hours? As community assets, schools must be included in coordinating preparedness, response, mitigation and response efforts with local authorities.

During a crisis it was important to understand that the crisis impacted parents as well as students. When a crisis occurred parents saw the situation through a different set of eyes. Understanding parental expectations during times of crisis was important. Schools should educate both students and families about support and response efforts. Effective communication with families during a crisis situation was critical to successful crisis management (Merriman, 2008). The author pointed out that administrators' thought processes were more broadly focused on campus crisis; whereas, parents' thought more specifically about the health and safety of their child. Furthermore the school's preparedness and response was under the microscope not only from the parents but also from the public. With communication networks such as cell phones, Internet, texting, Twitter, and FaceBook, news spread instantaneously. Merriman (2008) suggested that the university provide parents with copies of the communication plans, notification policies, and access information. The author opined that proactive inclusion of parents reflected a campus culture of care and created effective lifelong partnerships.

The Columbine Review Commission After-Action Report (AAR) (2001) concluded it was important for school administrators to include local emergency response agencies in the development of emergency plans. The AAR also indicated that a lack of preparation on the part of school administrators delayed efforts to secure the school and to evacuate trapped victims, as well as, provide vital information to responders during this critical incident. Furthermore, this commission recommended that regularly scheduled emergency management planning sessions be held with local response agencies.

Preparing for a Crisis (Perea & Morrison, 1997) although focused on the slaying of a student within a school district, contained several lessons-learned applicable to an event involving the release of radiological substances. Appropriate emergency responses included the establishment of a simple and understandable chain of command, which was a necessity for streamlining crisis management at the school system level. An all-hazards plan involved all school system personnel; provided training from and with community resources such as fire, law enforcement, and emergency medical services (EMS); established a common language for all responders; and created a system that can be used to evaluate lessons-learned. This plan included the following, (1) create a coordinated effort; (2) ensure safety and emotional well-being of those involved; (3) enhance district-wide crisis response; (4) assist in coordinating training needed to implement the plan; and (5) promote collaboration with community agencies, as per NIMS, on communication systems, equipment and emergency supplies (Perea & Morrison, 1997).

Protecting and accommodating special-needs students and staff through the four phases of emergency management—prevention, mitigation, preparedness, response and recovery—was an integral component of a school and school district's comprehensive

emergency management plan. According to the U.S. Department of Education's Emergency Management Crisis Management Technical Assistance Center (ERCM) districts needed to ensure that emergency management plans addressed the issue of students with special needs and disabilities and how those needs, especially during the response and recovery phase were addressed. Schools must consider the variety of disabilities—including visual, hearing, mobility, cognitive, attentional [sic] and emotional—to adequately integrate these students and their vulnerabilities into all emergency preparedness planning (2006). In July 2004 President Bush signed Executive Order 13347, *Individuals with Disabilities in Emergency Preparedness*, which added to the Americans with Disabilities Act of 1990 that required public entities to include people with disabilities in their emergency preparedness efforts (ERCM, 2006). The article also suggested a five-step approach for accommodating special needs within the school, (1) identify students' special needs, (2) maintain a confidential roster of students with special needs, (3) build on current accommodations, modifications and services, (4) teach to students with disabilities crisis response strategies; and (5) inform and train adults. In addition ERCM identified other resources and support groups that assisted with special needs students.

The ERCM (2007) developed a series of fact sheets designed to assist with developing emergency plans for situations that might be encountered in a school or school district. One suggestion was to develop a district-wide crisis response team to designate representatives from local fire, police, emergency management officials; public and mental health and school personnel; custodians, food services, counselors, school nurses, disability specialists, transportation, and other "essential personnel" during an emergency. ERCM (2007) provided a checklist entitled *Components of School and School District Emergency*

Management Plans. This checklist was divided into the four basic, comprehensive

emergency planning components—prevention, mitigation, preparedness, response and

recovery. Additionally, it included the status or 'Extent of Development' components—fully

in place, partially in place, not yet in place and estimated date to be in place. The purpose

was to serve as a basis for developing or enhancing a comprehensive school or district

emergency plan (ERCM, 2007).

The ERCM Technical Assistance Center (2006) developed an AAR resource to be

used by schools to capture important emergency exercise information. The resource guide

stated that After-action reports had a threefold purpose, (1) identified areas in the current

emergency management plan that needs improvement; (2) made recommendations to

improve it; and (3) captured key lessons learned from exercises or real-time events. ERCM

developed a suggested format to be used to capture AAR exercise data. Major headings in

the AAR consisted of the overview; goals and objectives; analysis of the outcomes; analysis

of the capacity to perform critical tasks; summary; and recommendations, including specific

improvements for each community partner (ERCM, 2004). A well-written AAR was

essential to document and improve emergency preparedness, prevention-mitigation, response

and recovery.

Being prepared for a school emergency event required preplanning. The Education

Department's ERCM Technical Assistance Center suggested preparing each position with

"go-kits." These kits contained materials administrators, teachers, school nurses, custodial

staff, or other staff personnel might need to perform their emergency-related duties.

Suggested items included:

- A list of all students (and descriptions of those with special needs);

- A list of school personnel;

- The school's emergency procedures;

- Key contact information for the district crisis team;

- A parent-student reunification plan and utility turnoff procedures;

- Battery-operated flashlight (and batteries);

- A whistle, and emergency communication device;

- A first-aid kit with instructions; and

- Brightly colored hat or vest that provides visibility and identifies a leader.

For the classroom teacher suggested items included:

- A list of students and their special needs;

- A list of classroom personnel; and

- The school's emergency procedures.

NIMS was a comprehensive approach to crisis planning that served as the framework for federal, state, local and private agencies to effectively and collaboratively manage incidents. NIMS used a core set of concepts, principles, procedures, processes, terminology and standards to develop emergency management continuity (ERCM, 2006). NIMS was created in 2004 by Homeland Security Presidential Directive 5 (HSPD-5) to standardize the management of domestic incidents and responder actions and coordinate and carry out responses to various incidents, including those involving schools. Local jurisdictions, including school districts that received federal funding for emergency preparedness were required to comply with NIMS (ERCM, 2006). Those requirements included (1) completion

of NIMS awareness course, (2) adoption of NIMS principles and policies, (3) assessment and establishment for compliance with NIMS, (4) development of timeframes and strategies implementation, and (5) implementation of the ICS structure (ERCM, 2006).

An initiative by a working group composed of representatives from higher education, federal, state and other experts found a lack of involvement on the part of higher education and emergency management officials in the ability to recover from natural disaster emergencies. Sheweber (2007) stated a goal of the workshop was to develop relationships between the higher education, government and emergency management communities to sustain resiliency, maintain learning, and improve disaster recovery and resiliency. The working group focused on academic continuity, higher education resilience, and emergency management. The group found four emerging themes:

(1) Lack of contact between academic continuity and emergency management professionals when developing emergency plans.

(2) Lack of emergency management guidance materials and personnel for planning purposes or for assistance.

(3) Minimal interface between the higher education community and emergency management officials.

(4) Lack of a pre-designated federal lead representing ED or DHS for higher education institutions to work with on academic continuity and emergency preparedness issues. According to Schweber (2007) education is not listed as one of the 17 critical infrastructure/key resource sectors identified in HDSP-7.

Schweber (2007) listed nine recommendations to close the gap with higher education's resiliency issues during emergency events:

(1) Develop a national center for academic continuity.

(2) Encourage institutions of higher education to proactively pursue academic continuity planning, including preparedness planning, and to work collaboratively with local and state emergency professionals.

(3) Engage regional accrediting agencies to include COOP as part of the accreditation process.

(4) Support the development of updated emergency preparedness standards, including academic continuity guidelines.

(5) Pursue strategies to secure funding for higher education preparedness planning.

(6) Encourage educational institutions and associations to work with the ED and DHS to elevate the priority of higher education to ensure that its needs and concerns are addressed in federal planning.

(7) Engage collaborative efforts between higher education and state and local emergency management.

(8) Identify and expand the number of national educational organizations that are engaged in campus preparedness and higher education resilience.

(9) Develop sustainable approaches for dealing with academic continuity and emergency management, namely, with state and local authorities, and public and private sector institutions.

An Analysis of Secondary Schools' Crisis Management Preparedness: National Implications (Adams & Kritsonis, 2006) analyzed crisis management plans of schools that

previously experienced crisis situations to determine the effectiveness of emergency response plans in re-establishing stability to their organization. Their research indicated a failure to adequately prepare for crises lead to failure to respond effectively, especially to an unpredictable event. Adams and Kritsonis state, "To create a greater sense of security and preparedness, organizations must reflectively evaluate their ability to respond effectively to a crisis situation" 2006, p. 2). The authors supported the argument that leaders of today must go beyond a simple definition of crisis by developing solutions before the crisis occurs. Pursuant to a crisis response teams must make several important decisions regarding response. And effective crisis management was an ongoing, evolutionary, dynamic process that needed periodic review and revision for an all-hazards plan to remain viable.

Shrestha (1990) introduced the concepts of a professional chief executive officer (CEO) and how it translated into crisis management within a school system. Functional and traits perspectives clarified the importance of effective crisis leadership. Two paths the CEO can take when responding to an emergency, first path was to mobilize support through citizen support groups and policy groups such as local, state and federal authorities, and second was to be sensitive to the needs of lay groups, especially those not previously served. Shrestha (1990) presented two strategies of crisis management: technocratic-analytic and political-bargaining strategies. The technocratic-analytic approach involved preplanning, organizing and serving in a leadership capacity while controlling assets and activities; all of which were important to minimizing the impact of the emergency event. The political-bargaining approach relied on developing relationships with local, state or federal agencies and using their assets to resolve the crisis. The author indicated these two approaches worked best when integrated. Integration of these two strategies achieved the best result because the

technocratic-analytic typically was a proactive approach involving preplanning while the political-bargaining was better suited for the contingency nature of response efforts. The article developed a set of broad response guidelines for the CEO to employ in the event of a crisis. Those guidelines included providing staff training; establishing communication systems; meeting with staff regularly during a crisis; talking with the press; communicating with peers in other school districts; in case of death, preparing a report that explained the circumstances, contacting family members of the deceased, and releasing students and staff to attend funeral services, if appropriate; appointing a spokesperson to disseminate information; and sending letters of appreciation to those involved in resolution.

Emphasis on planning was critical when developing an all-hazards plan but administrators needed to recognize legal implications during their planning efforts. Brickman, Jones, and Groom (2004) discussed the importance of safety plans for a school district from the legal perspective. In 1994 the federal *Safe and Drug Free Schools Communities Act* required school districts to assure state authorities that they had crisis management plans. Subsequently, the Department of Education created and released a model, *Practical Information on Crisis Planning: A Guide for Schools and Communities*, to assist schools in creating their own safety plans centered around prevention and mitigation, preparedness, response and recovery. The authors suggested that school administrators place and maintain copies of the plan at the district office, the school and even at their home, thereby ensuring a copy of the plan was always accessible. Discussions also mentioned the importance of complying with local, state and federal statutes, and the *Gun Free School Acts, Individuals with Disabilities Education Act* (IDEA), the *Patriot Act*, and the *Family Educational Rights and Privacy Act* (FERRPA). Of these acts, the authors discussed the

importance of meeting FERPPA requirements and exemptions that are safety, health, or terrorism-related events. Finally from a school district liability perspective, a school's failure to prepare for or respond appropriately to a terrorist attack or other emergency situation might result in lawsuits against its district. Therefore, it was important that school authorities consulted with school attorneys when they created, developed, or implemented new school safety policies, to ensure these plans did not impact liability issues within the districts (Brickman et al., 2004).

School Health Policies and Programs Study (SHPPS) (2006) was a national survey that assessed school health and safety policies at the state, district, school and classroom level. The focus of this survey was crisis preparedness, response and recovery and was divided into four categories, (1) health service, (2) mental health and social services, (3) nutrition services and (4) healthy and safe school environment. In the broader category of healthy and safe school environment 92.2% of states required school districts to have an emergency plan and 84.2% of districts required schools to have a comprehensive plan to address natural disasters or other emergency or crisis situation.

The 1958 version of the *United States Atomic Energy Commission Disaster Plan*, *Oak Ridge Community* specified the role of the superintendent of schools during an event involving the release of radiological materials. The superintendent had two major responsibilities required if Oak Ridge were attacked by a nuclear weapon. First, the superintendent of schools was "responsible for planning and directing evacuation of the school;" second, "in case of evacuation, for coordinating the registration of Oak Ridge evacuees at reception centers," and, "with the assistance of school personnel, using

registration information to unite separated families" (pp. 1-2). The entire community plan addressed only events precipitated by a nuclear weapons attack.

Brunner and Lewis (2005) discussed the importance of pre-planning for the evacuation of students from school. Pre-planning activities included components such as selecting a relocation site, procuring adequate supplies, and having well-thought-out student release procedures. All of the components affected the safety of students and staff members and depended on attention to detail during planning (Brunner & Lewis, 2005). The ideal plan included the types of transportation needed such as school buses, mass transit or privately owned vehicles; duties and responsibilities of the crisis management team at the evacuation site(s); prepositioned crisis kits at each relocation site; instructions for parent pickup, staff supervisory duties; staging of parents, communication systems needed; law enforcement assistance that might be needed at the school, for staging and at the relocation site. Finally, schools ensured that the relocation site was accessible and available during school hours.

Brunner and Lewis (2006) stressed the importance of individual classroom, school and district plans were aligned; school plans which synchronized with school and district plans, and community plans. These plans were reviewed by local emergency response organizations such as fire, police and the local EMA. Additionally, the school plans complied with DHS NIMS. Since NIMS was a national standard, school systems and their administrators used this as part of the planning process.

Emergency 101 (Grosse, 2001) presented a case for developing scenario-based training as a tool for preparing faculty to respond to a school emergency. The responsibility for developing procedures and training was placed with administrators. The author presented

a four-step process for preparing faculty to respond to an emergency. First, an emergency procedures crisis plan was developed that included all emergency situations and one that was congruent with existing administrative guidelines. Second, in-service training that focused on the plan was conducted. Third, a summary chart was developed in the form of an *If-Then Chart*. This made reading and understanding what to do easier. Fourth, a scenario-based training was designed to facilitate a better understanding of the all-hazards plan and actions each faculty member would take during an emergency event.

The *Role of Schools in Meeting Community Needs during Bioterrorism* (2007) discussed the multifaceted roles schools played in their communities before and after a big terrorism event. The research centered on the capability of schools to provide counseling and psychological interventions as part of a community response effort. Stein, Tanielian, Vaiana, Rhodes, and Brienam (2007) contended that the school's role of providing psychological first-aid expanded after a terrorist incident. Since terrorism response was new to school systems, the authors cited the recommendation by the National Advisory Committee on Children and Terrorism to include guidance for parents, teachers, and caregivers, and be situation-specific, and clear and concise (2007). Regardless of the event, schools played a major role as the communication link within their communities. For outreach to be effective, schools have to become a part of the community emergency management efforts. Because of the schools' established communication networks, government and public health officials used this expertise to communicate with the public regarding an emergency event. Many times schools were included passively in the emergency plan (serving as reception centers, points of dispensary for epidemic events and mass vaccination clinics) but may not be have been involved in the planning process with input from school officials. Representation from

the schools with other community emergency planners and leaders was critical for successful emergency response efforts.

There were many resources available that assisted school systems with planning for emergency events. In addition, school systems could coordinate their preparedness, mitigation, response and recovery with local assets such as fire, police and emergency management officials. However, as indicated, planning for atypical events still challenged many schools.

U.S. Government and Emergency Response

The Department of Homeland Security (DHS) Nationwide Plan Review Phase 2 Report (2006) indicated many emergency response plans were not sufficiently designed for COOP. COOP ensured local, state and tribal governments, business and industry and other organizations had the capability to perform essential functions during a disaster. The report addressed COOP plans that were designed to continue essential services such as day-to-day operations during a disaster. Three specifics areas were addressed, (1) ICS, (2) Staff/Dependent Care Plans and (3) AARs. The COOP process required the inclusion of ICS and the NIMS into all emergency planning, response and recovery. The ICS described the structure used for command and control of an emergency and was used when a plan was activated. NIMS provided a consistent nationwide approach for federal, state, local and tribal governments, the private-sector and nongovernmental organizations to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size or complexity. The NIMS included a core set of concepts, principles, and terminology. NIMS addressed multiagency coordination; training; identification and management of resources tracking qualification, certification, resources,

and reporting of incident information. NIMS addressed Staff/Dependent Care Plans that were designed to protect response personnel and their families during a response to an emergency event. Given previous knowledge about responders and their families, DHS anticipated that responders were more likely to work if they knew that their families were safe. Lessons learned from other emergencies indicated many of the first responders did not have personal plans for their families and became more concerned with taking care of their families than performing their jobs. AARs contained information about the COOP process. The information captured from these reports contained a view of the historical perspective of an emergency. Additionally, the AAR detailed what worked well and what did not work during an emergency event.

Preparation by nurses to evaluate patients and respond to crisis either natural or manmade disaster was essential. Conveniences were not always provided by hospital equipment, medications or other medical personnel, but by the nature of their training these professionals were prepared to provide assistance as required (Gee, Meece-Hinh, Muehlenkord, & Zwirn, 2006). Having disaster education before a response effort was critical for anyone in a leadership role. Disaster education materials were available through the FEMA web site. This site contained resources designed for health professionals, teachers, and parents to help them remain safe during first 72 hours after a disaster occurs, when federal or local assistance was unlikely to occur (Gee et al., 2006).

The DHS favored the 2007 edition of the *National Fire Protection Association (NFPA) 1600*, a 57-page document that established a set of criteria for disaster/emergency management and COOP (Hanford, 2008). The NFPA organization was formally recognized for their work in the emergency management area and specifically known for the

development and institutionalization of the ICS worldwide. The NFPA standards appealed to

DHS because they aligned with *Title IX of the 9/11 Commission Act of 2007. Title IX of*

Public Law 11-53, was more commonly referred to as the *9/11 Commission Act of 2007.* The

9/11 Commission Report called for the development of a voluntary, private-sector standards

program for all-hazards emergency preparedness. *Title IX* identified best practices in eight

areas:

(1) Identify potential hazards by assessing risks and impacts;

(2) Mitigate the impact of hazards, including weapons of mass destruction;

(3) Manage critical emergency preparedness response resources;

(4) Develop memorandum of agreement/memorandum of understanding

(MOA/MOU);

(5) Develop and maintain emergency preparedness and response plans and

procedures;

(6) Develop and conduct training and exercises to support and evaluate emergency

preparedness response plans and procedures;

(7) Develop and conduct security-related training programs centered on emergency

preparedness response plans and procedures; and

(8) Develop crisis communication plans for the media and the public.

Collaboration was necessary for planning and addressing natural, technological

hazards, and disasters as a result of terrorism (Waugh & Streib, 2006). The evolution of

emergency management, the essential roles of networks and the collaborative role of

emergency managers were discussed. Waugh and Streib (2006) argued that Hurricane

Katrina revealed a national emergency management system lacked comprehensive

organization, lacked the capability of responding effectively, and was unprepared to

coordinate the massive relief effort required to support recovery. There was a lack of

leadership at all levels of government and specifically they named the FEMA and the DHS

for the lack of a coordinated response. They cited a lack of understanding of concepts of

emergency management as one reason authorities suggested that the nation's response needs

a stronger command and control system that might be best handled by the military or a more

structured organization (Waugh & Streib, 2006). Historically, the emergency management

community has been voluntary and community-oriented and in some areas of the country this

still held true. Events like 9/11 forced the government to create the DHS to consolidate

emergency response under one umbrella agency and to centralize and standardize the

emergency management community to provide better communication and improve response

capabilities nationwide. The authors chronicle the evolution of emergency management from

the Cold War era of the air raid warden/civil defense directors, to today's all-hazards

emergency management focus. The modern focus required multijurisdictional, multiagency

and multi-governmental response efforts where it was incumbent on agencies to cooperate

effectively to address the cultural impact changes have had on emergency response. In this

type of hierarchy, the response efforts began at the local level. When assets at the local level

were exhausted the next avenue for supplementing assets resided at the state level. Finally,

when local and state assets were exhausted, federal assistance was called upon to supplement

response efforts. Because of DHS's poor response efforts during Hurricane Katrina the

question remained on the table; was FEMA in or was FEMA out? In other words, was

FEMA better suited to operate as an independent agency responsible for consequence

management of natural disasters occurring within the United States?

Because of the paradoxical nature of emergency response (meticulous planning yet nimble response), integrating a multijurisdictional, multiagency, multi-governmental response presented challenges. The community-based orientation of emergency management morphed into a community-resilience response effort where the focus was capacity-building through a series of networks; joint training; exercises drills; and resources sharing, based on MOU/MOA. The authors argued that command and control-based response efforts were more efficient than the network, community-based organizations, that existed in most communities.

Public Health Preparedness and Response to Chemical and Radiological Incidents; Functions, Practices and Areas for Future Work, (Davis, Dausey, Howell, LaTourrette, & Sama, 2009) prepared by the Rand Corporation, for the Department of Health and Human Services, emphasized the need for the public health community to spend more time, preparing for the release of chemical and radiological substances. There were few articles related to public health and its ability to respond to chemical or radiological events. Public health's role in these types of events will be critical. Public health will not only provide guidance on contamination and decontamination, but also serve as an information resource, as well as the conduct of population monitoring of exposed, non-exposed and the "worried well." The Rand Corporation's surveys among health workers found that most of these workers were less likely to report to work if the incident involved chemical or radiological substances. However, the study indicated that those receiving chemical- or radiological-specific training prior to an event were more likely to report to work than those who did not receive training. This important fact could not be overlooked as it provided valuable information important to an organization's internal capacity issues. From the capacity-

building perspective the report indicated that conducting exercises and training were important to the emergency preparedness aspects for response to chemical or radiological events. In conjunction with exercises and training recommendations, the report specified practices to assist with chemical and radiological training.

Since 9/11, the U.S. government initiated numerous measures to assist communities in preparing for, responding to, and recovering from manmade and natural disasters. Adoption of NIMS, ICS, and the National Response Framework (NRF) provided guidance and direction on emergency preparedness. Progress was being made; however, government officials expressed concern about resiliency to disasters, throughout the country.

Industry Crisis Planning and Response

Preparing for Evil (Mitroff & Alpaslan, 2003) revealed research conducted by Mitroff at the University of Southern California's Center for Crisis Management. Mitroff's study categorized organizations into two classifications: (1) crisis- prepared (or proactive) and (2) crisis-prone (for reactive). Crisis-prone businesses prepared to handle only the type of calamities they had already suffered while crisis-prepared organizations prepared to handle a wider variety of crises. The study pointed out that 75% of *Fortune 500* companies did not prepare to manage atypical crises thereby leaving the companies vulnerable. Additionally, the study indicated that crisis-prepared companies were more likely to survive not only the crisis but also, in business, in general, because of their atypical mentality approach to problem resolution. Another contrast highlighted that crisis-prepared believed that no harm should come to even one person when a crisis occurred, leading to a proactive approach. Crisis-prone companies sought to do the greatest good for the greatest number, so invested in cost-effective readiness. The study divided crises into three categories

(1) Natural accident—such as fires, earthquakes, and blizzards;

(2) Normal accidents—system failures, overloads and malfunctions; and

(3) Abnormal accidents—kidnapping, terrorists attacks or bombings.

The study specifically identified denial as part of the reason companies were not adequately prepared to handle crises. Mitroff and Anagnos (2001) opined that developing plans and procedures were not the key to preparing for emergencies, rather developing the capability to envision abnormal crises was the key. *Communication and Organizational Crisis* (Seeger, 2000) speaks to the issue of organizational denial of the potential for crises to occur. Seeger's research (2000) supported by Mitroff and Anagnos's (2003) claimed that denial was the reason organizations failed to adequately prepare for crises.

Olaniran's *The Role of Perception in Crisis Management: A Tale of Two Hurricanes,* (2007) discussed the anticipatory model of crisis management. The model provided an opportunity for crisis management officials to put in place programs that foster prevention of errors, disasters, and crisis, while also putting place all-hazards plans to handle any resulting crisis and disaster.

An important component of emergency preparedness was directing and advising the public on specific protective actions that should be taken to protect themselves. Wagner (2006) reported the New York Academy of Medicine revealed the importance of including the public when planning emergency response especially for terrorist activities. The author further stated that failure to involve the public put millions at risk should a terrorist event occur. When testing responses with a dirty bomb scenario, few people followed prescribed procedures unless they were assured that their families were safe. The study concluded that

public involvement in the planning process increased the likelihood of success for creating an all-hazards plan that works.

Like government agencies, the business and industry sector was still concerned with resiliency following a disaster. Since 9/11 many business and industry sectors developed COOP-focused plans designed to maintain their operations. Despite their efforts to plan for an event of national significance by developing a COOP plan, and because of the interdependence of the business and industry sectors on each other, the literature suggested that business and industry needed to engage collaboratively in additional planning efforts, especially for manmade disasters.

Preparedness and Emergency Management

The driving force for emergency managers was resilience to either natural or manmade disasters (Kahan, Allen, & George, 2009). DHS' Homeland Security Advocacy Council listed resiliency as one of top 10 challenges facing the next Secretary of Homeland Security. DHS defined resilience as " . . . the ability of systems, infrastructure, government, business, and citizenry to resist, absorb, and recover from or adapt to, an adverse occurrence that may cause harm, destruction, or loss of national significance" (Kahan et al., 2009, p. 5). The authors indicated that hard resilience—infrastructure systems—and soft resilience— human systems—were synergistically interrelated (Kahan et al., 2009). These interrelated systems contained three threads of commonality: resistance, absorption and restoration. Resistance was the ability of a system such as infrastructure or human to limit damage. Absorption minimized the damage and allowed continued operations moving toward recovery. Restoration was the ability of the system to resume pre-event functionality. The authors defined eight principles of resilience: (1) limit the threat or hazard; (2) withstand

system stresses and continue functioning; (3) reduce the impact of system stresses and continue operations; (4) adapt or respond to system stresses; (5) plan for threats, vulnerabilities and consequences; (6) allocate resources to meet resilience requirements; (7) all of the aforementioned are mutually reinforcing; and (8) understanding resilience and developing systems to ensure resilience occurs (Kahan, Allen & George, 2009, pp. 14-17).

In 2007, Cornelia Ashby, Director of Education and Income Security with the Government Accounting Office (GAO) testified before the *Committee on Homeland Security, House of Representatives* regarding the status of America's school districts emergency response planning and preparedness. The testimony indicated a three-fold need: (1) federal and state governments established requirements and provide resources to school districts for emergency management planning; (2) determine the preparation levels of school districts, and (3) determine the obstacles facing school districts in planning for emergencies, communicating, and coordinating with first responders, parents, and students (Ashby, 2007). While no federal law required states to have emergency plans, 32 states reported having emergency plans. Schools with plans developed multi-hazard plans; however, most of these plans did not address federally recommended practices. Less than half of the schools' community partners participated when developing and updating their plans. School officials were not trained with first responders on plan implementation. Over 56% of school districts did not plan for COOP, many expressed concern about their ability to communicate with first responders and parents during an emergency. Moreover, 62% indicated challenges with having equipment, staff training, and having personnel with emergency planning expertise.

The research for *Community Training in Bioterror Response* (2007) conducted by George Mason University as part of the *National Capital Region (NCR) Critical*

Infrastructure Projection Project, confirmed that trained responders were the *most* qualified for detecting, evaluating, reporting and responding to a bioterrorism event. Specific needs that remained to be addressed included developing and training volunteers; developing programs that were modular and adaptable to community-specific events; enhancing community health literacy regarding bioterrorism impacts on community and individual health; strengthening community outreach through the use of internet, radio and television; capturing the uniqueness of communities and preparing training accordingly; and developing a standardized tool to measure preparedness. The report concluded that the public was unprepared to respond to an event involving bioterrorism (Nicogossin, Metscher, Zimmerman, Hanfling, & Wise, 2007).

The American Academy of Pediatrics' *Radiation Disasters and Children* (2003) discussed the special medical needs of children during an manmade release of radiation including "(1) the detonation of a nuclear weapon; (2) a nuclear power plant event that unleashes a radioactive cloud; (3) the dispersal of radionuclides by conventional explosive or the crash of a transport vehicle" (p. 1455). Research indicated that short- and long-term impacts were greater with small children because they breathed differently thereby leading to a greater risk of internal exposure to radioactive gases. Children exposed to radiation *in utero* had a greater risk of developing cancer and were ". . . more likely to develop enduring psychological injury. . ." (p. 1455). Pediatricians were advised to work closely with public health authorities to ensure that ". . . children receive full consideration in local planning for a radiation disaster" (p. 1455). The report addressed schools' preparedness for radiation disasters.

Schools and child care facilities should also be included in response plans,

particularly if they are located within 10 miles of a nuclear power plant. School

evacuation plans should be created and practiced. Many school districts have been

successful in creating algorithms for evacuation of children and their rapid

reunification with parents. School plans should consider the designation of an out-of-

state relative or friend as a family contact, because during a disaster, it is often easier

to call long-distance than locally to find a family member. As with planning for all

disasters, medical directives (e.g., health care proxy) should be considered in the

event the parent of an ill or injured child cannot be immediately contacted. Schools

need written plans that define locations within the school building or in nearby

structures that afford the best protection from a radioactive cloud. School-based

crisis-management teams that manage other events associated with psychological

trauma should be trained to respond to consequences of a radiation disaster (pp. 7-8.).

The Use of Multi-Attribute Methods to Respond to a Nuclear Crisis (2008), discussed

adaptation of this process ". . . in nuclear management—Multi-Attribute Decision Making

(MADM)— to more effectively address potentially conflicting objectives, stakeholders with

different perspectives and many uncertainties" (Andrews, Helfrich, & Harrald, 2008, p. 1).

The goal was to ensure relevant attributes were included in the decision making process,

enhance communication among stakeholders and the public and include risk analysis. A

decision support tool provided decision makers with a preplanned and systematic approach to

ensure timely and effective decision-making. (Andrews et al., 2008). MADM involved three

steps: (1) problem structuring—issues, stakeholders, purpose, and scope; (2) model

building— listing alternatives, defining criteria and developing, or obtaining model values;

and (3) the analysis step—synthesizing the information, determining new alternatives, and determining robustness of the decision. From the MADM process researchers determined the Analytical Hierarchy Process (AHP) as the most appropriate methodology for conducting the research and reasoned that AHP could organize a complex MADM process and arrange it into hierarchically-based information accordingly (Andrews et al., 2008). In this case the AHP was used to develop radiological response plans and support procedures and alternatives. Once AHP was selected, researchers could use expert opinions to identify and determine the optimal approach. The researchers concluded that expert judgments were elicited using one of the following methodologies: "(1) individual interviews, (2) interactive face-to-face, group interviews, (3) Delphi method, sans face-to-face interviews, and (4) anonymously distributing data to experts for additional review. Either of these approaches [could] continue until consensus [was] accomplished" (Andrews et al., 2008, p. 9).

Four phases composed emergency management: (1) preparedness, (2) mitigation, (3) response, and (4) recovery. Although each of the phases was interdependent, preparedness was the area in which all of the other phases were addressed and planned for. Every article in this literature review spoke to the importance of preparedness. Whether it was within a school system, government agency, business and industry, or leadership, preparedness was important.

Delphi Methodology and Research

Delphi methodology was an effective tool for obtaining information from a panel of subject matter experts who were geographically separated. A review of the Delphi methodology, used for this study, is discussed in this section. The literature review also revealed the history, a description of the process and the appropriateness of the Delphi

methodology as a valid research methodology for answering the research questions posed in this study.

The Delphi technique was used to survey and collect the opinions of experts on subject-specific issues (Yousuf, 2007). This technique was developed as a forecasting tool, by Olaf Helmer during the 1950s while conducting defense research. The name Delphi originated from the ancient Greek oracles at Delphi. These oracles were statements issued from wise men of the day that were thought to have knowledge or infallible authority. Linstone and Turnoff (1975) defined the Delphi technique as "a method for structuring group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem" (p. 3). The Delphi method was useful where the opinions and judgments of experts are needed but time and distance make it unlikely for the panel to work together at the same location (Yousuf, 2007). Skutsch and Hull (1973) defined the technique as a process for gaining judgments on complex issues where there is little or no available information. Mitchell and Larsen (1987) indicated that the Delphi method was similar to the nominal group technique. However, the Delphi method could be accomplished by panelists that were geographically separated. Yousuf (2007) indicated that interaction took place between the members of the group and the researcher, with the researcher acting as the facilitator.

Dalkey (1967) identified anonymity, controlled feedback from the interactions and statistical group response as three characteristics of the Delphi response. Anonymity allowed panelists to freely express their opinions without fear of consequences. Controlled feedback from the interaction provided a platform for interaction at multiple stages of the process and individuality in a groupthink process. Helmer (1967) supported the Delphi Method as a valid

and reliable method for data collection from an identified group of panelists. He agreed that

Delphi was frequently used for eliciting consensus from a group of experts and had many

advantages over methods of using panel decision making. Dalkey (1972), Helmer (1983),

and Linstone (1975) found that consensus could emerge using Delphi methodology.

The difference between the Delphi Method and quantitative and qualitative research

methodology lay in the flexibility of the data collection process (sequential, concurrently or

iteratively). A Modified Delphi composed of three rounds was described by Pfeiffer (1968).

His process included the following steps:

(1) The first questionnaire was sent to the panel of experts asking for a list of

opinions involving experiences and judgments, a list of predictions, and a list of

recommended activities.

(2) The second questionnaire was sent to each expert and the expert is asked to rate

or evaluate each item by some criterion of importance.

(3) The third questionnaire included the list, the ratings indicated, and consensus, if

any. The experts were asked to either revise their opinions or discuss their

reasons for not coming to consensus with the group.

This study asked biological response experts to come to consensus regarding response

policies for emergency planners and first responders in the United Kingdom (UK). The

study focus was the intentional release of biological substance in the UK. The findings

indicated insufficient, readily available details were needed by the planner and first

responders to adequately address a significant biological event. Three themes emerged from

this study: (1) planning—there was a lack of planning and funding for the management of a

biological event; (2) equipment—hospitals lacked equipment as well as space for isolation of

patients with potential for developing infectious diseases; and (3) training—lack of resources to develop role-specific training for new employees, based on their functional response roles. The outcomes were a series of 125 consensus statements addressing biological planning and response (Brown, Crawford, Carley, & Mackway-Jones, 2006, p. 239).

A Generic Toolkit for the Successful Management of Delphi Studies (2005) proposed a generic research tool and process for conducting Delphi studies. The tool included design options, a staged model and methodological decision-making elements. The tool's purpose was to ". . . increase confidence when adopting the Delphi alternative and allow for a wider and more comprehensive recognition of the method within both scientific and interpretive studies" (Day & Bobeva, 2005, p. 103). The first stage defined the categories included within the tool—purpose of the study, number of rounds, participants, mode, anonymity, media and concurrency. The authors proposed that the generalizability of the model made it applicable to all Delphi studies regardless of the subject. The Delphi model combined with a literature review produced a model containing three components: (1) exploration, (2) distillation, and (3) utilization. *Exploration* was an unstructured, free-flowing investigation of issues and challenges within the study. *Distillation* provided for the synthesis of the collected data. *Utilization* provided opportunities for researchers to disseminate the knowledge gained through the conduct of the study. The authors suggested the development of a checklist to assist with the management of the study. The authors' goal was to identify techniques that ensured a complete and valid Delphi study methodology.

> When an emergency occurs, temporary administrative orders—not a set of scientific
>
> responses—will be employed to control the emergency, especially in most developing
>
> countries. At present there is an urgent need to develop a detailed list of functions for

public health emergency management as a guide for building management systems"

(Rao & Sun, 2007, p. 1908).

Using the Delphi method, these researchers' sought to develop a detailed list of emergency

management functions. Interviews from twelve public health and academic researchers

yielded a list of 10 functions: (1) command, coordination and assessment; (2) practice plans

for public health emergencies; (3) risk identification, assessment, and mitigation; (4)

surveillance and early warning; (5) epidemiological investigation and response; (6)

laboratory test; (7) first aid and medical treatment; (8) information report, communication,

and distribution; (9) logistics; and (10) emergency employee training and public education"

(Rao & Sun, 2007, pp. 1911-1912).

The Development of Criteria to Evaluate College Student Leadership Programs: A

Delphi Approach (1992) addressed the issue of student leadership programs. The researcher

used the Delphi method to develop, evaluate and research college leadership programs. The

criteria were established by querying 24 panelists representing three leadership programs:

(1) student affairs, (2) academic affairs, and (3) community-based. The panelists were

actively involved in administering or implementing student leadership programs and were

contributors to student leadership efforts through publications, books, or conference

presentations (Chambers, 1992). The research led to the development of ". . . self assessment

or external assessment of college student leadership programs" (Chambers, 1992, p. 343).

Through the Delphi study, participants identified assessment components of a 16-step

program that the researcher used to develop an assessment tool that contained a 16-Step

Program Structuring Criteria; a 13-Step Program Administration Criteria; and a 7-Step

Consequence Criteria. Findings from the study indicated that criteria for student leadership

were established; the criteria could be used to design or implement student leadership programs and criteria could be used for additional research. The researcher noted the criteria were not exhaustive for evaluation of student leadership programs. However, they served as a basis for the development of future student leadership programs.

Delphi Method for Graduate Research (Skulmoski, Hartman & Krahn, 2007) researched the appropriateness of using the Delphi method for graduate and PhD-level research. This article described the Delphi method process in detail and cited examples of graduate- and PhD-level research conducted using Delphi. The authors concluded that Delphi was useful in developing, identifying, forecasting, and validating a variety of research topics. While a three-round Delphi may be considered typical, single- and double-round Delphi studies have also been completed. Finally, the sample size varied in their studies from 4 to 171 *experts.* One quickly concluded that there was no *typical* Delphi; rather, the method was modified to suit the circumstances and the research questions.

Delphi methodology was a long-standing process that provided opportunities to research a variety of subjects, through the use of experts' opinions and experiences, and to answer, forecast, or research issues for which there are no definitive answers. Delphi was helpful where policies, procedures, or guidance was needed but time, distance, and costs prohibited experts convening to discuss the issue. Articles cited in the literature review provided an indication of how Delphi methodology was used to define, address, or research answers to questions.

Summary of the Review of Literature

This literature review examined emergency preparedness through the following lens: (1) school preparedness and response; (2) leadership and organizational management; (3) U.S. government and emergency response; (4) industry crisis planning and response; (5) preparedness and emergency management; and (6) the Delphi method. Five of these areas— school preparedness and response, leadership and organizational management, U.S. government and emergency response, industry crisis planning and response, and preparedness and emergency management provide insight into emergency management issues. The literature review regarding the Modified Delphi Method illuminated how Delphi was used by researchers to explore answers to questions where there were no apparent answers.

From the school preparedness and response lens the literature review revealed that school emergency preparedness was becoming more and more complex and this complexity cannot be ignored. This complexity necessitated that schools prepared for all-hazards, and in some locations, radiological hazards. The literature review provided a study of existing literature related to emergency response at the school level, specifically noting the lack of preparedness for radiological response. Each search revealed that American institutions, especially schools systems, were not prepared to respond appropriately to manmade disasters, specifically the release of radiological substances. The information gathered during this literature review confirmed the lack of planning by school systems related to manmade disasters, specifically the release of radiological substances and its impact on school resiliency. The lack of information regarding the ability of schools to respond to atypical emergency events confirmed the need to develop an all-hazards approach to assist

school systems with planning for and executing a plan of action to protect their students and

staff and to maintain operations of their schools as well as overall school resiliency.

Chapter Three: Methodology

The purpose of this Modified Delphi Method study was to consider the perspective of emergency management professionals regarding school resiliency and the four phases of emergency management—preparation, mitigation, response, and recovery. The study determined essential elements for inclusion in a school system-based radiological response framework. The data were analyzed, evaluated and assembled into a comprehensive list to be used to evaluate, enhance, or develop an all-hazards plan for a school system that addresses atypical disasters, specifically an event involving radiological materials. This study provided school systems with options and considerations for developing a radiological response framework. This study began with an evaluation of the appropriateness of selecting the Modified Delphi Methodology. The primary advantages of a Modified Delphi Method was that it improved the initial round response rate and provided a solid grounding in previously developed work. It also reduced bias, assured anonymity, and provided controlled feedback (Custer, Scarcella & Stewart, 1997). The Modified Delphi Method offered experts the opportunity to work together, without working face-to-face, to develop consensus on a specific issue. This study consisted of three rounds—a Pilot Round, Round One and Round Two, which is sufficient to arrive at consensus. From this, the framework was established for conducting this study.

Statement of the Problem

The majority of an all-hazards school plan focused on scenarios involving emergencies such as natural disasters, active shooters/intruders, and intervention programs, and as a result may leave school systems vulnerable to atypical events, such as a manmade

disasters, specifically, the release of radiological substances. A literature review confirmed that the release of radioactive substances and its impact on the ability of schools systems to prepare and respond, to protect their staff and students was an issue that school systems were not prepared to address. The task of planning for an all-hazards emergency response approach required cooperation and collaboration with a variety of community professionals and assets to develop practical guidelines for reducing the impact hazards may have on school systems.

Assumptions

This study presented emergency management as it relates to school resiliency through the lens of emergency management experts by identifying and describing the capability and capacity of school systems to respond to atypical emergency events such as the release of radioactive substances. This study addressed the research question, "What elements should be included in a school system-based radiological response framework, as defined by a panel of subject matter experts?" The Modified Delphi Method provided an opportunity for experts to offer opinions and suggestions for developing a school system-based radiological response framework that had not been specifically addressed by other studies. The ontology permitted the researcher to delve into and determine issues through an organized, systematic approach. It provided a set of essential elements that were used to produce and examine approaches that explored and discussed school system-based emergency management issues. This study explored the need for additional research in school systems' response to atypical emergency events. This research could be extended by adding additional components gained through alternative methodologies such as evidenced-based, quantitative and qualitative research, and integrating new technologies and best practices into the application of

emergency management. Further research may determine the usefulness and applicability of this study. Recommendations from this study were discussed in Chapter Five.

The questions in both survey instruments were based on information obtained from radiological response plans from a variety of U.S. agencies and are shown in Table 1. The questions were designed to elicit experts' opinions that addressed the research question posed in this study and to provide the researcher with insight into the experts' responses. Questionnaires were provided to each expert during the two rounds of questioning. The responses were concealed from other experts to prevent unnecessary bias and groupthink. The strength of the Modified Delphi Method was preventing bias and groupthink from entering the process. Bias was controlled by (1) maintaining anonymity of the experts, (2) using multiple surveying rounds, (3) using peer reviews and expert opinions to direct the survey, (4) coding qualitative data, (5) using quasi-statistics, and (6) preventing one-on-one interactions between or among experts or the researcher regarding the survey questions. Experts' answers were compiled in a password-protected, electronic database. Read-only access was granted by a database administrator to the researcher. This security feature prevented data manipulation. Qualitative data gained from this study, in the form of declarative statements, were compiled, analyzed, and coded without knowledge of who submitted the statements.

Table 1.

Reference Agencies and Associated Documents Used in Triangulation

Agency	Publication	Year
Agency for Healthcare Research and Quality (AHRQ)	*School-based Emergency Preparedness: A National Analysis and Recommended Protocol*	2009
Homeland Security Council Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats	*Planning Guidance for Response to a Nuclear Detonation*	2009
Southern California Regional Safe Schools Coalition	*Emergency Plan Rubric*	2005
Government Accounting Office (GAO)	*Combating Nuclear Terrorism Actions Needed to Better Prepare to Recover from Possible Attacks Using Radiological or Nuclear Materials*	2010
Conference of Radiation Control Program Directors (CRCPD)	*Responding to a Radiological Dispersal Device (Dirty Bomb)First Responder's Guide–The First 12 Hours*	2006
Federal Emergency Management Agency (FEMA)	*Developing and Maintaining State, Territorial, Tribal, and Local Government Emergency Plans*	2009
U.S. Nuclear Regulatory Commission (NRC)	*Criteria for Preparation and Evaluation of Radiological Response Plans and Preparedness in Support of Nuclear Power Plants (NUREG-0654)*	1980

Research Model

The literature review revealed the need for cooperation and collaboration among and

between governments such as local, state, federal, and tribal authorities, business and

industry, private organizations, community leaders and responders as well as residents to

exchange ideas that addressed school system preparedness. The study pointed out that the issue of radiological response was not confined to local jurisdictions, but was a national issue as well. To obtain answers to the research question a Modified Delphi Method was chosen as the preferred method to elicit this type of information. This study utilized the Modified Delphi Method to provide structure for the group process and to bridge the geographical distances between respondents. The Modified Delphi Method was administered at a national emergency management conference, where a majority of the respondents were in attendance. Other experts, not attending the conference, completed an online survey because it too, was a cost-effective and timely approach for completing the survey. This method provided an opportunity to gather data from larger, more diverse population of experts. A modified Delphi allowed individual, anonymous interaction with experts regarding the subject matter. Figure 3 illustrated a modified, three-round Delphi process (Skulmoski et al., 2007, p. 3).
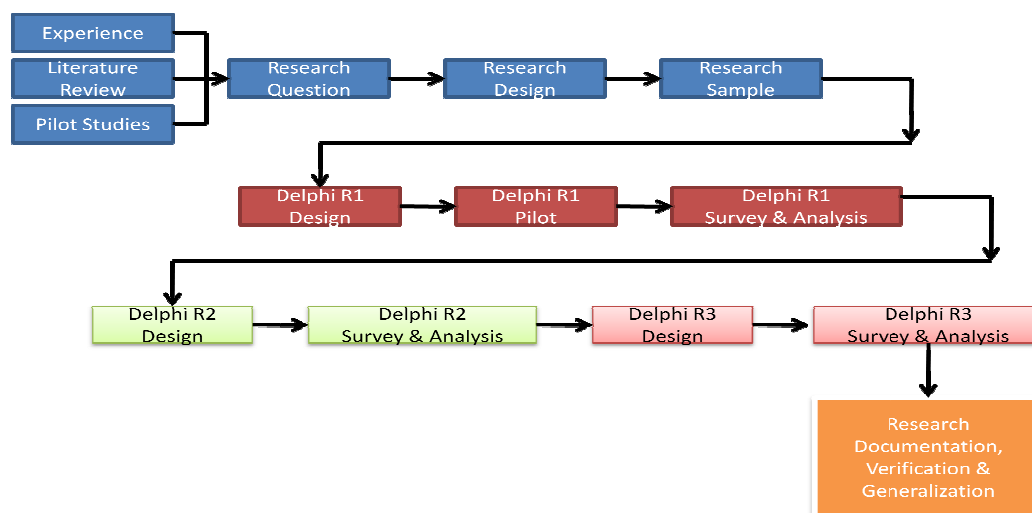
Figure 3. Modified Delphi three-round process.

The number of rounds depends on the purpose of the research. Delbecq, Van de Ven, and Gustafson (1975) suggested that two or three round Delphi process was sufficient for most research.

Coding Process

Sections of experts' responses considered important to this study were coded and

indexed as part of the analysis process. The coding process provided a structure for data

analysis, sorting, and retrieving the data. Coding provided the researcher an opportunity to

identify themes, trends, and relationships. Coding also helped to explain the meaning of

the data and compared different perspectives provided during the study. Coding processes

used during this study were based on analysis of keyword repetition and the manipulation

of text using a combination of techniques described in *Techniques to Identify Themes*

(Ryan & Bernard, 2003)*. Techniques used in the study, such as unmarked text, pawing,

and cut-and-sort were used to analyze the declarative statements provided by the experts.

Ryan and Bernard (2003) process designers suggested the following approaches for

identifying themes in qualitative data: (1) keyword searches and (2) unmarked text.

Keywords searches for this study included words such as *all-hazards, plan(s),*

communication, notification, collaboration, agreements, training, drills, exercises,

medical, public health, medication, and education and the number of times these words

appear in the data. The unmarked text technique required reading experts' responses

multiple times until the themes became visible. Once themes emerged, each was marked

with a different colored highlighter for quick identification. Pawing, similar to keyword

searches, required reading, analyzing, and underlining the data searching for patterns.

Cutting and sorting involved electronically removing quotes from the original source and

transferring them to categories that eventually become dominant themes or sub themes.

The coding process began at the end of Round One. Figure 4 illustrated the thinking,

organizing, and analyzing process used in transcribing and coding the experts' responses

during Round One and Round Two. Five themes emerged from the experts' responses

during Round One and Round Two: (1) training, (2) collaboration, (3) communication, (4)

medical, and (5) all-hazards. The researcher used these five emergent themes as keyword

categories for coding responses. The responses were transferred from *Select Survey* to a

prepared table. Once responses were transferred, the researcher color-coded each theme for

easy recognition and organization.
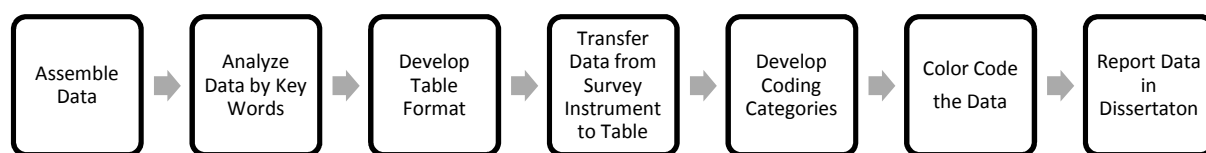
Figure 4. Coding process concept map.

The Modified Delphi Method revealed experts' opinions about responses to atypical

emergency events, specifically the release of radioactive substances, and its impact on school

resiliency. The study provided a lens through which information was elicited, responses

analyzed, data synthesized, and thought processes of experts regarding the issue were

comprehended. The data revealed similarities and differences in how the experts viewed the

issue of the impact of atypical emergency events, specifically the release of radioactive

substance on school resiliency. These opinions provided the researcher with insight into

what experts valued as it applies to this topic. The value placed on an all-hazards planning

represented their reality as it applied to the four phases of emergency management.

Analyzing, synthesizing, and evaluating their responses helped to set priorities for

subsequent school-system-based emergency planning processes. The experts placed high

value on the all-hazards plans and lesser value on event-specific plans. The response to both

surveys provided a consistent pattern that was unique to the experts. It indicated their

thinking, filtering, processing, storing, and analyzing processes that were critical to

answering the research question posed in this study. Their responses assigned meaning to their conclusions and what they deemed as important to this issue.

The purpose of emergency management was to ensure effective planning, mitigation, response, and recovery by equipping school personnel with knowledge needed for school resiliency. Paradigm shifts in school-based emergency management continued to evolve as new and unique threats emerged. Despite remaining vigilant with traditional approaches to emergency management, school systems still lacked the requisite knowledge to plan for, respond to, and recover from atypical emergency events. Internationalization of terrorism required the redefinition of emergency management practices and planning for school systems. Observing world events and their impact on domestic preparedness was important for effective planning, implementing, training, and managing future emergency events. Recognizing the value and relevance of emergency management within the education community was critical for successful school resiliency.

Research Question

During the first phase of data collection, experts were selected based on their subject-matter knowledge in emergency management. Twenty-seven experts were surveyed at a Department of Energy (DOE) emergency management conference held in Las Vegas, Nevada, May 2010. The other 17 experts completed an identical, online questionnaire using Select Survey as the response mechanism. These experts represented the DOE and its contractors, Centers for Disease Control and Prevention (CDC), Oak Ridge Institute for Science and Education (ORISE), a representative of a large, northeastern state's department of health and ORISE's Radiation Emergency Assistance Center/Training Site. The researcher attended the Las Vegas conference and requested experts' participation for the

study. Experts were provided an explanation regarding the study and signed the consent form prior to participating in the survey. The consent form is located in Appendix B. Respondents were asked to provide their expert opinion on the emergency planning-specific questions. The survey instrument is located in Appendix C, entitled *Radiological Response Plan Survey*. This survey was designed to assist the researcher in answering the following research question:

> RQ1: Considering the perspective of emergency management professionals regarding school resiliency and the four phases of emergency management—preparation, mitigation, response and recovery—what elements should be included in a school-system-based radiological response framework?

> Data collection, analysis, categorization and consensus-building occurred during the first two rounds of this research. The third and final round finalized results and examined five emergent themes for possible inclusion in a school-system-based emergency plan framework for an atypical disaster—a manmade or accidental release of radiological substances. The goal of the framework was two-fold: (1) to prepare school systems to plan and respond appropriately for an unplanned release of radiological materials, and (2) to protect the school population—staff, faculty, and students.

Restatement of the Problem

Specific guidelines to which schools systems can refer for assistance in responding to an atypical disaster such as the release of radiological substances in proximity to school facilities were lacking. In general, of school plans reviewed, focus was on an all-hazards emergency response approach such as natural disasters, active shooters/intruders, and intervention programs. These were the traditional emergency situations with potential to

impact school system resiliency. Therefore, existing all-hazards plans left school systems vulnerable a release of radiological substances. A literature review confirmed that such atypical disasters would impact school resiliency, continuity of operations and the ability of school systems to protect staff and students. Experts, whose professional experiences revolved around emergency planning, provided consensus responses regarding essential elements needed for an atypical disaster plan.

Research and Design

This study investigated the relationship between the perceptions of experts' opinions regarding essential elements for inclusion in a plan, specifically for radiological response. The experts offered input, responded to, and examined viewpoints regarding this issue. This study provided insight, from the experts' perspective, regarding a standard planning framework as a basis for determining if special considerations for radiological response should be added for future planning purposes. The study also added to the body of knowledge and became a useful tool for those school systems—especially those located in large metropolitan areas, in close proximity to commercial nuclear reactors, or along major transportation corridors where radioactive substances may be transported. Finally, this study was designed to provide school administration personnel with considerations for enhancing their all-hazards plans for atypical disasters—specifically the manmade release of radiological substances.

The Modified Delphi Method used a randomly selected population of emergency management experts from U.S. government agencies, other state agencies, business and industry as the basis for the survey. Each participant received a link to the online survey instrument, *Select Survey*, after signing a consent form. *Select Survey*, a password protected

Web site instrument, which provided the ability to conduct surveys with geographically separated participants. This approach gave experts an opportunity to maintain involvement throughout the study and expedited the data collection process.

The first step was to select the target audience to whom the survey would be administered—a purposive sample. The objective of a purposive sample was querying a subset of a larger population, which represented a specific focus area—in this case emergency management—for a specific need or purpose (Patton, 2008). The researcher determined that the optimal time, location, and availability of experts would occur at a national emergency management conference in Las Vegas, Nevada, in May 2010. From a pool of 300 conferees, a total of 43 experts participated in Round One. The researcher positioned the survey table in the exhibition area of the conference. As conferees passed the table, each was asked if he or she would be interested in participating in the survey. An oral description of the study was provided and each participant read and signed a consent form. Upon completion, each participant placed the questionnaire in a collection basket. Of the 43 who volunteered, 40 successfully completed and returned the survey. Each questionnaire was assigned a unique identification number to ensure participant anonymity. Experts used an online survey instrument, *Select Survey*, to record their responses. Additional experts were recruited with an introductory e-mail and consent form requesting their participation. This pool of experts was based on the researcher's professional affiliation and respect for their subject matter knowledge. Each expert was asked to sign and fax the consent form to the researcher. Upon receipt of the consent form, the researcher sent a link to the online survey. Online surveys were coded as well to ensure anonymity of each respondent.

Data Collection Process

The survey instrument served a dual purpose: (1) to obtain demographic information about the participants and (2) to obtain information regarding all-hazards radiological response plans. The demographic data substantiated the participants' qualifications—academic knowledge, applied knowledge, or experience in emergency management—to participate in the study.

Round one and round three pilot surveys.

A pilot survey for both Round One and Round Three was conducted prior to administering the survey with three emergency management experts who would not be participating in the survey process. These participants met the same criteria—educational background, applied knowledge and expertise in emergency management—as those in the target population. The goal was to determine readability of the survey questions, refine the survey instrument, and to ensure the relevance of questions. Based on their feedback, the survey instruments were refined and subsequently reviewed again by the same three experts. Both survey instruments were deemed relevant for the information being sought. The pilot survey provided an unbiased review and suggested that the survey instruments were reliable and valid for the targeted audience and research question.

Round Two survey instrument (Appendix C) gathered demographic data such as academic background, years of experience, and gender of the experts. The survey also gathered experts' opinions regarding all-hazards planning with an emphasis on a school system-based radiological response plan. Responses to these questions produced data used to develop the questionnaire for the Round Three survey instrument. Each expert was asked to rate their response using a Likert scale rating system strongly agree, agree, does not matter,

disagree, and strongly disagree. A comment box was provided, at the conclusion of the survey, for participants to provide additional comments or information they felt was relevant to the survey. During Round Four each member was asked to rate the items using the same Likert scale. A comment box was provided for each question and at the conclusion of Round Three for additional comments the experts deemed relevant to the study.

Additional data gathered in Round Two are analyzed, synthesized and categorized in the same manner as in Round Four. Based on responses in Round Four, the researcher consolidated the comments and developed recommendations for the practice of school-based emergency management and recommendations for future research.

Target Audience

The target audience consisted of experts who matched the definition of *emergency management professional*. According to a definition provided by Webster's Revised Unabridged Dictionary (1913) an expert or experienced person is one instructed by experience; one who has skill, experience, or extensive knowledge in his calling or in any special branch of learning. Criteria required to participate in this study included: (1) objectivity and the ability to explain potentially complex opinions in a concise manner; (2) impartiality and willingness evaluate the issue before offering an opinion; (3) pre-eminence as a practitioner in his or her field; (4) published, researched, or trained in the subject matter area; (5) well-experienced in the profession; (6) willingness to act as an expert; and (7) knowledge of subject matter standards (Harper, 2009). Based on Senge, Kleiner, Roberts, Ross, and Smith's (1994) definition of learning organizations, the experts participating in this study represented organizations that expanded their capacity to create results-oriented

solutions, worked collectively to discover new approaches through research, and learned together to meet the increasing security demands of the United States.

Those in the target audience were selected to participate in the survey by the researcher, either personally at a national emergency management conference or via electronic mail. Each participant received a consent form, located in Appendix B, which described the study and expectations of participants. After signing the consent form experts had two options for completing the questionnaire: (1) online, via *Select Survey* or (2) a paper copy completed at a national emergency management conference.

Limitations

Limitations of a Modified Delphi Method included:

- This study was limited to all-hazards planning for manmade disasters, specifically the release of radiological substances.

- This study may not be representative of all emergency management experts' opinions.

- The data obtained in the conduct of this study may be subject to different interpretations by different readers.

- The interpretive/subjective nature of the methodology may introduce bias into the analysis of the findings.

- There was a potential for bias because the researcher is employed in the emergency management arena.

- There was a potential for bias because the researcher performs work under contract with some of the survey respondents.

- Bias was controlled through the following processes:

1. The Modified Delphi Methodology maintains anonymity, elicits expert opinions, and uses multiple surveying rounds;

2. Peer reviews and expert opinions direct the survey;

3. Qualitative data was coded;

4. Quasi-statistics were used; and

5. One-on-one interactions were prevented.

Delimitations

Delimitations of a Modified Delphi Method included the following:

- Development of an all-hazards plan was viewed as *best industry practices* in emergency management.

- The results of this study may have generalizability, or at a minimum, transferability, for other event-specific, emergency response activities that have potential to impact school resiliency and continuity of operations.

- The results of this study may have generalizability or at a minimum, transferability, for other event-specific, emergency response activities for local, state, federal and tribal authorities as well as business and industry that have the potential to impact their resiliency and continuity of operations.

Validity and Reliability

The validity of the Modified Delphi Method depends on the careful and systematic application of procedures for initial competency selection for example reviewing the literature, developing a table of specifications, and conducting a pilot test. In a traditional modified Delphi, this careful selection process is necessary in order to (a) avoid biasing panelists by including inappropriate or unnecessary items and (b)

increase the probability that consensus can be achieved in an efficient and timely

manner (Custer, 1999, p. 6).

Another component for ensuring validity was the selection of experts to participate. The

Modified Delphi Method used three criteria to determine the qualifications to participate in

this study: (1) experience in emergency management, (2) academic background, and (3)

applied knowledge.

The Modified Delphi Method remained beneficial and appropriate for the data

collection process. The questions addressed in this study did not require precise quantitative

data collection. Instead, these questions required subjective knowledge and subject matter

expertise as a collective group. These subject matter experts represented diverse

backgrounds and a variety of government, business, and industry professionals who

specialized in emergency management best practices. To have face-to-face exchange with

this level of expertise presented insurmountable challenges as well as be cost- and time-

prohibitive. This process increased the efficiency of data collection from all participants.

Finally, the diversity and anonymity of the subject matter experts prevented domination or

groupthink and preserved the validity of the process.

Reliability, validity, and sample size were issues that the researcher considered when

collecting the data. Questionnaires and surveys were the primary instruments used to collect

this data. In addition to what was required of a survey, the Modified Delphi Method asked

experts to validate the researcher's interpretation and categorization of responses to the

research question. A major difference from quantitative- and qualitative-research

methodology was that the Modified Delphi Method is iterative, flexible and can occur over

an indefinite amount of time. The methodology was iterative in that all data must have been collected, analyzed and ranked at the end of each phase.

Experts were to provide their opinion regarding essential elements that should be included in a school system-based radiological response plan. Forty experts responded to this survey. Eleven essential elements were presented to the experts for consideration during Round One. These essential elements were gleaned by examining radiological response plans from the agencies listed in Table 1. These documents were designed to improve emergency preparedness functions at a variety of state or federal agencies. Each of these documents related to the release of radiological materials, whether intentionally or unintentionally. The ultimate goal for each of these agencies was to proactively address the four phases of emergency management—preparedness, mitigation, response and recovery— from the perspective of their organizational roles and responsibilities.

Ethics in Research

Prior to beginning any study involving the human element, the researcher's and approving institution's utmost priority is conducting research in an ethical manner. Lincoln Memorial University (LMU), the approving institution, required the researcher to submit an Institutional Review Board (IRB) application to the university prior to the commencement of the study. LMU's IRB Committee approved the IRB application as an expedited IRB. Provisions in the IRB included the following:

- Anonymity of the experts was assured;
- Paper-based data were retained in a locked cabinet within a locked room;
- Electronic data were password protected;
- The online survey was only accessible to the researcher;

- Participants' surveys were coded to maintain anonymity of the data;

- Only aggregate data was reported;

- All personal identifying information was kept confidential;

- No identifiable personal information was reported in the analysis or in the narrative; and

- A signed consent form was obtained from each participant.

For this study, the researcher was aware of his bias, formed from his technical knowledge in the emergency management, and took the following steps to ensure an unbiased process in conducting, interpreting, and reporting the data:

- Ensured none of the survey data contained any of the expert's personal identifiable information;

- Maintained objectivity throughout the process; and

- Represented all responses provided by the experts.

Summary of Chapter Three

A Modified Delphi Method was selected as the best approach for collecting, analyzing, and ranking data for consideration in a school system-based radiological response framework. The purpose of the framework was to maintain school resiliency and protect staff, faculty and students during a manmade disaster such as the release of radioactive substances. The literature was consistent in asserting that an all-hazards plan focused on manmade disasters was an issue not only facing school systems but many other organizations in the United States. The literature review also revealed that school systems and other organizations in the United States were unprepared to respond to atypical events such as the release of radiological substances, which led to the development of the research questions.

The research led to data collection and analysis as to what essential elements should be included in a school-system-based radiological response framework. The study produced emergent themes for consideration, to assist school systems with preparation for an atypical disaster, specifically, a release of radioactive materials. The Modified Delphi Method used sound reasoning, disciplined research methods, within a controlled environment, a systematic sequence of data collection, and valid and verifiable conclusions to substantiate and support the findings of this study. The reliability and validity of the tool was grounded in sound research methodology. The methodology allowed this researcher to study a question involving the development of a school-system-based radiological response framework could be implemented in school systems nationwide.

The Modified Delphi Method was a qualitative research methodology that used individualized, expert opinions to achieve consensus. However, it was important to consider that results from such studies were viewed through the lens of the experts and represented the truth as they saw, based on their experience and knowledge over time, rather than on quantifiable-based research. The four-round Modified Delphi Method presented a total of 137consensus statements from a panel of emergency management experts. Rounds Two and Four consistently produced four emergent themes—training, communication, collaboration, and all-hazards planning. Two complementary health-related themes—medical response and protective actions—emerged in Rounds Two and Four as well. The researcher selected a four-round Modified Delphi Method for two reasons. First, to prevent survey fatigue, and second, since the experts' responses were consistent throughout the survey—institutionalized cohesiveness—the researcher determined that a four-round Modified Delphi Method covered all phases of radiological response planning.

Chapter Four: Results

This chapter addressed results an analysis of data collected during this Modified Delphi Method. The results discussed in this chapter included qualifications of the experts surveyed and survey responses. Results of this study were based on the following research question:

RQ1: Considering the perspective of emergency management professionals regarding school resiliency and the four phases of emergency management—preparation, mitigation, response and recovery—what elements should be included in a school system-based radiological response framework?

The purpose of this study was to achieve consensus from emergency management experts on the need for a school system-based radiological response framework. The traditional Delphi structure used for this study provided experts the opportunity to address issues for which no definitive answers had been provided by implementing face-to-face interactions. The Modified Delphi Method provided consensus-building opportunities for experts to interact over two rounds of questioning, using electronic mail and links to an electronic survey instrument—*Select Survey*. Using a Modified Delphi Method with no face-to-face contact prevented the potential for dominance by one individual or groupthink. The convenience of using technology for a Modified Delphi Method was chronicled in *Managing a Large Distance Course Using Webboard* (Turoff, 2000). The author justified the use of the Modified Delphi Method with these parameters:

(1) Protects the validity of the results by using diverse expert opinions;

(2) Assures anonymity of the participants;

(3) Requires collective, subjective judgments rather than exact analytical processes;

(4) Eliminates barriers of travel, geographic separation, cost;

(5) Provides the convenience of using technology to address the issue rather than face-to-face interactions; and

(6) Contributions regarding a broad topic can be address, collectively by experts with diverse background (Turoff, 2000).

As with the Delphi Method, the Modified Delphi Method required data to be synthesized, analyzed, and refined in order to move to the next round of questioning.

Instrument Design

The Modified Delphi Method utilized the perspective of emergency management professionals regarding school resiliency and the four phases of emergency management— preparation, mitigation, response and recovery to determine what elements, if any, should be included in a school system-based radiological response framework. This study was also based on the literature findings. First, the information gathered in the literature review indicated school officials in general, lacked expertise in emergency planning therefore the researcher opted to solicit opinions on this topic from emergency management practitioners. Second, the literature review indicated that governmental organizations, business and industry as well as most aspects of American society were ill-prepared to respond to the release of radioactive materials.

The data were collected from two rounds of surveys. This Modified Delphi Method utilized a randomly-selected population of emergency management experts who attended a national emergency management conference. Other emergency management experts not at the conference were solicited by electronic mail and were invited to participate in the study. Once these individuals agreed to participate each received a link via electronic mail. This

approach provided geographically-separated experts an opportunity to maintain involvement throughout the study and expedited the data collection process. This study used a Modified Delphi Method to gain consensus from emergency management experts in determining if components for a school system-based radiological responses planning framework are necessary. Each of the two rounds of questioning used data collected from the previous round as a basis for seeking additional opinions from the experts. A Likert rating system was developed for use in these to evaluate individual, expert responses.

Round Two

The first step was to select the target audience for the survey. The target audience consisted of experts who matched the definition of emergency management professional. The definition was applied based on an assessment of each individual's academic knowledge, applied knowledge, or experience in emergency management. The researcher determined the ideal location was a national emergency management conference in Las Vegas, Nevada in May 2010. A total of 43 experts were randomly selected from a pool of 300 conferees to participate in Round Two of the survey. Of those 43 selected to participate, 40 completed the survey. The overall response rate for Round One was 93 percent. The survey is located in Appendix B.

Demographic data results.

In Round One of the survey, participants were asked questions about themselves and their years of experience in emergency management. Respondents were asked to identify themselves as either male or female. They were asked to provide information regarding their educational background, name of their employer, and job titles. Figure 5 depicted the gender ratio of those completing the survey.
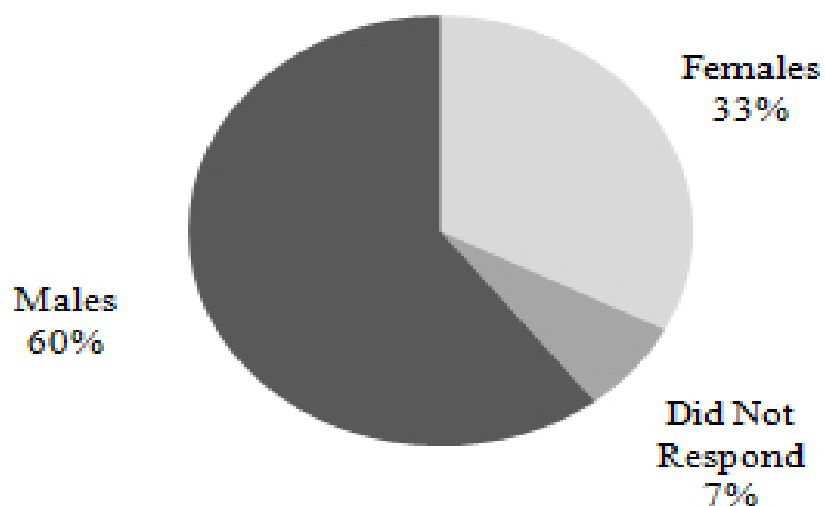
Figure 5. Gender distribution of survey participants.

Experience in emergency management was another criterion for participating in this survey. Participants' experience ranged from four to 30 plus years in emergency management. The experts' combined number of years experience in emergency management total 898 years or an average of 22.45 years per respondent. Another consideration was the diversity of the population surveyed. The researcher's goal was to survey experts horizontally—within state and federal agencies, business and industry; and vertically—at a multitude of levels within each organization. Each organizational representative brought a unique and different perspective to this survey. The list below illustrated the diversity of the experts' occupations. The list was grouped into job families or groups with similar responsibilities and functions.

- Program Analyst/Research Staff/ Emergency Manager/ Program Manager

- Senior Media Coordinator/Vice President Media Consultants

- Emergency Management Training Coordinator/NIMS-certified Instructor

- Director Continuity & Emergency Services

- Emergency Management Transportation Coordinator/Drill and Exercise Program

    Coordinator/ Senior Emergency Management Exercise Designer

- Emergency Exercise Specialist/ Emergency Planning Specialist/Emergency

    Management Specialist/ Emergency Management Technical Director

- Certified Health Physicist/Nurse/Paramedic/Doctor

- Assistant Director, Division of Environmental Health Investigation of a large
    northeastern state

    As noted earlier, academic experience was a qualifying criterion for participating in

    the survey. The educational background of the experts was ascertained and is

    depicted in Figure 6.
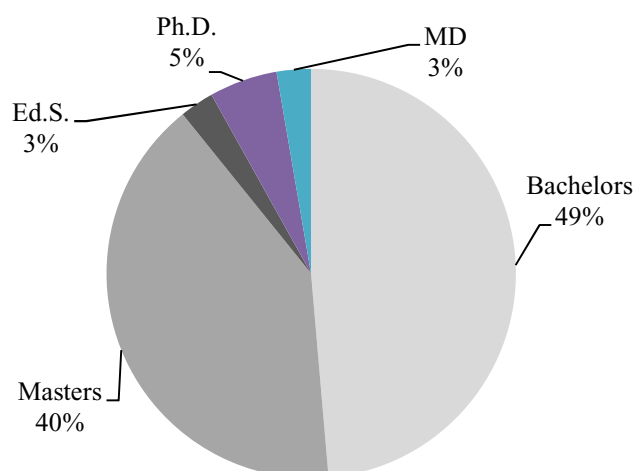
Figure 6. Round one experts' educational background.

There was no minimum number of participants required for a Modified Delphi

Method. The number of experts participating in the study was determined by the type of

research being conducted, the degree of diversity required on the panel, and the total of their

educational or applied experience. These qualifications were typically left to the discretion

of the researcher. To participate in this survey, experts from a variety of agencies were

selected. The Modified Delphi Method provided an opportunity to obtain data from a

nationwide perspective, representing an assortment of state and federal agencies, private

businesses and industries and colleges and universities. The agencies represented in the

study are depicted in Table 2. Many examples of research, using the Delphi Method, were

discovered during the conduct of this study. However, none revealed assembling of a panel

of experts to address the topic of a school system-based radiological response framework.

Table 2.

Distribution of Agencies Surveyed

Employer	Response Total	Response Percentage
Department of Energy Headquarters	5	12%
Department of Energy Field Office	1	2%
Department of Energy Contractor Sites	22	55%
Others:	10	25%
New York State Department of Health	1	2%
Centers for Disease Control and Prevention	1	2%
Private Business & Industry	2	4%
Colleges & Universities	1	2%
State Government	1	2%
Non-response	1	2%

Collection process summary.

Round Two was conducted both in person at a national emergency management

conference and via electronic mail. Round Four was conducted via electronic mail. Upon

completion of Rounds Two and Four the researcher compiled data from experts' opinions

into a list of emergent themes for consideration by school systems to enhance existing all-

hazards emergency plans.

Forty emergency management experts participated in Round Two (Appendix C) of

the study, conducted from May 4, to May 13, 2010. A Likert scale questionnaire was

developed to evaluate individual, expert responses pertaining to the research question. Data

gathered from the responses were collected, analyzed, categorized, and coded into emergent

themes. Qualitative data were grouped into emergent themes and analyzed accordingly. Consensus responses were pursued for each individual question. Consensus was defined as members of the group agreeing with the statements posed in the survey instrument. Statements that achieved consensus in Round One were further examined in Round Two.

Round Four (Appendix D) began on November 3, 2010, with the sending of an invitation (Appendix H) being sent to the original forty experts. Responses from Round Two were used to construct another Likert scale questionnaire and sought more specific opinions from the experts. A reminder email (Appendix I) was sent on November 16, 2010. The second round ended on November 19, 2010, with a total of 31 of the original 40 experts successfully completing Round Four. Data gathered from experts' responses were collected, analyzed, categorized, and coded into emergent themes. Declarative data were grouped into emergent themes and analyzed accordingly.

On November 19, 2010 the researcher compiled results identified by the experts in Round Two and Four. The researcher analyzed, categorized, and coded the data in this round.

Round two results.

The goal of the survey was to seek consensus from emergency management experts regarding a need for a school system-based radiological response plan. Experts were presented with 11 essential elements and asked to use a Likert rating scale to rate the importance these elements for a radiological response plan. The 11 essential elements and the percentage of agreement are listed in the Table 3, showing consensus responses among the experts on these 11 elements.

Table 3.

Representation of Round One Questionnaire Likert Scale

| | Response percentage | | | | |
| | Definitely | | Does Not | | Definitely |
Essential Elements	Disagree	Disagree	Matter	Agree	Agree
Direction and Control	3%	8%	0%	21%	68%
Notification	3%	0%	0%	23%	74%
Warning	0%	0%	0%	21%	79%
Shelter-in-Place	0%	0%	3%	24%	74%
Evacuation	3%	8%	0%	29%	61%
Communications	0%	3%	3%	17%	78%
Security and Law Enforcement	0%	0%	0%	26%	74%
Medical	0%	3%	8%	47%	42%
Public Information	0%	0%	0%	28%	72%
Transportation	0%	3%	5%	36%	56%
Memoranda of Understanding	3%	5%	11%	37%	45%

Although consensus was reached by the experts on the 11 essential elements

presented, declarative statements gathered in Question 12 yielded additional insight into their

thinking regarding a radiological response framework. The declarative statements resulted in

five emergent themes. The theme appearing most frequently was an all-hazards plan rather

than a separate radiological response plan as being the most appropriate for school systems.

An all-hazards plan was congruent with DHS's National Response Framework (NRF). The

NRF established a comprehensive national, all-hazards approach to domestic incident

response. The NRF served as guidance for multijurisdictional response partners to prepare

for and provide a unified national response to disasters (DHS, 2008). The NRF was

structured for "scale-ability" depending on the magnitude of the emergency.

Emergent themes in round two.

Round Two produced five emergent themes from declarative statements made by the experts. These themes served as an indicator of consensus-building regarding the composition of a school system radiological response framework. The five emergent themes were (1) Training; (2) Collaboration; (3) Communication; (4) Medical response; and (5) Agreement on an all-hazards approach to emergency preparedness.

Training.

According to the NRF (2008), effective response to any hazard involved a combination of planning, allocating resources, training, exercising, and organizing to build, sustain, and improve operational capabilities. This level of response required the identification of personnel, equipment, and developing school-system specific plans and procedures for responding to any disaster. Training was essential to the success of any implementable disaster response. During the coding process training was clearly identified 13 times as an emergent theme. Comments from the experts revealed the importance of training for emergency events, especially for events involving the release of radiological materials. Comments indicated the need for trained personnel who were capable of making decisions to address protective actions such as shelter-in-place or evacuation. The experts' comments also indicated the need for annual radiation-based, school-system-wide training as indicated by the following comments: "Have school superintendents and principals participate in local, county and state radiological and all hazards exercises so that they understand emergency response" and "Radiation specific, physics basics, common sense understanding for all staff possibly on an annual basis." Both of the comments reflect expert consensus on radiological-specific training within the education community.

The NRF also referenced the importance of training by stating, "Emergency management, including preparation and training for effective response, is a core obligation of local leaders" (NRF, 2008, p. 15). Training was an issue that impacted every component of emergency response. Underscoring the importance of training, the term was cited 32 times within the NRF. Not only did these comments express the need for training, but they also expressed a need for collaboration, which emerged as another recurring theme.

Collaboration.

Although emergency preparedness was an integral component for school resiliency, it was not the primary responsibility of school administrators. Educating students was their priority. The demands on a school administrator can be overwhelming on a normal day. A crisis multiplied the demands on an administrator exponentially. Second, providing a safe environment that enabled learning to occur was paramount. Third, the ability of an administrator to respond to crises impacted the public's perception and confidence in the administrator's decision making and leadership abilities. Last, each potential for an external crisis to impact a school should be examined and anticipated with crisis-specific roles, responsibilities and resources needed to resolve, mitigate or recover from the event (Strader, 2000). For this response to occur, collaboration with local, state and federal authorities was essential. Collaboration also fostered consistency, interoperability and collaboration during response activities (NRF, 2008). Collaboration with local responders was necessary to ensure that school plans and objectives were aligned. Collaboration also supported integrating with other plans to achieve overall goals and objectives in an incident (NRF, 2008). Experts participating in the study cited the need for collaboration 11 times, indicating the importance they saw in collaboration with authorities. The experts indicated the need for

collaboration beginning during the planning stage. They stressed the importance of collaboration noting, "fire department not only perform safety inspections of the school property, but also provide counsel on what needs to be done to better prepare for radiological event." Additionally, they indicated the importance of aligning school systems with local and state evacuation plans and developing Memoranda of Understanding with local authorities. From the perspective of a radiological-specific plan the sentiment of the group was expressed in the following quote:

> Radiological-specific response plan should be established by county (local) or state governments. Schools should not have a separate radiological response plan (from state and local governments) but should have the opportunity to partner and provide information to the local and governments to be included in the total community response plan.

Although collaboration and communication were interconnected, for the purposes of data analysis in this study, each was discussed separately.

Communication.

During a disaster, communications involved developing communication links with several entities. Three key communication links were identified by the experts: (a) internal—staff, faculty and students; (b) external—parents and guardians; and (c) response agencies—fire, police, and emergency medical systems (EMS). From the internal communication perspective, the experts cited the importance of communication 23 times as critical components in managing shelter-in-place or evacuation. As an example, one expert indicated that shelter-in-place or evacuation plans needed to be shared internally with staff, faculty and students as well as externally with parents, as part of an overall emergency preparedness

outreach. Additionally, the experts indicated that communication among school systems and local response agencies should occur at the onset of the planning stage. Specifically, they indicated the need to share school floor plans with responders and to develop accountability procedures that addressed the physical facilities such as restrooms, hallway, cafeteria, library, gymnasium, the athletic field, or off campus. Communication issues also included multiple access points to the school's public address system and the ability to communicate through text messaging. In reference to communication with parents, the experts' recommendations included developing: (1) parent-centric, educational outreach campaigns, specifically for atypical emergency events; (2) precautionary emergency response information directed toward parents such as evacuation or early dismissal, emphasizing the term "precautionary;" and (3) radiological response literature for school system personnel and parents, which would include information on types of radiation contamination, essentials of exposure hazards, and tips for decontamination.

The experts suggested the development of radiological-specific education materials that described the implementation of the school systems' emergency response actions, especially for an atypical emergency. The NIMS requirements supported the experts' recommendations. The NIMS indicated that planning should include educating stakeholders such as local residents, parents, and emergency responders.

Most of the experts agreed that preemptive responses would be wise. By educating stakeholders prior to an event, persons connected with the event have a better perspective, regarding the actualities of a response, rather than relying upon assumptions. In the emergency management nomenclature, these preemptive responses were closely linked to emergency public information (EPI). The greatest strength of EPI was its purpose—keeping

stakeholders, whomever they may be, informed. Emergency Public Information had two

congruent functions, first, to calm stakeholder's fears and anxieties, and satisfy their need for

empowerment by providing them with information needed to make decisions about

protecting themselves and their families. And second, EPI could simultaneously excite the

same stakeholders to take actions needed to protect themselves and their families. One

expert stated that schools needed an emergency communication plan that could be

implemented for internal and external stakeholders. Other communication efforts suggested

by the experts involved establishing communication with local response agencies prior to an

event. One expert opined that establishing communication process with local agencies led to

recommendations regarding best practices in preparing for, responding to, and recovering

from a disaster. Secondly, establishing open communication developed personal

relationships that were important for communication processes, especially during a disaster.

Communication via the media and social media were not within the scope of this

study. However, both outlets played an important communication role during an emergency

event. Both were readily accessible to stakeholders and asserted considerable influence on

the communication process. The NRF addressed communication by stressing the importance

of keeping the public informed through EPI, education strategies, and communication plans

that ensured the protection of the public (NRF, 2008). The NRF also recognized the need to

coordinate communication efforts during an emergency. From a national perspective, the

NRF (2008) stated,

> State and tribal officials typically take the lead to communicate public information
>
> regarding incidents occurring in their jurisdictions. It is essential that immediately

following the onset of an incident, the State or tribal government, in collaboration

with local officials, ensures that:

> Communication lines with the press are open, questions receive prompt
>
> responses, and false rumors are refuted before they spread. Information about
>
> where to receive help is communicated directly to victims and victims'
>
> families (p. 51).

One critical concern of communication, collaboration, and training was identifying

special needs population, associated with the school system. Those individuals needing

assistance during an emergency event required different communication approaches. The

Americans with Disabilities Act of 1990 specified that special needs populations must be

accounted for during an emergency event. Although the ramifications of this law were not

addressed in this study, special needs populations need assistance with the functional aspects

of sheltering-in-place, evacuation, or medical attention.

Medical response.

Medical issues surrounding shelter-in-place or evacuation presented challenges for

school officials especially if either of these two protective actions were prolonged. The Joint

Commission on Accreditation of Healthcare Organizations' (Joint Commission) *Health Care*

at the Crossroads: Strategies for Creating and Sustaining Community-wide Emergency

Preparedness Systems (2003) advised hospitals to ". . . ensure 48 to 72 hour stand-alone

capability through the appropriate stockpiling of necessary medications and supplies" (p. 8)

and a similar strategy holds potential for school systems. Gee, Meece-Hinh, Muehlenkord,

and Zwirn (2006) emphasized the same point—remaining safe during the first 72 hours after

a disaster occurred would be a challenge. During this time period, federal, state, and local

response assistance was unlikely because of the demands on the emergency management infrastructure. The conventional belief within the emergency response community was that during an event involving mass casualties, communities needed to be self-sustaining for at least 48 to 72 hours. Meaning these communities could expect no assistance from outside agencies, including local response agencies. Many schools were responsible for dispensing medication to students and therefore needed to include provisions in their emergency plans to address medical concerns of their staff, faculty and students. Medical issues were recognized as one school systems would encounter during an emergency event. Experts' comments focused on having sufficient medical and nutritional resources available during the aftermath of an emergency. Additionally, they voiced concern about acquiring, distributing, and dispensing medication during an extended shelter-in-place or evacuation situation. Another concern was the legality of parental permission to administer medication. The same concerns were expressed by the American Academy of Pediatrics (2003).

As indicated in the literature review, the policy statement provided by the American Academy of Pediatrics, *Radiation Disasters and Children* (2003) called for plans with medical directives, should injured children need medical attention or treatment. The Academy advised schools to stockpile potassium iodide (KI) to protect the thyroid from exposure to radioactive materials. This required school systems to have supplies of the medication on hand and trained personnel to dispense it. Although the Nuclear Regulatory Commission (NRC) recommended administering KI tablets, its use as a prophylaxis following after the release of radiological materials was still a controversial issue. A survey entitled *Evaluation of Potassium Iodide Prophylaxis Knowledge and Nuclear Emergency Preparedness: New Jersey 2005,* (Blando, Robertson, Pearl, Dixon, Valcin & Bresnitz, 2005)

suggested that gaps exist in practitioners' of emergency preparedness as it pertained to the release of radiological materials near a commercial nuclear power plant. Questions about dosage were particularly important to school nurses because they may administer KI to the school population. KI was not the only medication of concern. Many students took medications on a daily basis, and many of these medications were administered by a school nurse or designated personnel. If a school either sheltered-in-place or was evacuated, a critical issue was whether the appropriate dosages of medications would be available for 48 to 72 hours? Questions, planning, and communication with parents prior to an emergency event were critical to ensure supplies of medication were available during an emergency event. Additionally, there were other medical issues such as mental health to be addressed. One expert identified the ability to cope with mental health issues as an item for inclusion in an all-hazards response framework. In summary, medical issues impacted school resiliency by further complicating response efforts. Finally, a study entitled *Communicating Information on an Emergency Preparedness Pill Distribution Campaign* (Bland, Robertson, & Bresnitz, 2007) indicated that training and fact sheets were effective in enhancing knowledge among the general public and emergency responders.

All-hazards planning.

This study investigated the need for a school system based radiological response framework and provided school systems with a reference point on which to develop, evaluate or enhance existing plans. It also provided school systems with a process for maintaining school resiliency. The framework suggested by the experts—all-hazards planning—aligned itself with the NRF. The NRF (2008) was an all-hazards planning guide that described best practices for incident response from the local level to large-scale incidents such as manmade

or natural disasters. The framework was built on the National Incident Management System (NIMS) which prescribed standardized practices for managing emergency incidents. The intent of the NRF was to standardize the ability of communities' responders, and organizations ability to develop scalable, flexible, and adaptable coordinating plans and procedures. In so doing, alignment of the key roles and responsibilities became standardized across the nation (NRF, 2008). The ultimate goal was to protect the health and safety of the public, protect property and the environment, and meet basic human needs. Much like the NRF (2008), a school system-based all-hazards plan was designed to accomplish the same goals.

In addressing emergency preparedness, the experts' responses indicated they supported the intent of the NRF—using best practices for managing emergency events. During the coding process, the researcher noted 12 instances where experts' statements aligned with NRF all-hazards planning philosophy. One expert's comment stated,

The importance to evaluate the need for these items (survey statements) seems obvious. It is equally important to not be too specific / binding in guidance—the plan needs to be flexible enough to be implemented. For instance, don't specifically say always shelter-in-place or evacuate—the need to do either is situation-dependent.

Other comments referenced the need of an all-hazards plan to address event-specific, emergency-related issues based on the appropriate protective actions such as shelter-in-place or evacuation.

Round two conclusion.

The four phases of emergency management—preparedness, mitigation response, and recovery were addressed in the Round Two survey. The five emergent themes were: (1) Training, (2) Communication, (3) Collaboration, (4) Medical, and (5) All-hazards.

These themes were the basis for the next round of questioning. The Round Four survey asked the experts to provide additional information through a Likert rating scale and offer comments on school preparedness and resiliency. The importance of these themes was that they provided insight into areas in emergency preparedness where emergency planners may want to concentrate their efforts in solidifying an emergency plan.

Round Four Results

An email request was sent to those experts who completed the Round Two survey to participate in the Round Four survey. As with the previous survey, the target audience for the Round Four survey consisted of experts who matched the definition of emergency management professional. The definition utilized was based upon the individuals' academic knowledge, applied knowledge, or experience in emergency management. As noted earlier, academic experience was a qualifying criterion for participating in the survey. The educational background of experts completing Round Four was depicted in Figure 7. A total of 40 experts were asked to participate in Round Four of the survey. Of those 40 invited to participate, 31 completed the survey. The overall response rate for Round Four was 78%. The Round Four survey is located in Appendix D.
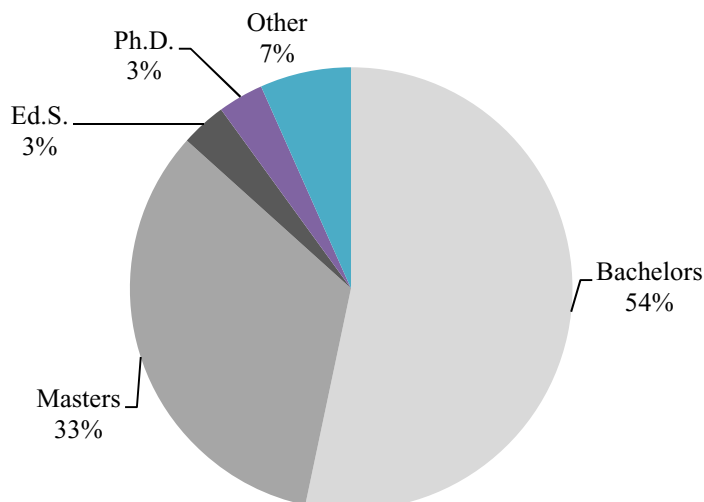
Figure 7. Round four experts' educational background.

Demographic data results.

Round Two of the survey asked respondents to identify their gender, their educational attainment, place of employment, and years of experience in emergency management. As in Round Two, participants' experience ranged from four to 30 plus years in emergency management. The experts' combined number of years experience in emergency management totaled 699 years, or an average of 23.30 years per respondent. Of those respondents completing the Round Four survey 62% were male, 37% were female and 1% did not reply.

The goal of the Round Four survey was to explore and clarify the experts' opinion regarding the need for a school system-based radiological response plan. Experts were presented with three questions and asked to use a Likert rating scale to determine if these elements were critical for a school systems' emergency response plan. Their responses and the percentage of agreement are listed in Table 4. This table showed consensus response among the experts on these questions. As in Round Two, the declarative statements resulted in five emergent themes. The theme appearing most frequently in Round Four was an all-hazards theme rather than a separate radiological response plan as being the most appropriate

for schools systems. As in Round Two, the experts' responses were congruent with the

DHS' NRF. The NRF established a comprehensive national, all-hazards approach to

domestic response, served as guidance for multijurisdictional response partners, and prepared

and provided a unified national response to disasters (DHS, 2008). Although the experts on

the questions presented reached consensus, declarative statements submitted for each

question yielded additional insight into their thinking regarding the need for a radiological

response framework.

Table 4.

Representation of Round Two Questionnaire Likert Scale

Question	Response percentage				
	Definitely Disagree	Disagree	Does Not Matter	Agree	Definitely Agree
School systems should have documented and disseminated policy and procedures that specifically address a manmade or natural disaster	1%	1%	0%	37%	57%
All-hazards procedures should list roles and responsibilities of each functional response position	0%	0%	0%	33%	67%
Understanding roles and responsibilities of school staff during the releases of radioactive materials is important.	0%	0%	1%	33%	63%

The survey also asked the experts to respond to the following questions:

Question 7. For manmade or natural disasters which might impact school resiliency, is an

all-hazards plan is sufficient?

Question 9. For credible scenarios, such as the release of radioactive materials that might

impact school resiliency, should an event-specific annex be developed?

Overwhelmingly, the experts reached consensus on both questions as indicated in

Table 5. Closer examination of these responses yielded a conflict from previously recorded

responses from Round Two and Round Four. Throughout the survey the consensus voiced

by the experts was that an all-hazards plan was sufficient. The responses to Question 9

indicated a need for a radiological-specific annex indicated by Table 5.

Table 5.

Experts' Responses to Question 7 and 9

Question	Yes	No	Did Not Respond
For manmade or natural disasters which might impact school resiliency, an all-hazards plan is sufficient?	78%	19%	3%
For credible scenarios, such as the release of radioactive materials which might impact school resiliency, an event-specific annex should be developed?	78%	19%	3%

Emergent themes in round four.

Round Four produced five emergent themes from declarative statements made by the

experts. Four of the five themes reoccurring in Round Four—training, collaboration,

communication, and development of an all-hazards approach to emergency preparedness—

were responses the experts provided in Round Two. The fifth theme—protective actions—

emerged as a significant theme from the Round Four survey data. Protective action

recommendations were physical measures, such as evacuation or sheltering, taken to prevent

potential health hazards resulting from a release of hazardous materials to the environment.

Protective actions were cited by the experts four times in the Round One survey data by

Glotzer, Psoter, St. Jean and Weiserbs (2007) and Wagner (2006, as important components of emergency preparedness.

The recurrence of these themes served as an indicator of consensus-building regarding the composition of a school system radiological response framework. The emergence of identical themes in Rounds Two and Four indicated the reliability and validity of the survey. The five emergent themes were: (1) Training; (2) Collaboration; (3) Communication; (4) All-hazards approach to emergency preparedness; and (5) Protective actions.

Training.

As reported in Round Two, an effective response to any hazard involved a combination of planning, pooling of resources, training, exercising, and organizing to build, sustain, and improve operational capabilities. Training was essential to the success of any implementable disaster response. During the Round Four coding process, training was clearly identified 13 times as an emergent theme. In their comments the experts continued to express the importance of training for emergency events, especially for events that involved the release of radiological materials. Comments indicated the need for trained personnel, capable of making decisions, to address protective actions such as shelter-in-place or evacuation. The following comment captured the opinions of the experts:

> School staff should be assigned to primary and secondary ICS roles, be trained how
> to perform those roles, and be required to participate in a least one tabletop,
> functional, or full-scale exercise, each year to evaluate how they'd perform their roles
> and responsibilities und the district's plan. The exercise scenario each year should
> include one or more of the likely risks or hazards that the district might face.

Regardless of the emergency, the experts continued to express the importance of training staff and students, knowing roles and responsibilities, and updating and testing of the plan annually through some form of school-based exercise. The experts' comments also indicated the necessity for school-system-wide training:

That notwithstanding [*sic*], planning, training, and exercising is important for all types of hazards. EM activities are important for everyone. Planning, practicing, and knowing is important. I know that the school systems do not provide an all hazard plan to parents or students. Any school in the area that has identified hazards should be responsible enough to provide such a plan as well as exercise the children and staff involved. Finally training, practice and drill are critical as well. Just having a plan and not practicing (exercising) the various scenarios won't protect schools. Not only should a well documented plan be in place but it should be reviewed and practiced (exercised) annually. These annual reviews/exercises should include an all aspects (all-hazards) approach to emergencies including potential radiological events.

Again, consider all hazards and staff two to three deep with responders. Also ensure that you make each person's responsibilities very clear and drill them periodically, with and without student involvement.

The school principal and teachers should be trained in the plan and both the parents and students should be briefed on the plan and how they are to react.

The consistency of responses throughout both Rounds Two and Four of the survey reflected expert consensus the importance of training for staff, faculty and students.

Collaboration.

Experts participating in Round Four of the survey cited collaboration seven times. In this round, the experts' discussed collaboration from the planning perspective, indicating the importance of developing a matrix of internal and external functional or operational positions needed to initiate a response. Two noteworthy comments voiced by the experts discussing the value of collaboration were:

Identifying hazards and their risks for schools are important. Developing a list of first responder points of contact (e.g., local fire departments, sheriff/police departments, ambulance services, hospitals, coroner, utility companies [electric, gas, water], local emergency management agency) as well as internal resources (e.g., such as Facility and Maintenance Personnel, Superintendent, Principal, Assistant Principal(s), School Psychologists, School Counselors, School Nurses, Security Forces) and understanding roles and responsibilities for protective actions for specific hazards would be beneficial. This could be accomplished in a matrix table.

School crisis plan should be in place with partners in the community, including law enforcement, fire, public health, mental health and the local emergency management agency (EMA). Not only is it important to address "traditional" crises (emergencies), it is equally important to address emergencies involving nuclear (radiological), biological and chemical crises as well.

In Round Four, the experts continued to closely link collaboration and communication efforts. The language used by the experts in their declarative statements indicated the value of collaborative planning, mitigation, response and recovery efforts—the four phases of emergency management.

Communication.

In Round Four, the experts continued to identify three key communication links as important: (1) internal—staff, faculty and students; (2) external—parents and guardians; and (3) response agencies—fire, police, and EMS. In this round, the experts cited the importance of communication 10 times. However, unlike Round Two where the communication was shelter-in-place- or evacuation-focused, the focal point in Round Four was parent- and school system-centered. Several statements referenced the need for customized communication for stakeholders—parents, staff, faculty, students and local response agencies—as a preemptive approach. Their reasoning is summarized by the following quote:

> Parents will be inclined to go retrieve their children and thus ignore protective action guides ("I'm going to get my baby! If we die, we die together!"). If they felt their children were safe and better protected from potential health effects at the school, and they knew the school plan for this in advance, parents would be much more likely to respond to local government authorities immediately post event.

The theme of preemptive communication response continued to be recognized by the experts as critical to the emergency response process. By educating stakeholders prior to an event, all personnel who are connected with the event have a better perspective of conditions encountered rather than relying upon assumptions.

Protective actions.

Initially emerging in Round Two, the term *protective actions* became an emergent theme in Round Four. *Protective actions* replaced *medical response* as a theme, which emerged in Round Two. The experts cited protective actions nine times during Round Four. The terms *protective actions* and *medical response* were linked since both referred to

protecting the health and safety of the staff, faculty, and students. The experts agreed that the release of radioactive materials and its impact on schools or school systems qualified as a unique circumstance. The experts' recommendations, relative to protective actions, included the development of a radiological response annex and a response matrix or chart designating responsible personnel for identification and initiation of school response activities. One expert specifically stated what other experts implied, "It would be useful to have information on things one can do to keep safe, for example, if contamination is suspected, removing clothing and showering will eliminate more than 90% of contamination."

Statement of protective actions focused on the release of radiological materials as an event which required additional research and was not specifically addressed in this study. Protective actions for atypical disasters, such as the release of radiological materials, may vary depending on the location of the school and the physical characteristics of the radiation released.

Protective actions were premeditated measures focused on protecting the health and safety of the public. Protective actions existed for a variety of hazards such as chemical and radiological releases and natural disasters. Protective actions were based on complex information, designed to optimize decision making where hazard-specific information was not readily available. Preplanning the response based on a set of existing criteria greatly reduced on-the-spot formulation of emergency response plans. Examples of protective actions were found in the Environmental Protection Agency (EPA) Office of Radiation Programs, *Manual of Protective Actions Guides and Protective Actions for Nuclear Incidents* (1991). The choice of a particular protective action is dependent on exposure pathways and

incident phases. Appendix E depicts the recommendations of the EPA's protective action guide based on exposure pathway and incident phases.

All-hazards planning.

Round Four of this study probed deeper into the thoughts and opinions of experts about the need for a school-system-based radiological response framework. As in Round Two, Round Four responses referencing all-hazards planning emerged more strongly. At the conclusion of Round Four, the coding process revealed 28 references citing all-hazards planning. Sentiments of the experts' opinions were summed up in the following survey comment:

> I don't think from a school perspective anything should be different for radiological response. If the school has disaster plans, then the shelter-in-place, take cover, or evacuation options should be covered anyway. The plan should mention that radiological events could be triggering events for these protective actions, but I don't see now the school's actions would be different from any other hazardous material incident.

As conferred in the discussion of Round Two, the framework suggested by the experts—all-hazards planning—aligned itself with the NRF, thereby standardizing roles and responsibilities nationwide. The ultimate goal of any emergency response plan was to protect the health and safety of the public, protect property and the environment, and meet basic human needs. Much like the NRF, a school system-based all-hazards plan was designed to accomplish the same goals (2008).

Based on their responses in Rounds Two and Four, the experts continued to strongly support the all-hazards plan as specified by the NRF. The NRF's all-hazards planning

approach assumed the implementation of best practices for managing emergency events. During the coding process, the researcher noted 12 instances where experts' statements aligned with NRF all-hazards planning philosophy. One experts comment stated, "The importance to evaluate the need for these items (survey statements) seems obvious. It is equally important to not be too specific / binding in guidance—the plan needs to be flexible enough to be implemented. For instance, don't specifically say always shelter-in-place or evacuate—the need to do either is situation-dependent." Other comments discussed the need for an all-hazards plan to address event-specific, emergency-related issues based on the appropriate protective actions such as shelter-in-place or evacuation.

Round four conclusions.

Five themes emerged in Round Four: (1) Training, (2) Communication, (3) Collaboration, (4) All-hazards, and (5) Protective actions. These themes are consistent with the themes that emerged in Round Two. The difference between Round Two and Round Four emergent themes was that *medical* emerged in Round Two and *protective actions* emerged in Round One. The other four themes—training, communication, collaboration, and all-hazards—surfaced consistently in both survey rounds. The consistency of these responses attests to the reliability and validity of the study. Table 6 shows the comparison of emergent themes in Round Two and Round Four.

Table 6.

Comparison of Emergent Themes Occurring in Round Two and Round Four

Theme	Round Two	Round Four	Total
All-hazards	12	28	40
Communication	23	10	33
Training	16	13	29
Collaboration	11	7	18
Protective Actions	4	9	13
Medical	9	0	9

The intended audience for this survey was superintendents of schools, school boards, and local response agencies. These entities were ultimately responsible for the health and safety of staff, faculty, and students during an emergency event. As evidenced in the literature review, a majority of all-hazards school plans were specifically focused on scenarios involving incidents such as natural disasters, and active shooters or intruders. However, there were other atypical disasters that had the potential to leave school systems vulnerable, such as, the release of radiological substances. The literature review suggested that the release of radioactive substances would impact the ability of school systems administrators to prepare and respond such an event because they were not prepared to address an atypical event of this magnitude. The task of planning for an all-hazards emergency response approach required cooperation and collaboration with variety of community professionals to develop practical guidelines for reducing the impact hazards may have in school systems. The goal of this study was to answer the following question:

RQ1: Considering the perspective of emergency management professionals regarding school resiliency and the four phases of emergency management—preparation, mitigation, response and recovery—what elements should be included in a school system-based radiological response framework?

The experts contributing to this study answered this research question. They determined that an all-hazards plan, and its *scalability,* was sufficient to protect faculty, staff, and students during an atypical event. Since 9/11, all-hazards plans, institutionalized through the NRF were the prescribed method and best practice for successfully coping with any emergency event. Based on the experts' responses, protective actions, communication collaboration, training and medical response— each an emergent theme during this study— should be addressed in a school system's all-hazards plan.

This study was the compilation of the results discovered during the survey. Three significant findings resulted from this survey. First, an all-hazards planning was strongly recommended by the experts. As evidenced by the survey data listed in Table 6, an all-hazards plan was cited 40 times by the participating experts. Second, the Modified Delphi Method used in this study was designed to prevent interaction between and among the participants by eliminating face-to-face contact. Participants submitted responses directly to a database thereby maintaining anonymity. Despite these efforts preliminary review suggested that groupthink occurred. Groupthink, as defined by Janis (1991), was the tendency of cohesive groups to reach consensus on issues without offering, seeking, or considering alternate viewpoints. From the perspective of this study, the appearance of groupthink as it pertained to all-hazards planning emerged as an unintentional, yet, significant finding. The researcher's bias was that the experts' currently-held beliefs were based on the post-9/11 events and the standardization of emergency planning shaped their responses for this study. Their responses represented institutional cohesiveness— institutionalization—because standardization has become the norm for conducting emergency management preparedness in the United States (Janis, 1991). This in turn may

have impacted the experts' ability to think critically and become a liability rather than an asset in the decision making process. Thus, groupthink's priority became consensus-building rather than evaluating and resolving issues.

This researcher surmised the consistency of responses was influenced by an external source rather than an internal source. The source of the external influence may have been a national movement to standardize emergency planning and response, represented by the NRF. As previously discussed the NRF was instituted as a result of the events surrounding the 9/11 terrorist attacks. The third finding was the consistency of the other emerging theme discovered in this study—protective actions, communication, collaboration, and medical response. This consistency attested to the reliability and validity of the Modified Delphi Method used to conduct this study. As seen in Table 6 the experts cited each of these themes numerous times.

Conclusion

Although emergency management plans were required by most state departments of education, few address atypical emergencies such as the release of radioactive substances. The purpose of this Modified Delphi Method research study was to query experts to determine elements needed for an atypical event such as the release of a radiological substance. The researcher gathered, analyzed and ranked data provided by emergency management experts based on the following question:

RQ1: Considering the perspective of emergency management professionals regarding school resiliency and the four phases of emergency management—preparation, mitigation, response and recovery—what elements should be included in a school system-based radiological response framework?

Data collection, analysis, and categorization conducted during Round Two and Round Four led the researcher to conclude that a radiological-specific response framework was not needed by school systems. Instead, the overwhelming response from the experts points to the all-hazards approach as prescribed by the NRF.

Summary of Chapter Four

This study asked experts to provide opinions regarding the need for a radiological-specific response framework for school systems. It gave experts an opportunity to offer input and respond to questions regarding this issue. Based on the data obtained, the researcher determined that an all-hazards plan was sufficient for school resiliency should an atypical event such as the release of radioactive substances occur. This study identified five themes for inclusion in an all-hazards plan (1) protective actions, (2) communication, (3) collaboration, (4) training, and (5) medical response. Despite the methodology used, Modified Delphi Method, to prevent groupthink, groupthink may have emerged. Finally, this study provided school administrators with considerations for enhancing their all-hazards plans for atypical disasters, specifically the release of radiological substances.

Chapter Five: Discussion

This study investigated the need for developing a school-system-based radiological response framework, through the lens of a nationwide panel of emergency management experts. The panel came together as a body to provide insight and opinions regarding elements needed in a framework. The purpose of this framework was to assist schools during the four phases of emergency management—preparedness, mitigation, response and recovery. These four phases were designed to protect faculty, staff, students, and maintain resiliency during an atypical event, specifically the release of radiological substances. Increasingly, the types of hazards that organizations face continue to evolve. This evolution meant planning for, responding to, and recovering from disasters, that present new, unique, and different challenges. These challenges required organizations to recast their understanding and thinking about disasters. The literature review and survey responses discovered indicated school systems may be prepared to respond to the traditional emergencies, natural disasters, fire drills, intruders, bullying, and even active shooters, however, they are less prepared to respond to atypical disasters. This study specifically focused on planning for a school's capacity and capability to respond to the release of radiological substances. To the surprise of this researcher, the experts strongly recommended the use of a NRF-inspired, all-hazards plan rather than a radiological-specific response plan.

On any given day, more than one-fifth of the U.S. population can be found in schools ("Taking the lead in an emergency," 2007). As previously discussed, gaps existed between schools and their involvement in emergency preparedness. As the CEO of the school system (Shrestha, 1990), the superintendent is responsible for providing leadership for emergency

preparedness for the school system. Leadership requires working cross-jurisdictionally with local, state, tribal, and federal authorities before, during, and after a disaster. This chapter discusses approaches and makes recommendations for areas of practice and future studies related to school-system-based emergency management, school resiliency, and leadership.

During an event including the intentional release of a chemical or radiological substance, emergency management officials need to be prepared to provide guidance to the public on how to best protect themselves. This guidance is based on the precept that pre-planning and preparedness has occurred with emergency management officials. Preparedness also involves one of two protective actions for recommendation to the public— evacuate or shelter-in-place (Glotzer, Psoter, St. Jean, & Weiserbs, 2007, p. 8). Protective actions are dependent on local, state, federal, and tribal authorities' abilities to analyze, synthesize and implement in a timely manner. Authorities should be well-versed on (1) the appropriateness of the protective actions, (2) the when, where, who, what, why, and how protective actions will be determined and articulated, and (3) protecting the health and safety of the greatest number of residents, utilizing the best available resources. According Glotzer et al. (2007), sheltering-in-place in a school setting may provide the best protection for faculty, staff, and students because the building provides sufficient shelter until help arrives or the emissions dissipate. Glotzer et al. (2007) agree with the NRF all-hazards approach rather than specific plans for each type of disaster. They also agree with the idea of maintaining provisions to shelter-in-place for 72 hours, especially for chemical and radiological incidents. For sheltering-in-place to be successful, pre-event education, social awareness, structural assessments and the type of hazardous materials should be components

of the preplanning. Data collected during the planning stage contributes to the most viable protective action recommendation.

The U.S. Department of Homeland Security (DHS) developed 15 all-hazards scenarios as a mechanism to develop national preparedness standards, with almost one-third of the scenarios focused on hazardous chemical or radiation release. Either chemical or radiological releases may involve protective actions ranging from sheltering-in-place to evacuation to decontamination. All of these protective actions will hamper response efforts. Therefore, it is imperative that emergency management officials explore protective action recommendations during the preplanning/preparedness stage (Glotzer et al., 2007).

Overview of the Study

Chapter One presented the research question focused on utilizing the perspective of emergency management professionals regarding school resiliency and the four phases of emergency management—preparation, mitigation, response and recovery— to determine what elements should be included in a school system-based radiological response framework. Chapter Two uses the literature to research emergency preparedness through the following lens: (1) school preparedness and response; (2) leadership and organizational management; (3) U.S. government and emergency response; (4) industry crisis planning and response; (5) preparedness and emergency management; and (6) the Delphi Method. Chapter Three describes the methodology, a Modified Delphi Method, used in the conduct this study. Chapter Four presents the results of the study and the analysis and synthesis of the experts' answers. Chapter Five presents recommendations and conclusions for practice and for research based on the data collected during the conduct of this study.

This study investigates the need for a school-system-based all-hazards emergency response plan, specifically one that addresses radiological response. While substantial research is available concerning school emergency preparedness, little research links radiological response to an actual emergency situation. This study concludes an all-hazards approach is preferred to an event-specific plan. The study adds to the body of knowledge regarding emergency planning. The findings of this study can be used to develop, evaluate, or enhance a school's emergency management efforts, especially for school systems located in large metropolitan areas; school systems that are located in close proximity to commercial nuclear reactors; or schools systems located in close proximity to major transportation corridors where radioactive substances may be transported.

Recommendations for expanding emergency management practices and future research, within the context of a school system setting, are based on the findings and conclusions of the data discussed in Chapter Four. The implications of this study for school systems are also based on the findings and conclusions of Chapter Four and the aforementioned discussion.

Recommendations for Expanding Emergency Management Practice

Recommendation 1. Evaluate district all-hazards plans to ensure alignment with local, state and federal requirements.

While most school systems have emergency management plans, these plans typically are incomplete, lack coordination with local response agencies, are rarely updated, and seldom used. In addition the plans are not evidence-based nor communicated to parents. Each school reviews its plan to ensure alignment with district plans and forwards to the district office for review. The district coordinates with local response agencies to ensure alignment with community response plans. Reviews are conducted annually for currency

and alignment with state plans and the NRF. The annual review process ensures emergency plans are up-to-date, communicated to local response agencies, staff, faculty, students and parents, and included in the local command structure. Emergency plans are living documents that evolve rather than documents that are stagnant.

Recommendation 2. Conduct tabletops, drills and exercises centered on atypical emergency events, such as manmade disasters, school shooters, natural disasters, shelter-in-place, evacuation, and the release of radiological materials.

Schools typically practice fire drills, natural disasters and intruders/active shooters and in some of the western states school systems include earthquake drills as well. However, many types of exercises can be used to expand the knowledge, capabilities, and capacities of school systems in emergency responses. Drills test the usefulness and effectiveness of response assets with different scenarios. They provide participants with opportunities that test, maintain or develop a response-specific procedure. Exercises provide participants with opportunities to demonstrate tactical and operational capabilities. Tabletops provide participants with opportunities to discuss emergency scenarios and to base plans on existing emergency management plans. Functional exercises are interactive and test several emergency responses functions simultaneously during a specific timeframe. Full-scale exercises involve emergency response organizations that have a response role and simulate real-time response efforts. At a minimum, school systems should conduct one tabletop annually, and one semi-annual drill to ensure staff, faculty, and students know how to respond during an emergency. The adage of "practice makes perfect" has significant relevance in emergency response.

Recommendation 3. Work collaboratively with local emergency planning committees (LEPC) to ensure congruency of the school system plan with existing community response plans.

The Rand Corporation aligned the capabilities of public health with emergency preparedness required for response to a chemical or radiological threat (2009). School systems can align their capabilities with LEPCs to strengthen the system's resiliency to disasters, as well. Developing a comprehensive all-hazards response plan requires superintendents and school boards to work collaboratively with local emergency management officials, elected officials, fire/rescue, police, emergency EMS, public works, utility and telephone companies, Internet service providers, local business and industry, public health and the medical community—LEPCs. Working with LEPCs provides school systems with the opportunity to become involved in community-wide emergency planning and preparation processes, networking with like-minded, community-based organizations, provides opportunities for input, feedback, guidance, evaluation, enhancement and testing of the emergency response plans. The NASRO study (2005) indicates "56% of school resource officers (SRO)" (p. 14) believe schools should work more closely with local response agencies to review and revise school's emergency plans.

Recommendation 4. Partner with local, state, and federal associations that can lobby local, state, and federal agencies such as the Departments of Education, Health and Human Services, and Homeland Security for additional funding to support school resiliency emergency preparedness planning.

In a NASRO survey (2005), SRO's were asked if they felt that there was adequate funding for school emergency preparedness planning. Their responses are captured in Figure 8.
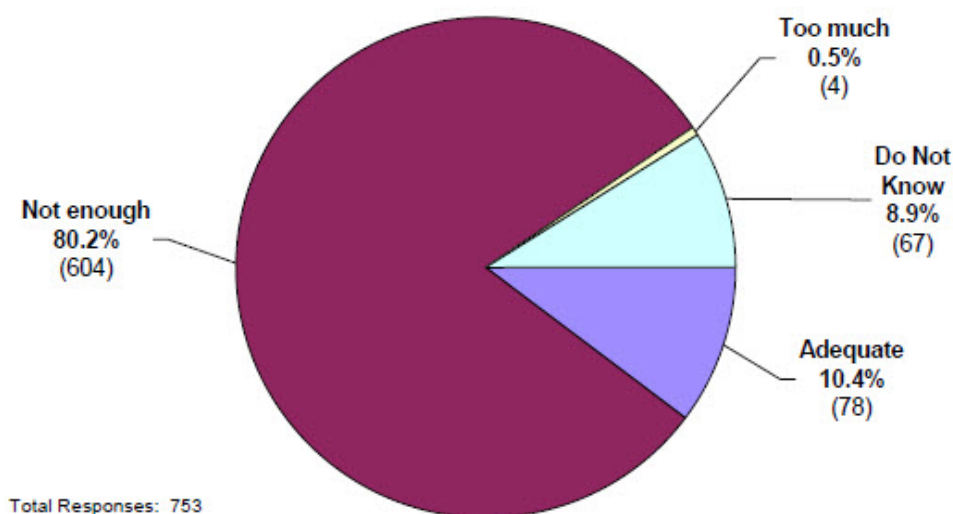
Figure 8. SROs and funding for school emergency preparedness planning, adapted from the NASRO survey (2005), p. 12

If protection of the country's most robust resource—students—is to be raised, school preparedness planning needs to be supplemented by either local, state, tribal or federal assistance. The funding is targeted toward evaluation, enhancement or development of plans and procedures by qualified emergency planners. The planning process should be regulated by experts who are well versed with the intricacies of emergency management planning rather than by unqualified staff. Funding at all levels in education is an issue, particularly for emergency management. Emergency preparedness is another component jockeying for funding from state and federal agencies. The U.S. Department of Education, Health and Human Services, and Homeland Security should work collaboratively to ensure appropriate emphasis and funding are priorities for the education community. As previously stated, during business hours, as many as 53 million people are connected by school systems on a daily basis. At any given time hundreds or thousands of people can be impacted by an emergency event. Planning and preparation are keys to lessening the impact of emergencies on schools.

Recommendation 5. Develop collaboratively with community assets and other education oriented organizations to ensure academic continuity and emergency management are mutually inclusive.

In 2007, a working group of higher education, federal, state, and emergency management officials convened to discuss academic continuity and campus resiliency through the lens of emergency response. Their goals were to consider realistic approaches for sustaining and maintaining continuity of teaching and learning and improve disaster recovery and resiliency simultaneously (Schweber, 2007). Planning for sustaining and maintaining a learning conducive environment is an important factor in school resiliency. If students and parents are separated for a period of time by an emergency event, maintaining a consistent, scheduled, but flexible, learning environment to occupy the mind of the students while administration personnel work toward reunification may help in reducing anxiety. Not only may it reduce student anxiety but also anxiety of faculty and staff. Developing a three-part action plan—(1) what can be done, (2) what should be done, and (3) what must be done— provides structure and as well as direction and control during an emergency event.

Recommendations for Future Research

Recommendation 1. Share results from this study with school systems, especially those that are located in high risk/vulnerable areas as large metropolitan areas, proximity to commercial nuclear facilities, communities where Department of Energy facilities, are located, or along transportation corridors.

Sharing results from this study, with school systems, provides an opportunity for those school systems to prepare for an atypical emergency event, such as the release of a radiological substance. Most emergencies impact the operational aspects of school systems. A release of radioactive substances in, near, or around a school, is an issue that school systems are typically unprepared to address. Depending on the severity of the release, schools might be required to either evacuate or shelter-in-place for a few hours to as much as

96 hours. This means being self-sustaining without assistance, from any outside sources. This will be a critical time for school systems. As indicated in the literature review, just the separation of parents from their children, for an extended amount of time, is stressful for staff, faculty, students, and parents. At a minimum, school systems should have plans in place to address this issue. Additionally, perhaps results from this study will spur school systems to seek assistance from local response agencies as a proactive approach for planning for an atypical emergency event.

Recommendation 2. Conduct training for school system personnel in the four phases of emergency management—preparedness, mitigation, response, and recovery.

The level of knowledge about school-specific emergency management, greatly enhances the schools ability to plan, mitigate, respond, and recover from a disaster. Proper planning ensures rational planning; appropriate estimation of risks; and the ability to manage emergency response, based on credible scenarios that might impact school resiliency. Increased staff knowledge assists schools with pre-event assessment, directed toward hazard vulnerability and mitigation, provides a realistic view of pre- and post-event emergency management capabilities, and focuses schools' emergency management efforts on realistic expectations for school resiliency.

Recommendation 3. Conduct evidenced-based studies on school resiliency and emergency preparedness focused atypical emergency events.

Atypical incidents such as terrorist events, the release of radioactive substances, and school shootings are events that school plans should address. A NASRO study (2005) indicates the lack of preparedness for terrorist attacks through the lens of school resource officers. Figure 9 depicts responses from the NASRO study. The presence of peer-reviewed, evidence-based research provides a platform to substantiate the need for additional disaster

research studies. These studies can provide additional insight into how responders and the

public react to disasters, how to better plan and train for disasters, anticipate and calculate

funding requirements more accurately, improve partnerships with response agencies,

establish event-specific response protocols, and expedite the recovery process. Evidenced-

based research produces five data sets useable in future studies of emergency management:

(1) multiple measures of management, performance, and variables; (2) studies that can be

replicated for validity; (3) complex relationships and multiple interactions that can be tested;

(4) the applicability and transferability to other organizations; and (5) the accessibility of

collected data for other studies (Meier & O'Toole, 2008).
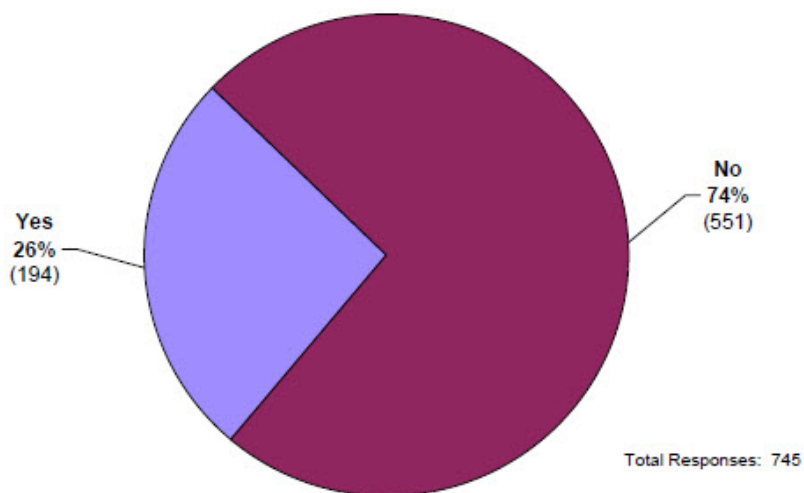
Figure 9. School's preparedness for terrorist attack, adapted from the NASRO survey (2005), p. 12.

Implications

The practice of emergency management, especially to atypical emergency events is

an overwhelming obstacle for most school systems. Superintendents and school boards must

recognize the need to be prepared for such events to protect their students and staff, to remain

operationally functional, and to be self-sustaining for extended period of time. Mitroff &

Alpaslan's (2003) research concluded that 75% of *Fortune 500* companies do not prepare to

manage atypical crises thereby leaving the companies vulnerable. Additionally, the study

indicates that crisis-prepared companies are more likely to survive not only the crisis but

also, in business, in general, because of their atypical mentality approach to problem

resolution. This researcher's bias is that a high percentage of school systems are not

prepared to respond to out-of-the box emergencies either. Many studies have been conducted

and articles written on the subject of school preparedness. Those reported in this study are

confined to conventional preparedness activities, such as intervention programs, active

shooter, and natural disasters, rather than unconventional, atypical emergency events—

manmade disasters—such as the release of radioactive materials. As an example, the lack of

information regarding a manmade release of radiological materials confirms the need to

develop an all-hazards plan that considers events that have potential to affect school

resiliency. Increasingly, the world of school emergency preparedness is becoming more and

more complex and this complexity cannot be ignored. This complexity necessitates that

schools prepare for all-hazards, particularly radiological hazard. The research phase of this

study revealed that American institutions, especially schools systems, are not prepared to

respond appropriately to the manmade disasters such as the release of radiological materials.

A NASRO study shown in Figure 2 depicts the perceptions of SROs about schools being soft

targets for terrorist attacks.

The New York Academy of Medicine (Wagner, 2006), when testing responses with a

dirty bomb scenario, found that few people followed prescribed procedures unless they were

assured that their families were safe. Both of these findings present issues for school

systems. If an atypical event occurs, according to the NASRO (2005) survey, schools are

easy targets. If students are forced to shelter-in-place or evacuate to a location where parents cannot access their children, are schools prepared to assume responsibility—*loco parentis*—for an extended period of time? School systems should prepare parents, prior to a shelter-in-place event. This is accomplished by publishing shelter-in-place plans, conducting educational outreach campaigns, and working with local responders, to ensure all stakeholders—parents, students, staff, faculty, the community, and the school board—recognize the importance of this plan. Parents should refrain from trying to reunify with their children until school officials declare the event resolved. As the temporary guardian of students during business hours, school systems assume the responsibility for protecting students. Therefore, failing to protect students has potential liability issues for school systems. In a presentation entitled *Schools' Prudent Preparation for a Catastrophic Terrorist Incident (2003)*, "Senior experts from the military and law enforcement communities agreed that superintendents, principals, and others in charge carry 'by name accountability'"(p. 7). This implies that parents and the community will hold school authorities responsible for the prevention and management of emergency events. In short, school preparedness may quell future legal actions.

Another issue regarding school preparedness is NIMS compliance. NIMS was created in 2004 by Homeland Security Presidential Directive 5 (HSPD-5) to standardize the management of domestic incidents and responder actions and to coordinate and carry out responses to a variety of incidents, including those involving schools. "Local jurisdictions, including school districts that receive federal emergency preparedness funding, are required to comply with the NIMS" (ERCM, 2006, p. 1). Those requirements include completing the NIMS awareness course, adopting NIMS principles and policies assessing and establishing a

baseline for compliance with NIMS, developing a time frame and strategy for full NIMS implementation; and institutionalizing the Incident Command System (ICS) (ERCM, 2006). The question arising from this is, are school systems NIMS compliant? Schools that cannot answer these questions with a "yes," are placing their systems, staff and students in harm's way. If school systems want to move forward as learning organizations, create a safe learning environment for their staff and students, retain their position as a community-leading organization, and serve as a community resource, they must continue to assess their all-hazards approach for emergency response. FEMA provides a school-based NIMS certification training online at http://training.fema.gov/EMIWeb/IS/is362.asp, or in-residence through the Emergency Management Institute located in Emmitsburg, Maryland.

This study adds to the body of knowledge regarding school systems' approaches to emergency preparedness, based on opinions of emergency management experts about essential elements needed in an all-hazards plan. It also provides a framework for developing a radiological response framework. This study also adds to the body of knowledge by examining preparedness through the lens of: (1) school preparedness and response; (2) leadership and organizational management; (3) U.S. government and emergency response; and (4) industry crisis planning and response. Using Delphi methodology, this study provides confirmation that an all-hazards approach for emergency preparedness is the appropriate direction schools should take when developing school response plans. FEMA, DHS, and the International Association of Emergency Managers suggest that an all-hazards approach that requires school systems to examine threats that range from low to high consequence must be integrated into a school's and community's emergency response plan. Collaborative planning is a proactive measure that ensures that

school systems' plans are aligned with local, state and federal plans. It alleviates duplication of effort, ensures NIMS compliance and makes certain that school systems are connected with local planning efforts.

This study supports the findings that school systems, as well as other local, state and federal organizations are ill-prepared to address atypical events such as manmade disasters. Over half of the officers report that their school crisis/emergency plans are not adequate. Over two-thirds report that their school emergency plans are not exercised on a regular basis. A significant percentage (over 43%) of the SROs indicated that school officials do not formally meet at least once a year with police, fire, emergency medical services, emergency management agencies, and other public safety officials to review and revise school plans. More than half of the respondents indicate that teachers, administrators, and support staff do not receive ongoing professional development training on school security and emergency preparedness issues. Almost two-thirds of the officers state that school bus drivers and transportation personnel have no training in the past three years related to security measures, emergency planning and response, terrorism, and associated topics (NASRO, 2005).

This study provides educators with essential elements that should be included in an all-hazards radiological response framework that is designed to protect the staff, students and school facilities during an emergency event. Students spend as much as 80% of their time in school. "Since 2006, there has been a marked increase in awareness of the vulnerability of schools and the challenging logistics involved in protecting children in schools during unexpected events" (Chung, Danielson, & Shannon, 2009, p. 1). Because educators typically lack emergency preparedness expertise, they continually face obstacles in developing comprehensive school-based response plans (Chung et al., 2009). The all-hazards

components compiled by this study can assist educators with developing a school-based response plan that meets the needs of their school system. The researcher envisions that educators will use the all-hazards plan essential elements defined by this study to enhance their school response plans. Annually schools must allocate dollars to meet increasing demands for new and innovative programs. Even after manmade disasters—9/11, the Columbine shootings, Virginia Tech University, Hurricane Katrina—emergency preparedness funding continues to decrease while the demand for preparedness continues to increase (NASRO, 2005). The researcher suggests that school systems that do not have the expertise or the funding to develop an all-hazards plan use the framework defined with this study to develop a customized plan for their school system.

Conclusion

A lingering research question about the release of radioactive materials is, "What is the impact of institutionalized groupthink in emergency management—preparedness, mitigation, response, and recover?" In other words, the predominate thinking and prescribed process for addressing emergency events in an all-hazards approach. Currently there is a lack of evidence-based data showing the effectiveness and efficiency of an all-hazards approach. Instead, all-hazards planning appear to be assumption-based theory institutionalized throughout the practice of emergency management. The all-hazards approach has yet to be tested with an intentional or unintentional release of radiological materials. This researcher's bias is that a large scale release of radioactive materials will confirm or deny the effectiveness and efficiency of an all-hazards approach. In the absence of evidence-based data researchers rely on data from Nagasaki, Hiroshima, and Chernobyl to predict the impact a release of radioactive materials on the public and the environment.

Although this data is dated, these three events are the only significant events from which to study, research, and gather data. Coping with atypical events such as a manmade disaster requires adapting emergency management thinking processes (readiness, response and recovery). Traditionally, emergency preparedness is community-centered and focuses on natural, regionally-based disasters, such as hurricanes along the Gulf and east coasts, earthquakes/tsunamis along the west coast, and tornados in the South and Midwest. However, atypical events such as Hurricane Katrina and earthquakes in Haiti are national or international rather than locally based in terms of response efforts. As witnessed in these events, traditional emergency response roles were rendered ineffective because of the uniqueness of the emergency—massive destruction. In both cases massive destruction impacted infrastructures such as government, schools, medical, and security, as well as the people living in the area. The recovery processes for these disasters will continue for years. This research surmises that an atypical event, such as a manmade release of radioactive materials, would similarly affect not only the areas where the materials were released but the United States as a whole.

In an address closing the Republican state convention in 1858, Abraham Lincoln said, "If we could first know where we are and whether we are tending, we could better judge what to do and how to do it" (Basler, 1953, p. 461). Following Lincoln's lead, it is important for school systems to heed this advice and build capabilities and capacities focused on protecting its staff, faculty, and students by developing response-appropriate plans so that when and if the day comes, they will know what to do and how to do it.

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Appendix A: Approval of Draft Proposal

Lincoln Memorial University
Executive Leadership EdD
Appendix B
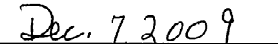
Approval of Draft Proposal by Chair

Candidate's Name: Ronald G. Edmond   Date: December 5, 2009

Research Topic:
    Developing a comprehensive, K–12, radiological response plan

Betty Standifer, Ed.D   _Dec. 7, 2009_
Chairperson's Signature   **Date**

This form must be submitted to Office of Executive Leadership by end of first Fall Semester.

Appendix B. LMU Institutional Review Board Consent Form

Survey Number:_____

The Delphi Technique:
Using Group Consensus to Develop a Comprehensive, K–12 Radiological Response Plan

You are being asked to participate in a research study. Participation in this study is completely voluntary. Please read the information below and ask questions about anything you do not understand before deciding if you want to participate. A researcher listed below will be available to answer your questions.

RESEARCH TEAM
Lead Researcher:
Ronald G. Edmond
EdD Candidate
Lincoln Memorial University
865-567-2248

Faculty Sponsor:
Cynthia Norris, Director
Executive Leadership, EdD Program

Study Location(s):
US Department of Energy Contractor Representatives at the Emergency Management Issues Special Interest Group (EMI SIG)Annual Meeting, Las Vegas, NV, May 2010

PURPOSE OF STUDY
The purpose of this study is to collect and analyze data which will be used to develop a rubric to assist school systems with developing, customizable radiological response plans for their jurisdictions. The methodology used for the research is the Delphi Technique. This methodology includes a review of the literature, use of a panel of emergency management and radiological response experts from federal, state, and local organizations. Additionally, this study is intended to add to the body of knowledge and to deepen the understanding of the importance for school systems to have radiological response plans in place should an intentional or unintentional release of radiological materials, through a terrorists, weapons of mass destruction event occur or if a release were to occur from a commercial nuclear facility or transportation-related incident. While substantial research has been conducted concerning school emergency preparedness, little research has been accomplished that links radiological response to an actual emergency situation for school systems.

SUBJECTS
Respondents participating in this study are experts in the emergency management and radiological response.

Number of Participants and Time Commitment
This study will include approximately 25 subjects and will involve approximately 20 minutes of your time.

PROCEDURES
The following procedures will occur:
• You will be provided a questionnaire to complete and return to the researcher.
• You will be asked to provide your personal demographics (Example: How long have you been a decision making in crisis/emergency management?)
• A follow-up interview or clarification may be requested by phone or in person.
NOTE: The modified Delphi Technique used in this study requires follow up with respondents to complete the three-round data collection process and to establish consensus opinion from "experts" in a structured format.
• You will be provided with data collected in rounds one and two and ask to provide further input as appropriate.

RISKS AND DISCOMFORTS
There are no known harms or discomforts associated with this study beyond those encountered in normal daily life.

BENEFITS
As a participant, you may or may not benefit from participation in this study. The possible benefits you may experience from participation in this study may include:
- increased awareness of the lack of radiological response capacity in the nation's school system
- participation in a study that will enhance emergency preparedness at the school system level

This study may add to the body of existing knowledge in crisis/emergency management.

Your participation is voluntary. There is no penalty if you choose not to participate and you are free to withdraw at any time. You may skip any questions you do not feel comfortable answering.

COMPENSATION, COSTS AND REIMBURSEMENT
 You will not be paid for your participation in this research study.

Costs
There is no cost to you for participation in this study.

WITHDRAWAL OR TERMINATION FROM THE STUDY AND CONSEQUENCES
You are free to withdraw from this study at any time. If you decide to withdraw from this study you should notify the research team immediately. The research team may also end your participation in this study if you do not follow instructions, miss scheduled visits, fail to return completed surveys or if your safety and welfare are at risk.

CONFIDENTIALITY

All identifiable information that will be collected about you will be removed and replaced with a code. A list linking the code and your identifiable information will be kept separate from the research data and stored on a secured, password protected computer.

Data Storage
All research data will be stored on a laptop computer that is password protected. No other person(s) will have access to the data at any time.

Data Access
The research team and authorized LMU personnel are guided by all HHS and FDA regulations concerning confidentiality and may have access to your study records to protect your safety and welfare. No information derived from this research project that personally identifies will be used for any purposes and will not be voluntarily released or disclosed by these entities without your separate consent, except as specifically required by law. Research records provided to authorized, non-LMU entities will not contain identifiable information about you. Publications and/or presentations that result from this study will not include identifiable information about you.

Data Retention
The researcher intends to keep the research data until the research is published and/or presented. After that time, and in accordance with LMU's policies, will either be shredded, incinerated or deleted from any and all computer systems.

OTHER CONSIDERATIONS

Investigator Financial Conflict of Interest

No one on the study team has a disclosable financial interest related to this research project.

NEW FINDINGS
If, during the course of this study, significant new information becomes available that may relate to your willingness to continue to participate, this information will be provided to you by the researcher team listed at the top of the form.

RETURN INSTRUCTIONS
Please place the survey and consent form in the enclosed envelop and seal. If you prefer, you may mail the contents to:

Ron Edmond
153 Johnson Road
Oak Ridge, TN 37830

If you wish to complete the survey electronically (email), please send responses to ron.edmond@orise.orau.gov.

Participants are requested to return all materials by 5/21/2010.

IF YOU HAVE QUESTIONS
If you have any comments, concerns, or questions regarding the conduct of this research please contact the research team listed at the top of this form.

If you are unable to reach a member of the research team listed at the top of this form and have general questions, or you have concerns or complaints about the research study, research team, or questions about your rights as a research subject, please contact LMU's Office of Research, Grants and Sponsored Programs by phone, (423) 869-6214 or 869-6291 or by email, pauline.lipscomb@lmunet.edu, or in person at 304 Duke Hall, 6965 Cumberland Gap Parkway, Harrogate, TN 37752.

VOLUNTARY PARTICIPATION STATEMENT
You should not sign this form unless you have read it and have been given a copy of it to keep. Participation in this study is voluntary. You may refuse to answer any question or discontinue your involvement at any time without penalty or loss of benefits to which you might otherwise be entitled. Your decision will not affect your future relationship with LMU or your quality of education provided to you by LMU. Your signature below indicates that you have read the information in this consent form and have had a chance to ask questions that you have about the study.

I agree to participate in the study.

Subject Signature   **Date**

Printed Name of Subject

Legally Authorized Representative/Guardian Signature   **Date**

Printed Name of Legally Authorized Representative/Guardian

Researcher Signature   **Date**

Ronald G. Edmond
Printed Name of Researcher

Appendix C: Round Two Radiological Response Plan Survey

Radiological Response Plan Survey   **Survey No._____**

Background:

The following survey is an effort to seek expert opinion about essential emergency planning components that should be contained within a school system's radiological response plan.

This survey asks your opinion as it relates to your background in emergency management.

Your input will be valuable in developing a model national radiological response plan for school systems.

Your answers on this survey are confidential.

Each survey has been assigned a *unique* identification number.

You will be provided a number by the Survey Researcher.

You *should not* use someone else's identification number.

Survey responses with duplicate numbers will be considered invalid.

Part I: Demographic Information

Please complete the following:
Name:
Email address:
DOE
Contractor site:
DOE-HQ
DOE Field Office
Other (please specify):

Number of years of experience in emergency management/radiological response:
__0-4   __5-9   __10-14   __15-19   __20-24   __25-29   __30+

Education:
- o   Bachelors____
- o   Masters____
- o   Ed.S.____
- o   EdD.____
- o   Ph.D. ____
- o   MD____
- o   DO____

Other: (please specify)

Part II: Response Plan Components

Based on your expertise in emergency management, rate the following components you feel should be included as part of a school system radiological response plan. The following emergency functions should be considered in a radiological response for school systems.

1. Direction and Control – specify one person to be in charge of the emergency.

O   1   Definitely Disagree

O   2   Disagree

O   3   Does Not Matter

O   4   Agree

O   5   Definitely Agree

2. Notification – provided to the Superintendent's office or to local responders about an occurrence of an event.

O   1   Definitely Disagree

O   2   Disagree

O   3   Does Not Matter

O   4   Agree

O   5   Definitely Agree

3. Warning – a system (i.e., weather alert radios, sirens, alarms, etc.) that notifies affected populations that an event has occurred.

O 1   Definitely Disagree

O 2   Disagree

O 3   Does Not Matter

O 4   Agree

O 5   Definitely Agree

4. Shelter-in-Place – students, staff and facility remain within the confines of the school facility.

O 1   Definitely Disagree

O 2   Disagree

O 3   Does Not Matter

O 4   Agree

O 5   Definitely Agree

5. Evacuation – emergency sheltering at another location.

O 1   Definitely Disagree

O 2   Disagree

O 3   Does Not Matter

O 4   Agree

O 5   Definitely Agree

6. Communications – using interoperable systems (NIMS/ICS) to maintain contact with response agencies.

  O 1   Definitely Disagree

  O 2   Disagree

  O 3   Does Not Matter

  O 4   Agree

  O 5   Definitely Agree

7. Security and Law Enforcement – control of access to the event scene, staging, or relocation assistance

  O 1   Definitely Disagree

  O 2   Disagree

  O 3   Does Not Matter

  O 4   Agree

  O 5   Definitely Agree

8. Medical – ability to care for or treat injuries or illness.

  O 1   Definitely Disagree

  O 2   Disagree

  O 3   Does Not Matter

  O 4   Agree

  O 5   Definitely Agree

9. Public Information – ability to respond to parents, media and community.

     O 1   Definitely Disagree

     O 2   Disagree

     O 3   Does Not Matter

     O 4   Agree

     O 5   Definitely Agree

10. Transportation – school buses required to move students from the school to either homes or alternate shelters.

     O 1   Definitely Disagree

     O 2   Disagree

     O 3   Does Not Matter

     O 4   Agree

     O 5   Definitely Agree

11. Memoranda of understanding- established partnerships with local responders.

     O 1   Definitely Disagree

     O 2   Disagree

     O 3   Does Not Matter

     O 4   Agree

     O 5   Definitely Agree

12. Other: In the space provided below, please list other components you feel are essential for a radiological-specific response plan for school systems.

Appendix D: Round Four All-hazards Plan Assessment Survey

All-hazards Plan Assessment   **Survey Identification Number: _____**

Background:

The goal of this survey is to gather information school systems can use to assess their resiliency to manmade or natural disasters, specifically the release of radioactive materials.

This survey seeks your expert opinion for essential elements contained within a school emergency preparedness self-assessment.

Your input will be valuable in making available an assessment tool for schools emergency planning.

Answers will be complied and released as "consensus answers."

Please feel free to add additional comments for each question or add comments at the end of the survey.

Demographic Data
1. _____Male   ____Female

2. **Number of years experience in emergency management/radiological response:**

   __0-4   __5-9   __10-14   __15-19   __20-24   __25-29   __30+

3. **Education:**
   Bachelors____
   Masters____
   Ed.S.____
   EdD.____
   Ph.D. ____
   MD____
   DO____
   Other: (please specify):

1. If the risk is likely, school systems ***should*** have documented and disseminated policy and procedures that specifically address a manmade or natural disaster, specifically the release of radiological materials.				
Strongly Agree	**Agree**	**Does not matter**	**Disagree**	**Strongly Disagree**
Additional comments here:				

2. For manmade or natural disasters which might impact school resiliency, an all-hazards plan is sufficient. _____Yes _____NO

   Please explain:

3. For credible scenarios, such as the release of radioactive materials which might impact school resiliency, an event-specific annex should be developed. _____Yes _____NO

   Please explain:

4. All-hazards procedures ***should*** list roles and responsibilities of each functional response position.				
Strongly Agree	**Agree**	**Does not matter**	**Disagree**	**Strongly Disagree**
Additional comments here:				

5. Understanding roles and responsibilities of school staff during the release of radioactive materials is important.				
Strongly Agree	**Agree**	**Does not matter**	**Disagree**	**Strongly Disagree**
Additional comments here:				

6. In the space provided below, please add additional comments, related to this survey, you feel are important.
Additional comments here:

Appendix E. Potential Exposure Pathways, EPA Manual (1991)

Table 7.

Exposure Pathways, Incident Phases, and Protective Actions adapted from EPA's Manual of Protective Actions for Nuclear Incidents (1991).

Potential Exposure Pathways	Incident Phases	Protective Actions
External radiation from facility	Early	Sheltering Evacuation Control of access
External radiation from plume	Early	Sheltering Evacuation Control of access
Inhalation of activity in plume	Early	Sheltering Evacuation Control of access Administration of stable Iodine
Contamination of skin and clothes	Early and Intermediate	Sheltering Evacuation Decontamination of persons
External radiation from ground deposition of activity	Early, Intermediate, and Late	Evacuation Relocation Decontamination of land and property
Ingestion of contaminated food and water	Early, Intermediate and Late	Food and water controls
Inhalation of re-suspended activity	Intermediate or Late	Relocation Decontamination of land and property

Appendix F. Round Two Emergent Themes

Essential Elements	Theme	Declarative Statements
Direction and Control	All-hazards	• The planning should also be considered for other events rather than just rad. - depending on where you are. Preplan decision trees to aid with determine protective actions • These components are necessary for any emergency plan.
	All-hazards	• Unless there is a definite risk from radiation due to location of the school, these questions all fall within an all-hazards plan
	Training	• Practice drills/exercises – evaluation Full integration of all the above components
	Training	• Training for K-12 on this element of emergency response is imperative
	Training	• Training and drills for school system management and school officials
	Training	• Only trained personnel to make decisions on Protective Actions for children (SIP or Evac) for the situation
	Training	• For rad plan Drills, tabletops, exercises should be part of the process
	Training	• Training and drill requirements
	Training	• Holding exercises and drills for students, faculty, and administrative staff to practice shelter in place and evacuation
	All-hazards	• But backups must be several layers deep
	Collaboration	• Include functional positions at each school as well: Incident Commander Hallway Chief Transportation Lead Communication Lead Law enforcement/security lead Also may want to include in plan a schedule for EM training and exercise
	Collaboration	• In charge - no; point of contact - yes; response lead outside of school system/district w/local and state responders or other agencies

Notification	Communication	• Notification needs to be to both entities • Automated notification using text/pager • Information provided to parents regarding how their children will be cared for(or how they will be cared for)in the event of a radiological emergency
Warning	Training	• But only after rapid analysis of the event. • Basic radiological education information for parents & children
Shelter-in-Place	Training	• Explain pitfalls of SIP vs evacuation for Rad events - evacuation should be the preferred choice, if time permits. However, this requires planning to implement
	All-hazards	• Parents will go after their kids in many SIP events • Care and feeding of students if sheltered in place for a long-term event
	All-hazards	• Make sure each school's crisis plan has procedures for establishing and maintaining security in the event of a crisis, and subsequent evacuation or shelter-in-place
	Communication	• Establish and end of the shelter in place/ evacuation procedure • Identifying special needs students, faculty, and administrators who need assistance for evacuation and/or shelter in place
	Communication	• In most cases but location of event relative to the school is an important consideration • Information regarding school layout to first responders • Shelter-in-Place shielding factors of building

Evacuation	All-hazards	• A plan should be in place to relocate students if there is a warning. For nuclear power plants the school should be relocated at a site area emergency. This is before any release offsite • Likely not usually necessary but depends on incident and circumstances. No incident is bound by all or never
	Collaboration	• Local/state government decision should refer to local and state plans for evacuation
	All-hazards	• For emergencies where evacuation would be recommended, recognize that shelter in place may be used when there are impediments to evacuation
	Collaboration	• Information regarding school security to first responders (if they have security at the school)
Communications	Communications	• The school needs to be able to communicate protective actions • Having photo IDs and contact information for all students, faculty, and administration available for accountability purposes • Be prepared to account for students who, at the time of the emergency, are not in their classrooms, but elsewhere, such as rest room, hallway, cafeteria, nurse's room, library, in the gym, in the lockers, on the athletic field, even off campus. • Having access to each school building's PA system from more than one location in each building • Be prepared to send emergency-related texts to each student's cellphone/blackberry • Ability to notify all parents and guardians • Having bullhorn available if PA system goes down • Having back-up generator ability*Having ability to shut the HVAC and utilities off
	Training	• Contribute to discussions about communication; can make recommendations regarding school operations; and to develop personal relationships that will be important for communication
	All-hazards	• Radiation specifics, physics basics, common sense understanding training for all stall possibly on an annual basis
	Training	• Building Emergency Evacuation Maps First Aid Kits Code word that specifies the reason for

evacuation
- Primary location for evacuation
- Training for staff Drills/exercises for staff and students with external agencies

Security and Law Enforcement	Collaboration	• Should have MOUs or LoAs with local and state governments and other resource agencies.
	Training	• Person in charge of School Radiological Emergency plan must have a basic understanding of radiological risks and potential doses
		•
Medical	Medical	• Should have the ability to contact medical resources to treat injuries or illness that exceed the normal assets of the school.
		• Having back-up generator ability*Having ability to shut the HVAC and utilities off*Having several days of nutritional and medical supplies available for shelter in place
		• Having portable meds (that students take during the day) for evacuation
		• Likely not usually necessary but depends on incident and circumstances. No incident is bound by all or never
		• Rapid assessment is most important as is removal from contaminated area into a safe area. Treatment may not occur on scene at a school facility
		• I said agree and I feel one person should be responsible for coordinating efforts, but also feel that there should be an alternate or more than one alternate in case the primary person is unavailable
		• Schools are often used by public health departments for public health clinics. Include only if schools are designated as a care facility by local government/public health departments. Colleges usually have medical clinics, elementary through high school usually do not
		• Availability of I-131 and other appropriate medications are quickly available to the school. Prior permission (parental) for use of such medication
		• Ability to handle mental health issues

Public Information	Communication	• Media tools provided to families in school districts
		• Informational sessions for parents regarding such plans- not all parents/people will understand radiological without being educated.
		• Per NIMS/ICS Planning should include briefing/educating stakeholders (local residents, parents, emergency responders, etc.) of what materials are present and the kind of work being done
		• Provide precautionary emergency response info to parents before an emergency i.e. evacuation/early dismissal - stress precautionary
		• Communication/education should include emergency plan information provided to parents and children before there is an incident
		• Education materials for parents and students relative to the radiological risk Outreach to parents for their understanding of the process
		• Radiological response information for school system personnel and parents; e.g., types of rad contamination, essentials of exposure hazards, decon tips. Could use an information booklet with a small pocket card w/tips of essential information
		• I had said agree, but also feel that there may be sensitive situations in which you might want to withhold some info under some circumstances may only for some short period of time
Transportation	Collaboration	• With agreements - some bus companies have multiple contracts - the school has to make sure they have priority
		• Local government/state decision to use resources as needed

Memoranda of understanding	Training	• Preplanning with school systems - tabletops drills with school and community leaders. The more they know the less they fear
	All-hazards	• The planning should also be considered for other events rather than just rad. - depending on where you are. Preplan decision trees to aid with determine protective actions
	Collaboration	• Holding exercises with MOU partners
	Collaboration	• Having fire department not only perform safety inspections of the school property, but also provide counsel on what needs to be done to better prepare for radiological event
	Training	• Have school superintendent and principals participate routinely in local, county, and state radiological AND all hazard exercises so that they understand emergency response
		• Likely a low priority for emergency responders except in the case of severe contamination close to the school facility
	Collaboration	• Radiological-specific response plan should be established by county (local) or state governments. Schools should not have a separate radiological response plan (from state and local governments) but should have the opportunity to partner and provide information to the local and governments to be included in the total community response plan
	Communications	• Schools need an Emergency Communications Plan rather than a radiological-specific plan. I agreed to the elements above to ensure schools are aware of information for their own emergency plans
	All-hazards	• The importance to evaluate the need for these items seems obvious. It is equally important to not be too specific/binding in guidance - the plan needs to be flexible enough to be implemented. For instance, don't specifically say to always shelter in place or evacuate - the need to do either is situationally-dependent

Appendix G: Round Four Declarative Statements

Emergent Themes	Declarative Statements
All-hazards	- Based on the caveat of the risk being "likely" certainly a P&P is in order - Any policy or procedure from school systems should mainly address hazards, threats, and protective action efforts (actions to take) such as lock down, shelter-in-place, evacuation, relocation, decontamination, etc. as coordinated between school officials and/or local emergency management officials and/or first responders. - A rad deal would be a huge deal. It would surpass any school crisis in our history, and not to have a plan in place, trained, would be an absolute disaster in every respect. - Too much can be too much. That is, I don't think a 30 page document with every possibility is helpful. A good, basic emergency plan will be sufficient in nearly any circumstance. This is borne out by (~weekly) community evacuations around the country due to truck and rail derailments in areas that have trained first responders but little or no community drills and exercises. - I don't think that from a school perspective anything should be different for radiological response. If the school has disaster plans, then the shelter-in-place, take cover, or evacuation options should all be covered anyway. - The plans should mention that radiological events could be triggering events for these protective actions, but I don't see how the school's actions would be different from any other hazardous material incident. - Response is response. Example, the process for evacuating and relocating due to a release of radiological release most likely would be the same for other evacuation reasons (gas leak, loss of power, etc). - The potential effects of emergencies are much the same, even though the types of hazards vary. Schools can plan to deal with effects common to several hazards, rather than develop separate plans for each hazard. For example, earthquakes, floods, and hurricanes all can force students to evacuate their school. The jurisdiction can develop a plan with minor adjustments for the expected intensity of different hazards.

- Yes, if the all-hazards plan includes components witch address both natural and made-made disasters. Obviously, there are both common as well as incident specific procedures which may differ.
- Maintaining an understanding and competency to respond to specific hazards is often an unrealistic expatiation, and can lead to a gap between expatiations and reality. For this reason the all-hazards model provides a basic skill-set around which response can be modified to address specific hazards.
- All hazards plan referencing manmade or natural disaster specific in detail to what response is needed or wanted.
- Any hazard that the school may be subjected to should be included BUT care must be taken to concentrate on those hazards which are more likely (storms, hostile shooter, ect) than those that are not (radiological impact). Planning dollars should be spent on higher probability events.
- I touched on this in Q6. From a planning standpoint, the only difference that I see would be to list likely radiological events that could trigger school protective actions. The actions themselves would not (should not) be different. An All-hazards plan will provide all of the essential elements required to protect students during a natural or manmade disaster.
- A recovery plan will be based on a case-by-case basis. An event-specific annex would not be helpful. Whether manmade or natural disasters both could be equally devastating and can only be addressed by a recovery plan for a specific event after it happens.
- These types of events involve very unique problems which can be covered in an annex.
- Huge gaps exist. After IND, schools may need to shelter kids in place for several days. This goes against current policy of releasing children to parents within a few hours at most. Are the schools prepared for this within their all hazards plans?
- Everyone has action they are responsible for. Everyone knows their job and the big picture is covered.
- Again, keep it simple. Roles and responsibilities should be just about the same for chemical and radiological
- I think it will help during the response if everybody knows what their role would be. Similar to fire drills where we designate searchers, marshals, etc.

	• School districts need a crisis plan that addresses the unique circumstances and needs of individual schools. Districts should be encouraged to develop a separate plan for each school building. Each school crisis plan should address four major areas—prevention/mitigation; preparedness; response and recovery.
	• All hazards approach should be sufficient, but if the possibility of rad material is significant.
	• Any all hazard plan should be coordinated with Local EMA and State Board of Education. This approach will help ensure all issues have been addressed.
	• The Plan should be developed with the local EM personnel and the School staff.
	• School system in the vicinity of Nuclear power plants and DOE facilities need preplanned actions in plans and SOPs.
	• The Plan should be developed with the local EM personnel and the school staff
Training	• Not only have them in place but test them through drills & exercises. The Staff should also be trained how to respond.
	• Understanding roles and responsibilities of school staff during any manmade or natural disaster are important.
	• School staff should be assigned to Primary and Secondary ICS roles, be trained how to perform those roles, and be required to participate in at least one Table Top, Functional, or Full-Scale Exercise each year to evaluate how they'd perform their roles and responsibilities under the District's plan. The exercise scenario each year should include one or more of the likely risks or hazards that the District might face.
	• Roles and responsibilities for a radiological event should not be so different than those for other emergencies, but staff needs awareness training.
	• If you don't know what position you fill and train for that position you cannot adequately respond during an actual emergency.
	• It is important to understand the roles and responsibilities of school staff during any crisis.
	• That notwithstanding, planning, training, and exercising is important for all types of hazards. EM activities are important for everyone. Planning, practicing, and knowing is important. I know that the school systems do not provide an all hazard plan to

parents or students. Any school in the area that has identified hazards should be responsible enough to provide such a plan as well as exercise the children and staff involved Finally, training, practice and drill are critical as well. Just having a plan and not practicing (exercising) the various scenarios won't protect schools. Not only should a well documented plan be in place but it should be reviewed and practiced (exercised) annually. These annual reviews/exercises should include an all aspects (all-hazards) approach to emergencies including potential radiological events.

- Again, consider all hazards and staff two to three deep with responders. Also ensure that you make each person's responsibilities very clear and drill them periodically, with and without student involvement.
- The school principal and teachers should be trained in the plan and both the parents and students should be briefed on the plan and how they are to react.

Communication

- Parents may be included in the development and/or vetting process. The P&P should be made public and included as part of the handbook of materials parents usually received from the school system and the individual school. The plan should be detailed enough to allow parents to know how their children will be managed during a school day emergency.
- Dissemination may be different for various stake holders. Students, Teachers, parents, local law enforcement should all get the information but at different levels of detail.
- An adequate plan for emergency response should include how to best protect children against potential radiation exposure or contamination by radioactive materials.
- If students needed to go to specific locations instead of evacuating and going home.
- There are only three actions that can be taken in the event of an emergency/crisis/disaster. (1) You can evacuate (to a specific point where accountability is taken). (2) You can shelter-in-place in the safest possible areas of the building. Or (3) You can wait to see what you need to do (e.g., if it is snowing heavily, you may need to wait until you know if students should be told to stay home, sent home early, or held until the afternoon if conditions are expected to improve OR if you have a shooter,

you must decide whether to move students out of the school or shelter them in place, perhaps with some sort of barricade on the door of a classroom. In other words, in this third case you must wait until you have enough information to know what to do.

- School staff is the direct communicator with the effected students. Knowledge is a valuable tool for communications.
- The role of those impacted by an event—including radiological events—should be well documented and articulated to the entire school and throughout a school district.

Collaboration
- The plan also needs to address any other hazards that may impact the school - this information should be available from the local fire department.
- As was the case in Louisiana – the local government (Parish) used their emergency preparedness radiological planning tools to respond to a rail accident involving tankers cars filled with very hazardous material.
- Every manmade hazard has unique issues that need to be addressed. I would recommend the school identify their hazards in coordination with the Local EMA.
- And primary and alternate responders should be listed. In fact, it does not hurt to even go three deep in assigning response roles
- Optimal emergency response by authorities may rest on protective action guides, such as shelter in place, being adhered to.
- One way would be for the school system to the development of a matrix /chart with which responsible personnel can identify and initiate a response.
- Identifying hazards and their risks for schools are important. Developing a list of first responder points of contact (e.g., local fire departments, sheriff/police departments, ambulance services, hospitals, coroner, utility companies [electric, gas, water], local emergency management agency) as well as internal resources (e.g., Facility and Maintenance Personnel, Superintendent, Principal, Assistant Principal(s), School Psychologists, School Counselors, School Nurses, Security Forces, etc.) and understanding roles and responsibilities for protective actions for specific hazards would be beneficial. This could be accomplished in a matrix table.
- School crisis plan should be in place with partners in the

community, including law enforcement, fire, public health, mental health and local emergency management agencies (EMAs). Not only is it important to address "traditional" crises (emergencies), it is equally important to address emergencies involving nuclear (radiological), biological and chemical crises as well.

Protective Actions

- It would be useful to have information on things one can do to keep safe... for example, if contamination is suspected, removing clothing and showering will eliminate more than 90% of contamination.
- Rad related incidents are different. Extreme lack of knowledge of rad principles in general public exists (unlike hurricane/tornado or infectious agent disasters). Lack of knowledge mitigates extreme fear of all things rad. Generic all hazards response plan may not be adequate; e.g. evacuate building immediately after explosion may be directive in all hazards response but in R/N incident it may be the worst thing you could have the kids do - they need to shelter in place.
- Some manmade events would require significantly different responses than a natural one, like a tornado. A chemical event is much more dangerous than a radiological event, requiring different responses.
- Response actions for a specific event such as a release of radioactive materials would be unique, and therefore an event-specific annex would be useful. For example, if students became contaminated, a decontamination plan might be needed, as well as how to handle students with internal contamination (bioassays, chelation, etc.)
- The topic should be covered sufficiently in the plan or annex. Focus on protective actions and leave the emergency response to the professionals.
- Actually, there should be an annex for any special circumstances - for example contaminated and injured persons in addition to mass causality OR any special industry in the area – anything from someone who uses or transports sources to a prison in the area.
- There are some unique characteristics for a radiological event. It may be useful to have available information that is contaminant specific (i.e. radiation/radioactive contamination) rather than

event specific.

- Event-specific annexes can explain the response actions that are unique for each type of event or hazard (e.g., evacuation, shelter in place, medical treatment, etc.)
- Response actions to a radiological event have some unique aspects that schools should be aware of if relevant.
- School system in the vicinity of Nuclear power plants and DOE facilities need preplanned actions in plans and SOPs related to the potential radiological hazard.
- Optimal emergency response by authorities may rest on protective action guides, such as shelter in place, being adhered to.
- Parents will be inclined to go retrieve their children and thus ignore protective action guides ("I'm going to get my baby! If we die, we die together!"). If they felt their children were safe and better protected from potential health effects at the school, and they knew the school plan for this in advance, parents would be much more likely to respond to local government authorities immediately post event.

Appendix H. Round Two Invitation Email

Thank you for agreeing to participate.

Attached is the link to the survey.

The 1st questions will ask you to enter an identification number. Your number is RRP0XXX.

The rest is self explanatory.

On the consent form, go to page 4, sign and print your name and either pdf it or fax it to me (I do not need the other pages faxed, just page 4). The fax number is 865.576.9383.

The consent form is the standard Institutional Review Board (IRB) form stating no drugs, alcohol, psychological pressure, payment, etc. were provided to you in order to complete this survey; your responses will remain anonymous.

https://www.orau.gov/SelectSurveynet/TakeSurvey.aspx?SurveyID=72M19l7

Thank you for your time and for helping me achieve something I never thought possible.

Ron Edmond
Doctoral Candidate
Lincoln Memorial University
Harrogate, TN
865.576.6266
Ron.edmond@orise.orau.gov

Appendix I: Round Four Reminder Email

Thank you for participating in the first round of my dissertation survey that began in May 2010.

Two weeks ago, I sent you a link for the second round that I hope to complete by November 19, 2010.

To complete the data collection, I am dependent upon your response.

This is the last round. I will not ask for any more of your time.

As indicated in our previous correspondence, the survey takes about five minutes.

For your convenience, I am attaching the link.

Thank you for your time and for helping me achieve something I never thought possible.

https://www.orau.gov/SelectSurveynet/ResultsOverView.aspx?SID=S37PN29MQ58DG64

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Appendix J: Curricula Vitae

Ronald G. Edmond
ron.edmond@orise.orau.gov

EDUCATION
Lincoln Memorial University, May 2011, Ed.D., Executive Leadership
      Dissertation: Considering the Perspective of Emergency Management Professionals
      Regarding Radiological Response and School Resiliency

Lincoln Memorial University, Ed. S., Educational Administration and Supervision
      Research: Edmond, Ronald G., Murawski, Linda, Williamson, Mark, (2004) The
      Three R's of School Emergency Preparedness: Readiness, Recall and Response

Vanderbilt University, M.Ed., Human Resource Development/Adult Learning

East Tennessee State University, B.S., Speech and Communication
      Listed in Who's Who among Colleges and Universities

Oak Ridge Associated Universities (ORAU), Leadership Development Program
      Project Management I and II; Financials
      Business Development: Proposal Writing
      Strategic Planning Process Training
      Conceptual Leadership: Aligning Leadership Practices with ORAU Strategic Plan
      Organizational Problem Solving: Meeting New Challenges as Member of
      Management
      ORAU101: Mission and Vision
      ORAU 102: Financials and Procurement
      ORAU 103: Effective Supervision and Leadership

EMPLOYMENT HISTORY
2007-present   Group Manager, Oak Ridge Associated Universities, Emergency Management
                Laboratory

2002-present   Faculty, Oak Ridge Associated Universities, Radiation Emergency Assistance
                Center/Training Site

1998-2007   Senior Technical Specialist, Oak Ridge Associated Universities, Emergency
                Management Laboratory

1995-1998   Senior Training Specialists, Oak Ridge Associated Universities, Training and
                Operations Division

1986-1995   Training Specialist, Oak Ridge Associated Universities, Training and
                Operations Division

1982-1986   Teacher Demonstrator, Oak Ridge Associated Universities, Energy Education
             Division

MEMBERSHIPS
American Society for Training and Development
Society for Risk Analysis

PROFESSIONAL SERVICE
Oak Ridge Associated Universities
- Manage projects in excess of one million dollars annually
- Manage the research, development test, training and implementation of first responder software applications for Department of Homeland Security and Department of Energy
- Conceptualize marketing materials such as conference exhibits, brochures, Web sites, cover designs, etc.
- Serve as primary client interface
- Reengineer organizational emergency management processes
- Research, develop and implement marketing plans /statements of work
- Develop project management plans, including budgets, personnel allocation, work assignments,
- Design, develop, conduct and manage emergency preparedness training for Department of Homeland Security, Center for Disease Control, Department of Defense, Department of Energy as well as other local, state and tribal agencies
- Design, develop and conduct nationwide training courses on crisis risk communication issues, transportation of radioactive waste materials, emergency preparedness training for schools/educators and the use of advanced communication technology during emergency events
- Nationally-known risk communication speaker/trainer
- Faculty, internationally renowned Radiation Emergency Assistance Center/Training Site
- International training experience
- Facilitate meetings/workshops
- Equal Employment Opportunity Council
- Speaker's Bureau, Oak Ridge Associated Universities

Department of Energy (DOE)
<u>Facility Manager, Department of Energy-Oak Ridge Operation Joint Information Center (JIC)</u>
- Designed and developed the Emergency Public Information Pocket Guide
- Designed, developed and implemented a facility-wide emergency communication program for the Waste Isolation Pilot Plant and the National Energy Technology Laboratory
- Conducted radiological response train-the-trainer program for the DOE-Transportation Emergency Preparedness Program

Designed, developed, managed and implemented JIC training program addressing the following: Spokesperson, General Emergency Management Overview, Administrative Support, Telephone Team and Media Monitoring Training

Served as evaluator/controller for DOE exercises

Served controller for TOPOFF 07

Currently, serve as coordinator for the Emergency Management Issues Special Interest Group - Public Information Working Group

Designed, developed and implemented a facility-wide emergency communication program, National Energy Technology Laboratory, Pittsburgh, PA, Morgantown, WV and Albany OR

National Stakeholders Transportation Forum, Applying Risk Communication to the Transportation of Radioactive Materials, Chicago, 2010

Y-12 National Security Complex

Designed, developed and implemented a occupational (chronic beryllium disease) health risk communication program

Consulted, edited, and review script for a occupational (chronic beryllium disease) health risk communication video

Designed, developed and implemented complex-wide, industrial hygiene risk communication training program

Department of Homeland Security (DHS)

Chemical Stockpile Emergency Preparedness Program (CSEPP)

Manage the development and implementation of the Public Affairs and Information Technology PDA-based course; the development of PDA-based patient tracking application (WeB-MEDIS); and the PDA-based spokesperson application (Web-PIO)

Center for Disease Control and Prevention (CDC)

Served as ORISE's risk communication team working with the Center for Disease Control (CDC) to prepare for public health communication in a chemical, biological, radiological, and nuclear event

Collaborated with CDC and American Institutes for Research staff on the review and nationwide implementation of the Crisis and Emergency Risk Communication (CERC) training curriculum

Served as the lead trainer, CDC's Strategic National Stockpile (SNS) risk communication program

Conducted risk communication training, CDC's Technical Advisory Response Unit, senior management, and liaison officers

Conducted message development training, CDC's SNS program

Designed, developed and delivered Introduction to Spokesperson Training for the Division of News and Media Relations, Atlanta, GA. February 2011.

Designed, developed and delivered Advanced to Spokesperson Training for the Division of News and Media Relations, Atlanta, GA. February 2011.

Facilitated and conducted training for Divisions of Heart Disease and Stroke Prevention (DHDSP) DHDSP Presentation Skills: Delivering Professional and Consistent Presentations Atlanta, GA. February 2010.

Facilitated public meetings for CDC's National Immunization Program

Facilitated roundtables, CDC's RSB and the Conference of Radiation Control Program Directors (Alliance to Expand Radiological Emergency Preparedness in Public Health) Atlants, Ga. April 2009; Volunteer Radiation Professionals Roundtable, Atlanta, GA, February 2009; Communication and Teamwork: Keys to Successful Radiological Response, December 2008.

Facilitated pandemic influenza tabletop exercises, at eight US international airports, Division of Global Health and Migration and the Division of Quality Healthcare Promotions

Facilitated pandemic response roundtables, Division of Quality Healthcare Promotions

Facilitated Call Center (211, 711, 911, etc.) roundtable, Division of Quality Healthcare Promotions

Facilitated Planning Workshop for a Community Alternate Care System: Oregon HPP Region, 2, Stevenson, WA. July 2010.

Facilitated EMS Radiological Response Roundtable, Atlanta, GA. August 2010.

Facilitated Champaign-Urban Community Influenza Pandemic Workshop, Champaign-Urbana, IL, August 2010

Facilitated Los Angeles County Mass Medical Care Workshop, San Diego, CA, September 2010

National Enrichment Facility

Designed, developed and implemented a facility-wide emergency communication program

Tennessee Emergency Management Agency

Designed, developed and implemented Spokesperson Training programs

Pennsylvania Emergency Management Agency

Designed, developed and implemented Spokesperson Training programs

Nebraska Emergency Management Agency

Designed, developed and delivered Spokesperson Training, Lincoln NE February 2011

Great Plains Association for Threat Assessment Professionals

Designed, developed and delivered Risk Communication Cadre Workshop, Lincoln, NE, February 2011

Department of Public Health, State of Kentucky

Designed, developed and implemented Spokesperson Training programs

Designed, developed and implemented Pandemic Influenza: Advanced Spokesperson Workshop

Designed, developed and implemented Joint Information System Workshop

Designed, developed and implemented Spokesperson Training programs

Department of Health and Human Services (DHHS)
>Conducted pandemic influenza, public information-focused, emergency response exercise for the Assistant Secretary for Public Affairs

Department of Defense-National Guard Bureau (DOE-NGB)
>Designed, managed and implemented the first-ever environmental communication training course

Gila River Indian Community
>Designed, developed and implemented a Spokesperson Training program
>Confederated Tribes of the Umatilla Indians
>Designed, developed and taught a crisis communication course to the Tribal Chief and the Tribal Council

State of Utah
>Manned the Joint Information Center, 2002 Winter Olympics

International Association of Chief of Police
>Wrote the emergency public information chapter
>Presented at presented and regional and national conferences

University of Tennessee
>Advisory Committee, University of Tennessee Department of Communication, School of Advertising and Public Relations, Risk Communication Research
>Sigma Nu Fraternity Alumni Advisory Board

University of Tennessee/East Tennessee State University
Life Coach, Mentor/Volunteer
>Provide advice/guidance, design resumes, and coach interview skills for young men and women seeking initial employment or enrollment in graduate programs

RESEARCH INTERESTS
Crisis communication, emergency public information, risk communication; the use of social networking (Web 2.0) applications such as Twitter, FaceBook, MySpace, YouTube, etc., to advance emergency communication; cost-effective, off-the-shelf technology such as personal digital assistants, Blackberries, cell phones, etc., to advance emergency communication; application development that can be using during an emergency event.

PUBLICATIONS
CHAPTERS

Edmond, Ronald, G., The Resource Guide for Law Enforcement Public Information Officers, Chapter 2, Emergency Public Information, International Association Chief of Police, June 2005.

Edmond, Ronald G., Spokesperson for the First Responder, U.S. Department of Energy, June 2004.

Edmond, Ronald G., Spokesperson for Technical Advisors; Environmental Risk Communication, U.S. Department of Energy, June 2004.

Edmond, Ronald G., Emergency Public Information: The Role of the Spokesperson during a Crisis, U.S. Department of Energy, June 2004.

Edmond, Ronald G., Telephone Team and Media Monitoring, U.S. Department of Energy, June 2004.

Edmond, Ronald G., Emergency Public Information Pocket Guide, U.S. Department of Energy, Office of Emergency Management, May 2002.

School Emergency Management Model Plan and Procedures Office of School Safety and Learning Support, Tennessee Department of Education, August 1999.

Edmond, Ronald G., Balcombe, Marilyn, Murawski, Linda, Northeast Utilities Public Opinion Poll Survey Results, December 1997.

INVITED PRESENTATIONS AT PROFESSIONAL MEETINGS (selected list)
2009

Edmond, Ronald G., Integrated Training Summit, Department of Health and Human Services, Department of Homeland Security and the Medical Reserve Corps, Veterans Affairs Exercise Builder – Hospital, poster session, Dallas, TX, April.

Edmond, Ronald G., Crisis Communication Tabletop Exercise: Introduction to the Joint Information Center, Lee University, Cleveland, TN, February.

Edmond, Ronald G., Facilitator, Roundtable on Volunteer Radiation Professionals, Center for Disease Control and Prevention Radiation Studies Branch, Atlanta, GA, February.

2008

Edmond, Ronald G., Why Emergency Risk Communication is Different: The Psychology of Messaging during a Crisis, University of Tennessee School of Advertising and Public Relations, Public Relations Day, December.

Edmond, Ronald G., Beam Me Up Scotty-Using Handheld Devices to Assist in Emergency Public Information, University of Tennessee School of Advertising and Public Relations, Public Relations Day, December.

Edmond, Ronald G., Facilitator, Roundtable on Communication and Teamwork: Keys to Successful Radiological Response, Center for Disease Control and Prevention Radiation Studies Branch, Atlanta, GA, June.

Edmond, Ronald G., Facilitator, Workshop on Community Partnerships for PandemicInfluenza Planning, Center for Disease Control and Prevention, Division of Healthcare Quality Promotions, Indianapolis, IN, April.

Edmond, Ronald G., Influenza Pandemic Table Tabletop Exercise: The Role of an Epidemiologist during a Crisis Event, Advance Epidemiologic Methods, University of Tennessee, February.

Edmond, Ronald G., Crisis Communication Tabletop Exercise: Introduction to the Joint Information Center, Lee University, Cleveland, TN, February.

2007

Edmond, Ronald G., Facilitator, Border Crossing/Point of Entry Pandemic Flu Tabletops, Center for Disease Control and Prevention Division of Global Migration and Quarantine, Atlanta, GA; Washington, DC; San Diego, CA; Detroit, MI; Champlain, NY; Honolulu, HI; Anchorage, AK; Miami, FL; Dallas, TX,2007.

Edmond, Ronald G., Introduction to Risk Communication Principles: Health and Safety in the Workplace (Occupation Exposure to Beryllium), Y-12 National Security Complex, Oak Ridge, TN January 2007.

Edmond, Ronald G., Applying Risk Communication Principles: Health and Safety in the Workplace - Occupation Exposure to Beryllium), Y-12 National Security Complex, Oak Ridge, TN January 2007.

Edmond, Ronald G., Introduction to Risk Communication Principles: Health and Safety in the Workplace -Radiation Exposure, Y-12 National Security Complex, Oak Ridge, TN January 2007.

Edmond, Ronald G., Facilitator, Border Crossing/Point of Entry Pandemic Flu Tabletops, Center for Disease Control and Prevention Division of Global Migration and Quarantine, Houston, TX; San Juan, PR; 2007.

Edmond, Ronald, G., Public Information in Radiation Accidents, Radiation Emergency Assistance Center/Training Site, Oak Ridge, TN, monthly since 2002.

2006

Edmond, Ronald G., Crisis Communication for Church Ministries and Church Affiliated Organizations, Clinton, TN, June 2006.

2005

Edmond, Ronald G., Crisis and Emergency Risk Communication Conference: Pandemic Flu, Isolation and Quarantine Public Information Tabletop Exercise, Honolulu, HI, June 2005.

Edmond, Ronald G., Emergency Public Information for Law Enformecment,112th Annual IACP Conference Law Enforcement Education and Technology Exposition, Miami Beach, FL , 2005.

Edmond, Ronald G., Facilitator, Border Crossing/Point of Entry Pandemic Flu Tabletops, Center for Disease Control and Prevention Division of Global Migration and Quarantine, Honolulu, HI; New York City, NY; San Francisco, CA; Chicago, IL; Los Angeles, CA; Honolulu, HI; 2005.

Edmond, Ronald G., Crisis and Emergency Risk Communication, University of South Carolina Center for Health Preparedness and South Carolina Department of Health and Environmental Control, Columbia, SC, February.

Edmond, Ronald G., Psychology of a Crisis, University of Nebraska Mental Health Disaster Behavioral Conference, Omaha, NE, July.

2004

Edmond, Ronald G., Crisis Emergency Risk Communication National Train-the-Trainer, Centers for Disease Control and Prevention, Bethesda, MD, May; Atlanta, GA June, Washington, DC, September; Atlanta, GA October; Washington, DC, November.

Edmond, Ronald G., Spokesperson Training, Pennsylvania Emergency Management Agency, Pittsburgh, PA, East Stroudsburg, PA, June.

Edmond, Ronald, G., Message Mapping Techniques, Center for Disease Control-Radiation Branch, December.

Edmond, Ronald G., Spokesperson Training, Will County Public Information Officers Summit, Joliet, IL, June.

Edmond, Ronald G, Hultquist, Chip, and Noey, Jim, Technology and the 21st CenturyEmergency Environment Workshop, Department of Homeland Security-Federal Emergency Management Agency, Seattle, WA, June.

Edmond, Ronald G. Emergency Public Information for the Spokesperson, Pennsylvania Emergency Management Agency, Allentown and Pittsburgh, PA, June.

Edmond, Ronald G. Technology and the 21st Century Emergency Environment, University of Tennessee Graduate Communication Seminar, June.

Edmond, Ronald G., Technology and the 21st Century Emergency Environment, University of Tennessee TELEHEALTH Network, statewide video conference, May 2004.

2003

Edmond, Ronald, G., Covello, Vincent T., and Richard Tardif. Spokesperson's Training for Center for Disease Control's Technical Advisory Response Unit, Center for Disease Control, Atlanta, GA, April, May, June 2003.

Edmond, Ronald G. Emergency Public Information for the Spokesperson, International Association of Chief of Police-Public Information Officers, Chattanooga, TN, April.

Edmond, Ronald G. Emergency Public Information for the Spokesperson, National Radiological Emergency Preparedness Conference, Milwaukee, WI, April.

Edmond, Ronald G, Hultquist, Chip, and Noey, Jim, Advance Public Information and Technology Course, Department of Homeland Security-Federal Emergency Management Agency, August and November 2002, 2003.

2002

Edmond, Ronald G, Hultquist, Chip, and Noey, Jim, Advance Public Information and Technology Course, Department of Homeland Security-Federal Emergency Management Agency, August; November.2003.

Edmond, Ronald G, Hultquist, Chip, and Noey, Jim, Technology and the 21st Century Emergency Environment Workshop, Department of Homeland Security-Federal Emergency Management Agency, Las Vegas, NV, December.

Edmond, Ronald G. Emergency Risk Communication CDCynergy Train-the Trainer, Center for Disease Control, Atlanta, Washington, D.C., May, June, August, October, November.

2000

Edmond, Ronald G. Enhancing School Safety Through Emergency Preparedness, Roane
State Community College, Roane County Schools, January.

Edmond, Ronald G. New Conference Management, Fluor Daniel Hanford, Richland, WA,
April; May.

Edmond, Ronald G. Do's and Don'ts for Facility Technical Representatives, Flour Daniel
Hanford, Richland, WA, April; May.

1999

Edmond, Ronald G. Principles of Environmental Risk Communication Training, National
Guard Bureau Technical Project Managers, Andrews Air Force Base, MD, February,
March.

Edmond, Ronald G. Enhancing School Safety Through Emergency Preparedness, Roane
State Community College, July; October

Edmond, Ronald G. Enhancing School Safety Through Emergency Preparedness
ArkansasTech University, October.

Edmond, Ronald G. Spokesperson for Educators, Blount County Schools, February.

Edmond, Ronald G. Spokesperson for Educators, Anderson County Schools, March.

1997-2000

Edmond, Ronald G. Emergency Public Information: Spokesperson Training, Fluor Daniel
Hanford, Richland, WA, April; May.

Edmond, Ronald G. Emergency Public Information: Spokesperson Training, United States
Enrichment Corporation, Portsmouth, Ohio, March; April.

Edmond, Ronald G. Emergency Public Information: Spokesperson Training Washington
Public Power Supply, Richland, WA, June.

Edmond, Ronald G. Transportation Public Information, State of New Mexico, Albuquerque,
NM, July 1997; Pennsylvania Emergency Management Agency, Harrisburg, PA,
April.

Edmond, Ronald G. Transportation Public Information State of New Mexico, Santa Fe, NM,
March.

Edmond, Ronald G. Transportation Public Information Western Governors Association,
Denver, CO.

1999-2000

Edmond, Ronald G. Transportation Public Information Department of Energy's
Transportation Emergency Preparedness Conference, Memphis, TN, August;
Chicago, February; August

Edmond, Ronald G. Principles of Risk Communication, Tennessee Health and Safety
Conference, Nashville, TN, July.

1996-1998

Edmond, Ronald G. Risk Communication for the Industrial Hygienist, Lockheed Martin
Energy Systems, June; July; August; November; January.

1994

Edmond Ronald G. Principles of Environmental Risk Communications for Emergency First Responders, Confederated Tribes of the Umatilla Indian Reservation, Pendleton, OR, July.

Edmond, Ronald G. Principles of Environmental Risk Communication Training Refresher, National Guard Bureau Technical Project Managers, National Guard Great Lakes/Central Regional Airspace Committee, Madison, WI, January.

Edmond, Ronald G. and Michael Hubbard. Environmental Risk Communication: A Strategic Approach to Planning, Society for Risk Analysis, San Diego, CA, November.

1991-1994

Edmond, Ronald G. Principles of Environmental Risk Communication Training, Army/Air National Guard, Washington D.C., June 1992;Tucson, AZ, October 1992; San Diego, CA, January 1993; Charleston, SC, February 1993; Chicago, IL, February 1993; St. Petersburg, FL, March 1993; Portland, OR, March 1993; Tampa, FL, March 1993, Dallas, TX, April 1993; Kansas City, MO, May 1993; Houston, TX, June 1993; Boston, MA, June 1993;Houston, TX, January 1994;New Orleans, LA, February 1994; Sacramento, CA, March 1994; Alexandria, VA, April 1994; Santa Fe, NM, May 1994; Providence, RI, June 1994;National Guard Northeast Regional Airspace Committee, Springfield, MA, June 1991; National Guard Great Lakes/Central Regional Airspace Committee, LaCrosse, WI, November 1991; National Guard Northwest/Mountain Regional Airspace Committee, Salt Lake City, UT, November 1992; Air Force Reserve, Warner-Robins Air Force Base, GA, September 1992; National Guard Bureau's Public Affairs Conference, Scottsdale, AZ, November 1992; National Guard Pacific/West Coast Regional Airspace Committee, Riverside, CA, 1994; Environmental Management Workshop for Air National Guard Environmental Coordinators and Bioenvironmental Engineering Technicians, Clinton, MD, October 1991; January 1992; February 1992; June 1992; October 1992; January 1993; February 1993; March 1993; April 1993; May 1993; June 1993; November 1993; January 1994; February 1994; March 1994; Environmental Technologies Seminar, Columbia Basin College, Kennewick, WA, July 1994.

Edmond, Ronald G. Principles of Environmental Risk Communication Training, National Guard Bureau Technical Project Managers, Andrews Air Force Base, MD, February; March.

Appendix K. Approval of Dissertation Form

Lincoln Memorial University
Executive Leadership EdD

Approval of Dissertation Form

**The Dissertation Committee for Lincoln Memorial University
certify that this is the approved version of the following dissertation:**

**CONSIDERING THE PERSPECTIVE OF
EMERGENCY MANAGEMENT PROFESSIONALS REGARDING
RADIOLOGICAL RESPONSE AND SCHOOL RESILIENCY**

Committee:

Dr. Betty Standifer, Chair	Date
Dr. Christopher Henderson, Content	Date
Dr. Gary Peevely, Methodologist	Date

Director	Date
Dean's Name	Date
Vice President Academic Affairs	Date

Appendix L. Certificate of Authorship/Acceptance

Lincoln Memorial University
Executive Leadership EdD
Taken from Graduate Education/Research Framework

Certificate of Authorship/Acceptance

I certify that I am the author of this dissertation entitled:

Considering the Perspective of Emergency Management Professionals Regarding
Radiological Response and School Resiliency

and that any assistance I received in its preparation is fully acknowledged and disclosed in
the paper. I have also cited any sources from which I used data, ideas, or words, either quoted
directly or paraphrased. I also certify that this paper was prepared by me specifically for this
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