DISASTER PREPAREDNESS OF RURAL HEALTHCARE PROVIDERS

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The Supervisory Committee certifies that this ***disquisition*** complies with North Dakota State University's regulations and meets the accepted standards for the degree of

DOCTOR OF NURSING PRACTICE

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ABSTRACT

The purpose of this project was to identify the current status of education/training of rural health care providers and identify gaps in training/education to better prepare rural providers to care for victims of disasters. A survey was conducted and distributed to 21 physicians, nurse practitioners, and physician assistants employed at rural clinic/critical access hospital. The survey consisted of quantitative and fill in the blank questions. The survey was distributed through the electronic survey engine "Qualtrics." Participation in the survey was voluntary and responses were anonymous. The survey addressed/identified: basic demographic information, knowledge of disaster/emergency preparedness and care of victims as a first receiver, experience and education related to disasters/emergencies, perceptions of emergencies/disaster types most likely to impact their facility, future education/training preferences, and barriers to participation in disaster/emergency education/training. The survey also assessed the providers' comfort level with suggested disaster/emergency core competencies put forth from professional emergency/trauma organizations.

The response rate to the survey was 57.14%. Of those that responded 41.67% reported experience in caring for victims of disaster. Participation in previous disaster education/training was reported by 83.3% and these same respondents were familiar with their role according to the facility's Emergency Operations Manual (EOM). The providers perceived that natural disasters were most likely to affect their community (83.33%) in relation to events from the facility's Hazard Vulnerability Analysis (HVA). Respondents that reported having not participated in disaster education/training indicated a lack of time and new employment as barriers. For future training 66.66% of those that responded would prefer hands on training and were willing to spend one hour per year on disaster training/education. In regard to their ability to care for

disaster/emergency victims, participating providers considered themselves novice (25%), advanced beginner (25%), competent (16.67%), proficient (25%) and expert (8.33%). Overall, results indicate that most respondents had experience and are currently participating in education/training. However, the majority still consider themselves novice or advanced beginner in their ability to care for disaster/emergency victims. Most felt that there was little likelihood for most disaster events to occur in their community other than natural disasters.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

CHAPTER ONE. INTRODUCTION AND SIGNIFICANCE

Disaster preparedness within the healthcare system is essential to providing quality care to disaster victims. A disaster as defined by Leow et al. (2012) is "a sudden calamitous event bringing great damage, loss, or destruction that exceeds the community's ability to meet the needs of those involved in the disaster" (pg. 356). Since the September 11th, 2001 terrorist attacks, considerable effort has been put toward disaster preparedness; however, the efforts have been primarily aimed at urban areas and does not address the needs of rural communities and the unique challenges they face in disaster preparedness. In fact, there are limited published research studies available addressing the specific needs of rural communities. Some recent articles addressing rural communities, did so broadly, and identified unique barriers in rural health including geographical isolation, decreased workforce/resources, delay of definitive care, and organizational and financial restraints (Hodge, Miller, Skaggs, 2017; Obaid et al., 2017). A 2006 study by Manley et al. was the most recent to address the unique barriers of rural health in depth which include: small or absent public health departments; fewer resources; less sophisticated forms of technology/communication systems such as the electronic medical record and radio systems' for both intra- and inter-facility communication; and decreased surge capacity. Surge capacity refers to a healthcare system's ability to meet the needs associated with a sudden influx of patients including staff, space, supplies, and equipment (Manley et al., 2006). In addition, there are fewer healthcare professionals and greater distances from other resources such as public health departments, hospitals, or trauma centers (Manley et al., 2006). Finally, rural emergency medical service (EMS) personnel are usually volunteer as opposed to specifically dedicated EMS personnel in urban areas (Manley et al., 2006).

Definitions

Disasters can be either man made or natural. A disaster can be created by a multitude of hazards including a mass casualty event, biologic event, chemical event, radiologic/nuclear event, explosive/bombing event, mass shooting event, or a pandemic/infectious outbreak. The Federal Emergency Management Agency (FEMA) defines a disaster as “an event that requires resources beyond the capability of a community and requires a multiple agency response” (FEMA, 2014, EM Terms and Definitions section). The Department of Homeland Security (DHS) and FEMA (2016), describes disaster preparedness as "a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action to ensure effective coordination during incident response” (para. 1). The disaster preparedness cycle enables communities, facilities, and providers to prepare for, respond to, mitigate for, and recover from disasters. Disaster preparedness includes developing the capacity to care for multiple injured/ill patients and is an essential responsibility of healthcare providers (Leow et al., 2012). Since the terms disaster event and emergency event are often used interchangeably it is important to distinguish between the two terms. FEMA differentiates a disaster event from an emergency event by defining an emergency as “an unexpected event that requires an immediate response using routine community resources and procedures” (FEMA, 2014, EM Terms and Definitions section).

Significance of Problem

Disasters/emergencies continue to occur in both urban and rural areas and are intensifying throughout the world. In 2012, natural disasters caused 10,783 deaths and affected 104 million people worldwide (Ito & Managi, 2015). Economic damages in the United States related to natural disasters were as high as $290 billion in 2012 (Ito & Managi, 2015).

According to the international disaster database (2015), natural disasters alone affected 98.6 million people, accounted for 22,773 deaths, and cost 66.5 billion in economic damages worldwide. In 2017, FEMA reported 137 disaster declarations including the major disasters Hurricane Harvey and Irma and the data from these recent events continues to accumulate (FEMA, 2018). As technology continues to advance, the number of man-made disasters and the significance of natural disasters will continue to evolve and have a greater impact on humanity (Klima et al., 2012). If healthcare providers are not prepared to handle the impacts of disasters, the associated negative outcomes for patients, facilities, and communities could be exacerbated.

Currently, there is a lack of emergency/disaster training among physicians, nurses, hospital staff, volunteers, public health, and safety personnel (Scott et al., 2013). The lack of training in both urban and rural areas poses risk to patients, health care providers, and healthcare facilities; however, these risks are modifiable with appropriate training (Scott et al., 2013). Currently there are no universally agreed upon standards for disaster training of healthcare providers. The Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) does require that hospitals have an emergency management plan and conduct two disaster exercises annually to obtain accreditation (Klima et al., 2012). However, exercises can be operation based (i.e. drills, functional exercise, full-scale exercise) or discussion based (i.e. seminars, workshop, tabletop exercises, simulation) and have no specific requirements as to the participation of the healthcare providers (Klima et al., 2012). Centers for Medicare and Medicaid (CMS) (2018), updated their requirements for disaster preparedness which not only requires that the facility participate in a full-scale drill and conduct one other exercise a year but, also includes the following requirements for training:

- Initial training in emergency preparedness policies and procedures to all new and existing staff, individuals providing on-site services under arrangement, and volunteers, consistent with their expected roles.
- Provide emergency preparedness training at least annually.
- Maintain documentation of the training.
- Demonstrate staff knowledge of emergency procedures (CMS,2018).

To date there are hundreds of competencies which have provided a foundation for the development of disaster training. However, the multitude of competencies have also prohibited the development of standardized disaster preparedness for healthcare providers due to the wide variation of competencies among varying medical associations (Daily, Padjen, & Birnbaum. 2010). A 2015 systematic review revealed that healthcare continues to have a lack of consistency in definitions of terminology and competencies related to disaster (Gallardo et al., 2015).

All healthcare providers have an obligation to be prepared for disasters/emergencies as these events will affect the health of their patients, family, community, and themselves. To meet this obligation "all healthcare providers should be knowledgeable about the range of illnesses and injuries that may arise and how their expertise facilitates effective response" (Leow et al., 2012, pg. 359). This is especially true in rural areas where there are fewer healthcare professionals and resources. The involvement of healthcare providers in disaster preparedness training and planning is crucial in rural areas and needs to include providers that primarily practice in an outpatient setting as they are essential in managing the increased number of patients (Hanfling, 2013).

Due to the barriers previously addressed, providing care to emergency and disaster victims in rural areas is difficult. An event such as a multi-vehicle accident may be handled with

little to no difficulty in an urban facility, however, in a rural facility this could be classified as a mass casualty incident (MCI) due to the facilities capacity being overwhelmed. An MCI is defined as “an event that overwhelms the local healthcare system, with the number of casualties exceeding local resources and capabilities in a short amount of time” (Ben-Ishay et al., 2016, p. 1). Due to the small or absent public health departments, decreased surge capacity, limited resources, lack of healthcare professionals, and greater distance from other resources, it is important to address the needs of rural healthcare providers and deliver specific training to all providers (Manley et al., 2006). The training should include providers in acute care and outpatient settings, as an all hands-on-deck approach will be needed to effectively care for victims of an emergency or disaster.

Problem Statement

Disasters/emergencies can have significant consequences for the community in which they occur and these consequences can be mitigated by increasing preparedness. The purpose of this project was to identify the current status of emergency/disaster preparedness education/training of rural health care providers and identify gaps in emergency/disaster preparedness training/education to better prepare rural providers to care for victims of disasters.

Project Objectives

Objective One

Identify the current emergency/disaster preparedness knowledge, experience, and education level of rural health providers at a rural healthcare facility.

Objective Two

Identify barriers to participating in training, preferred methods of learning, and time available to dedicate to emergency/disaster education for providers at a rural healthcare facility.

Objective Three

Identify the healthcare provider's perceived level of competency to care for victims of emergencies/disasters and perform skills related to their care within a rural healthcare facility.

Objective Four

Identify the healthcare provider's perceived likelihood that a specific emergency/disaster event will occur, knowledge of how to care for victims of the event, and comfort level with caring for victims of the event at a rural healthcare facility.

CHAPTER TWO. REVIEW OF LITERATURE

A literature review was completed using databases to retrieve evidence-based research articles that contributed to and supported the objectives of this project. The databases used included EBSCO, PubMed, CINAHL, and ProQuest. Topics searched focused on disaster preparedness, emergency preparedness, disaster preparedness in rural healthcare, disaster competencies, disaster and rural healthcare providers, and barriers to disaster preparedness.

Disaster Preparedness

As previously defined, disasters are sudden events that overwhelm the community's or facility's ability to care for the victims (Leow et al., 2012). Disaster and emergency preparedness is essential and healthcare organizations must be in a constant state of readiness (Bulson & Bulson, 2013). By being prepared for emergencies and disasters healthcare providers can maximize safe conditions, decrease vulnerability, and minimize risk to individuals when they are confronted with a disaster (Spain, Clements, DeRanieri, & Holt, 2012).

Individual Preparedness

Healthcare providers must be assertive in their individual disaster training and education to provide optimal care to emergency or disaster victims. The need for providers to augment their own education is a result of the delay in public agency response, the lack of training in formal education curriculums, and the legal and moral responsibility of the provider to give the best care possible to emergency or disaster victims (Hanfling, 2013).

As healthcare providers, one cannot assume that public health officials, federal disaster workers or disaster volunteers will be readily available in the response phase of a disaster. In fact, according to Spain, Clements, DeRanieri, and Holt (2012), the reality is that federal agencies may not respond for up to 72 hours. According to the Institute of Medicine (IOM)

Crisis Standards of Care Report (2012), facilities need to be prepared to practice autonomously for up to 96 hours. Therefore, healthcare providers within the community of the disaster event will need to be capable of providing the bulk of the healthcare in the response phase (Hanfling, 2013).

Curriculum

Since the healthcare provider's role is so pivotal in emergency and disaster preparedness, one may contest, "why isn't disaster preparedness a part of their formal education curriculum?" The Association of American Medical Colleges and the IOM have made recommendations for disaster preparedness training to be incorporated into medical school curricula; however, these curriculums have been slow to develop, and training focuses primarily on practicing providers (Scott et al., 2013). Educational institutions have identified that there are many barriers to integrating disaster preparedness education into the curriculum including the lack of standardized disaster training for medical students and lack of time in the existing curriculum (Jasper, Wanner, Berg, & Berg, 2017). The same recommendations have been made for incorporation of disaster preparedness training into undergraduate, graduate, and doctoral nursing programs (Bulson & Bulson, 201l; Spain et al., 2012). According to Scott et al. (2013) "literature reviews from the past 5-6 years suggest that healthcare provider disaster training programs lack clarity, objectivity, competency-driven goals, scientific rigor, prospective validation, and consistency across medical specialties" (pg. 44).

Standards of Care

Care for disaster victims challenges healthcare providers to transition from the traditional standards of care concepts of beneficence and non-maleficence for all patients to the disaster care standard of doing the greatest good for the greatest number of people. Disaster standards of care

substantiate that the health outcomes of an individual are of less importance than the health outcomes of the population or community as a whole during disaster events (Hanfling, 2013). Providers may also be asked to work outside of their comfort level, usual practice standards, or to some extent their scope of practice (Hanfling, 2013). The changes from usual practice can be a cause of concern for healthcare providers regarding possible legal action (Hanfling, 2013). To address legal concerns, the U.S. Department of Health and Human Services asked the IOM to put forth standards of care related to disasters which resulted in the "crisis standards of care" (CSC) (Hanfling, 2013, pg. 9). Crisis standards of care as defined by Hanfling (2013) are a substantial change in operation and the level of care that can be delivered in a disaster; care will be justified by specific circumstances allowing medical providers to allocate services to save the greatest number of lives possible. CSC is a recognition that there are limited resources and everyday standards of clinical care are not possible under the circumstances (Leider, Reynolds, Koch, & Seaberg, 2017). To ease healthcare providers concerns regarding legal action in crisis situations, in addition to the "crisis standards of care", the Public Readiness and Emergency Preparedness Act was developed (Neil, 2014). This law attempts to protect healthcare providers from liability lawsuits that may develop from providing care to preserve the greatest number of people rather than attempting to save every individual (Neil, 2014). However, for the act to protect them, healthcare providers must be able to prove that they have been properly trained, educated and prepared in a manner that would allow them to respond sufficiently to a foreseeable disaster, as decided by the legal system (Neil, 2014). Healthcare providers need to engage in training and education to prepare themselves to care for disaster victims, as their formal education and daily practice may not be enough to protect them from possible legal ramifications associated with

inadequate disaster training. The IOM (2012), recommends provider participation in advanced planning and preparedness activities to mitigate the risk of prospective liability claims.

Training and Competencies

Emergency and disaster preparedness is a cyclic continuum that consists of planning, organizing, training, exercise drills, and evaluation (Klima et al., 2012). There is not one aspect on the continuum that is more important than the other and all must be addressed to be adequately prepared for an emergency or disaster. Adequate training of individual healthcare providers is imperative because even one individual's inadequacy can compromise the entire healthcare system's emergency/disaster operation (Scott et al., 2013). After healthcare providers were trained in emergency/disaster preparedness, skills, and concepts, they were better equipped to participate in exercise drills, allowing for an assessment of the multidisciplinary effectiveness of an entire community emergency/disaster plan (Klima et al., 2012). Ultimately, the healthcare providers and healthcare organizations will be better prepared to care for emergency/disaster victims (Klima et al., 2012). "Providing competency-based disaster preparedness training for all healthcare providers is essential to the future success of disaster operations" (Scott et al., 2013, pg. 47).

Retrospective studies of the September 11th, 2001 terrorist attacks on the United States, Hurricane Katrina, Hurricane Sandy, the Joplin Missouri tornado, and the multiple mass shooting events in recent years have illustrated that healthcare providers have been grossly unprepared to handle the influx of victims associated with such events. Despite these studies, there has been little evidence of improvement in healthcare disaster preparedness and standardization in training methods (Scott et al., 2013). Furthermore, few states have performed workforce assessments of their healthcare providers to identify disaster preparedness training needs (Scott et al., 2013).

According to Scott et al. (2013), over 52% of healthcare providers receive less than 2 hours per year of disaster training/education. In 2008, a study conducted assessing nurse practitioners in North Dakota, 67.75% of providers had no previous disaster experience (Hohman, 2008). In the same survey of North Dakota nurse practitioners, 30.2% of the participants reported their facility did not conduct annual disaster drills (Hohman, 2008).

Barriers to Training

Scott et al (2013) identified barriers that prohibited healthcare providers from participating in disaster preparedness training including: unclear disaster duties of the provider, unclear training needs, unclear standards of training, poor quality training curricula, lack of courses, lack of instructors, lack of staff interest, time constraints, and financial barriers (Scott et al., 2013). In North Dakota, 52% of nurse practitioners identified lack of time and educational programs as barriers to participating in disaster preparedness (Hohman, 2008). These barriers need to be addressed in order to promote healthcare providers' participation in disaster training. Schultz, Koenig, Whiteside, and Murray (2012) offer the following solutions;

- Competency-based education/training that focuses on what the healthcare provider's roles are in a disaster event.
- Competencies that are measurable and include both skills and specific concepts of disaster such as triage, communication, and incident command.
- Provide a nomenclature within training that is standardized and clear to everyone involved in the training.
- Offering a variety of training modalities that can be self-paced or completed in shorter time periods.

- Offering continuing education credits with the completion of training to place a type of value to the training.

Training Modalities

A study done by Williams et al. (2008), attempted to compare the efficacy of different training modalities through a systemic review. Williams et al. (2008), additionally attempted to identify whether training modalities for disaster preparedness such as didactic, hands-on courses, disaster drills, simulations, and other forms of continuing education, improved objective measures of disaster knowledge and skills of healthcare providers (Williams et al., 2008). The results of the study were inconclusive and further research needs to be conducted to validate the effectiveness of computer-based or didactic lecture training as the results were mixed (Williams et al., 2008). A study by Jasper et al. (2107), regarding disaster preparedness training of medical students in their curriculum indicated students found didactic lecture and hands on skill training to be the most beneficial in preparing for disasters; however, the full-scale disaster did give them an understanding of the overall challenges hospitals face. According to a study of North Dakota nurse practitioners, 34.51% would prefer a conference as their training modality (Hohman, 2008). However, simulation-based training has had great utility in preparing providers for "rapidly evolving situations and the severe consequences of errors of omission or commission" (Gardner et al., 2016, pg. 556). According to Jung et al. (2016), in situ full scale simulations have been shown to improve knowledge and communication during a disaster but smaller scale drills performed frequently throughout the year improves providers' retention of knowledge, skills and communication in all areas of disaster.

Competencies

Education and training are imperative to emergency/disaster preparedness and multiple programs have been developed; however, there continues to be a lack of common standards or "standardized core competencies" (Daily et al., 2010). Standardized core competencies are vital in ensuring that healthcare providers are prepared to respond efficiently in all types of emergencies and disasters (Schultz et al., 2012). Competencies should include not only high frequency skills within emergencies and disasters such as airway and circulatory management but, also a running knowledge of concepts such as triage and incident command which are specific to disaster preparedness (Schultz et al, 2012). Among the hundreds of currently developed emergency and disaster training competencies, few have been validated or proven to be more useful than others (Daily et al., 2010). Due to a lack of validity, further research needs to be conducted to develop a standardized consensus on disaster preparedness core competencies that are applicable to all healthcare providers (Daily et al., 2010).

Disaster Preparedness Specific to Rural Health

Events such as the September 11th, 2001 terror attacks, the Boston Marathon bombing, Hurricane Sandy, Hurricane Katerina, Hurricane Harvey, Hurricane Irma, Hurricane Maria, and multiple mass shootings have created an increase focus on disaster preparedness; however, much of that attention was focused on urban areas and little focus has been given to rural areas (Putzer, Koro-Ljungberg, Duncan, & Dobalian, 2013). The lack of preparedness in rural areas can be detrimental; experts believe that disasters pose just as much of a risk in rural areas as urban areas. The United States land mass is considered 80% rural with 25% of the population living in rural areas (Putzer et al., 2013).

Emergency and disaster preparedness in rural areas have unique challenges in comparison to urban areas which include:

- Restricted access to resources/public health infrastructures.
- People living in poverty.
- Lower income community members.
- Members of the community that livelihoods depend on resource-based occupations. that are at great risk in natural disasters.
- Majority of community members living more than 30 miles from a hospital.
- EMS personnel are usually on a volunteer basis (Prelog & Miller, 2013; NRHA Policy Brief, 2011).

Rural healthcare facilities also face unique challenges regarding lack of space, staffing in all departments, reliable communication systems and transportation equipment (Leow et al., 2012). Since rural healthcare facilities face unique challenges such as limited resources, facilities often collaborate with regional organizations to address challenges and effectively respond to disaster events (Obaid et al., 2017). Thus, disaster preparedness needs to extend beyond a written plan/table top exercise and needs to include a full-scale drill to include all regional agencies potentially involved in disaster response (Obaid et al., 2017).

Rural Providers

Rural hospitals and healthcare providers that work within the rural healthcare system need to have a coordinated effort to effectively prepare for emergencies and disasters. Often rural healthcare systems have a limited number of providers and an even more limited number of specialty providers. Thus, providers within rural health systems will likely need to provide care to emergency/disaster victims outside of their specialty area (Putzer et al., 2013). For this reason,

all providers must be involved in emergency and disaster preparedness training, understand their facility's emergency plan, and be fully prepared to respond when an emergency or disaster occurs. Due to the limited number of providers and resources, rural healthcare providers need to be trained in a cost-effective and sustainable manner with a focus on common elements that improve emergency and disaster response such as clinical skills, triage, role expectations, communications, and incident command within their facility (Manley et al., 2006). Many healthcare providers have an "it can't happen here" or, a "leave it to the authorities to figure out what to do" mentality regarding emergency and disaster preparedness and this cannot be allowed (Hanfling, 2013 pg. 7). Rural healthcare providers need to transition to an "expectation preparedness" mentality by anticipating emergency and disaster response and accepting that one may occur (Putzer et al., 2013).

CHAPTER THREE. THEORETICAL FRAMEWORK

Iowa Model of Evidence-Based Practice

Evidence based practice is utilized in healthcare for the development of policies, protocols, and implementation of best practice. The Iowa model can be utilized to help guide clinicians and researchers to implement evidence-based practice. The Iowa model is a seven-step process that focuses on knowledge triggers, questions current practices, and improves practices through current research findings (Doody & Doody, 2011).

Selection of a Topic

The selection of a topic requires consideration of the magnitude of the problem, its application to practice, contribution to improving care, and availability of evidence (Doody & Doody, 2011). Disasters and emergencies can have significant repercussions on the healthcare system and facility if adequate preparation is not taken to train and prepare. A literature review conducted revealed a multitude of evidence-based articles regarding disaster/emergency preparedness that indicated there are gaps in provider preparedness.

Forming the Team

The team is responsible for development, implementation and evaluation; the individuals on the team should be interested stakeholders in the topic (Doody & Doody, 2011). The team of the project is composed of a chair person, two committee members and a graduate appointee. The chair of the project is a practicing nurse practitioner with experience in emergency medicine and extensive experience with the military giving him expertise in disaster/emergency preparedness. The graduate appointee is a faculty member with her PhD in Emergency Management. The remaining committee members included a nurse practitioner who practices

rurally, and the other member is the director of emergency preparedness at the participating facility.

Evidence Retrieval and Grading the Evidence

Evidence was found by utilizing electronic databases as mentioned previously related to the topic. Key words searched included; disaster, disaster preparedness, emergency preparedness, mass casualty, rural disaster preparedness. The evidence received included both qualitative and quantitative data. Criteria for utilization of the evidence was data from a reputable, valid and trusted source along with data that was recently published.

Developing and Implementing Evidence Based Practice

The goal of this project was to identify the current status of education/training of rural health care providers and identify gaps in training/education to better prepare rural providers to care for victims of disasters. The needs assessment was developed to assess the areas, based on evidence collected and a previously utilized survey. Implementation of the needs assessment was completed through collaboration with the facility's clinical director to distribute the link to the needs assessment to all providers within the healthcare facility.

Evaluation

Evaluation is a vital element of the theoretical framework; it is what is utilized to address how the evidence can be applied in practice. Evaluation of this project included the review and analysis of the completed needs assessment. Evaluation included the current strengths and gaps in disaster/emergency preparedness at a healthcare facility and recommendations for future disaster/emergency preparedness training/education.

Neuman System Model

Neuman's System Model recognizes that there are varying levels of defenses and resilience when it comes to an individual's stress reaction. The first level is the normal line of defense which is considered the individual's usual state of adaptation (Flaherty, 2013). The second level of resilience is the flexible line of defense, which protects the normal line of defense by defusing stressors before they overwhelm the normal line of defense (Flaherty, 2013). Lastly, there are lines of resilience, which are actions taken to protect the individual and restore equilibrium when a stressor has overwhelmed the normal lines of defense (Flaherty, 2013).

The Neuman's System Model is a systems theory that correlates well to emergency and disaster preparedness. The model focuses on the reaction to both internal and external stressors within the environment and focuses on concepts such as stress adaptation, homeostasis and levels of prevention (Flaherty, 2013). Emergency and disaster preparedness does not focus on the patient but, rather the provider administering the care. By being prepared for a disaster or emergency the provider is practicing secondary prevention. The purpose of emergency and disaster preparedness is to prepare the provider to react to the needs of patients in a highly stressful event by controlling their own reaction to the stress (Petiprin, 2016).

The Neuman's System Model can also be applied to interdisciplinary teams working together. The theory speaks to the need for common language and structure in organizing patient information that is vital in interdisciplinary work (Memmott, Marett, Bott, & Duke, 2000). When it comes to emergencies, disasters, and preparedness working as an interdisciplinary team is pivotal in providing the best care to the victims. Neuman's System Model can guide the actions of incident command, triage, and disaster management planning and training.

The model depicted in Figure 1 illustrates how Neuman's System Model can be adapted to emergency/disaster preparedness. The normal line of defense includes the providers seeking out educational opportunities and preparing themselves with training and education so that in the event of an emergency or disaster they are ready to act. The lines of resilience are put into effect during an emergency or disaster response when the providers utilize the education and training obtained in the normal line of defense. When it comes to emergency or disaster preparedness, the line of flexibility would be the providers' participation in the community and regional drills, as mock events allow for evaluation of the current emergency or disaster plan and the effectiveness of provided training.

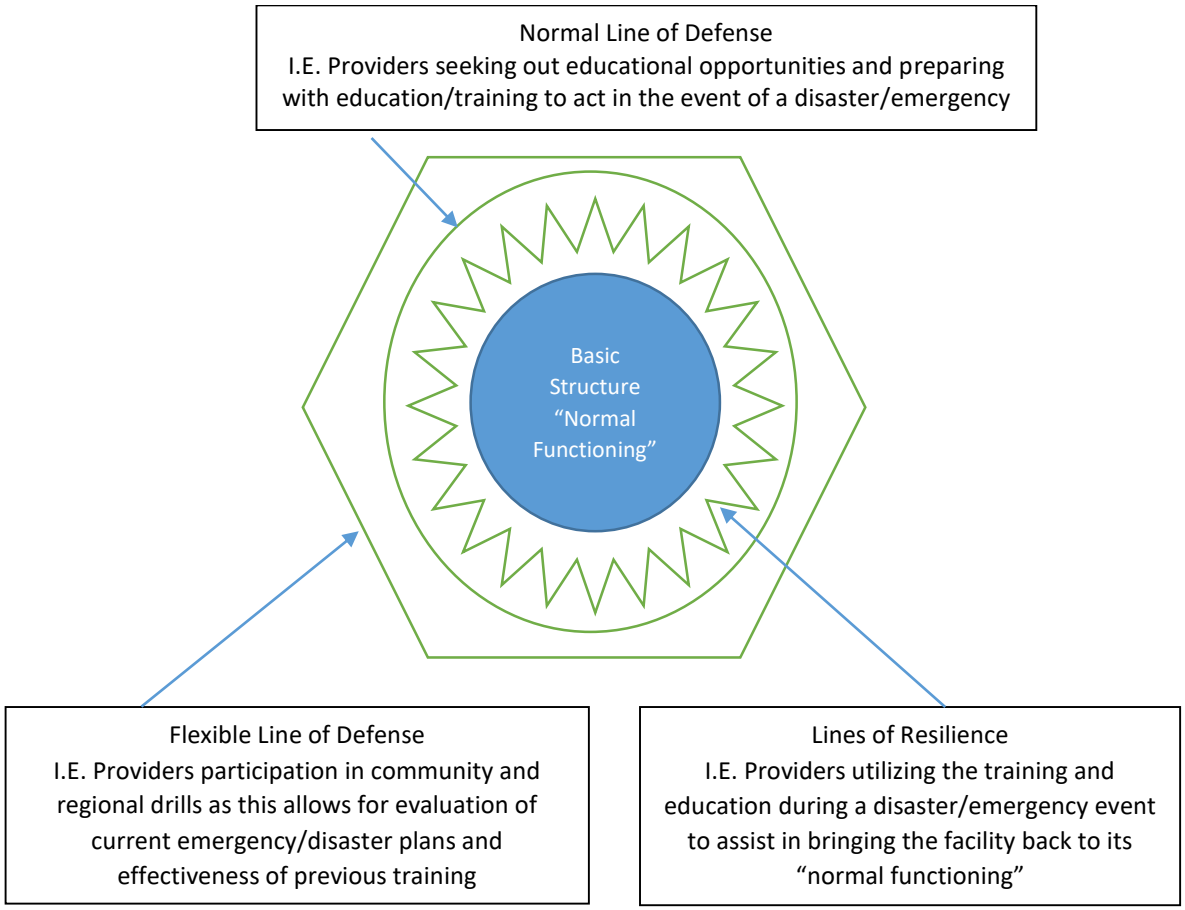

Figure 1. Neuman's System Model adapted for Emergency/Disaster Preparedness.

For this project the focus was on the first level which is the normal line of defense. Education and a training schedule were provided to healthcare facility to improve the providers' baseline knowledge and prepare for care of emergency/disaster victims. By applying the first line of defense to providers through education and training the flexible lines of defense (drills) and lines of resilience (response) were strengthened thus providing increased protection to the community and healthcare system and allowing for return to equilibrium following the emergency or disaster event.

Congruency of the Project to the Organization's Strategic Plan

The facility in which the project was conducted is located in a rural Minnesota community comprised of multiple recreational lakes, farms, and industry. The community is also a hub for railroad and a major state highway. The facility is composed of three clinics, one of which is conjoined with the hospital/emergency room along with two more rural clinics in neighboring towns and is associated within a larger health system from which they receive outreach. The hospital is located 66 miles from the regions nearest major trauma center. By ambulance this is about a 75-minute drive and a 25-minute to 30-minute flight by air ambulance, thus defining the facility as a critical access hospital (CAH). According to the Department of Health and Human Services office of inspector general (2013), a CAH is designated by the following:

- Having no more than 25 inpatient beds
- Maintaining an annual average length of stay of no more than 96 hours for acute inpatient care
- Offering 24-hour, 7-day-a-week emergency care

- Being located in a rural area, at least 35 miles drive away from any other hospital or CAH

As mandated by the JCAHO, the facility has an Emergency Operations Plan (EOP). The facility's EOP defines an emergency as "any unplanned event that can cause deaths, or significant injuries to patients, staff, or the public: or can shut down the organization, disrupt operations, cause physical or environmental damage or threaten the organizations' financial standing of public image" (EOP, 2013, pg. 7). Although the facility has a complete EOP which is exercised on a semiannual basis, this does not ensure that all providers are familiar with or trained on the procedures/roles expected of them during an emergency or disaster.

As a critical access hospital in a rural area with a limited number of providers/staff, the facility depends on the all hands-on-deck approach for providing care in the event of a disaster. The EOP indicates that they utilize hospital and clinic space in the event of a disaster and categorize the patients based on the simple triage and rapid treatment (START) triage method. The START triage method is composed of four categories which are as follows:

- Red; indicates immediate intervention is needed to save the patient and is composed of victims with compromised airway, breathing, or circulation
- Yellow; indicates delayed treatment is sufficient for survival and is composed of victims with serious or potentially life-threatening injuries but, are not expected to deteriorate significantly for several hours
- Green; indicates minor injuries and are not expected to deteriorate for several days
- Black; indicates the expectant victims, or those not likely to survive given the severity of symptoms, level of available care, or both. These victims should be provided

palliative care and pain relief (REMM & U.S. Department of Health and Human Services,2016).

According to the facility's EOP, patients will be triaged according to categories I-IV which are defined as follows. Category I patients includes those who need immediate treatment (RED) and will be treated in the emergency room/operating room (EOP, 2013). Category II patients are those who can receive delayed treatment (Yellow) and will be treated in the clinic (EOP, 2013). Category III patients are those who need minimal treatment (Green) and will be treated in the clinic (EOP, 2013). Category IV patients are those who have little chance of survival regardless of lifesaving interventions (Black) and will be put in medical-surgical rooms and kept comfortable as rooms are available (EOP, 2013). Category V patients are those who are dead on arrival (Dead on Arrival (DOA)-Black) and triaged to the maintenance garage or other space that can be utilized as a morgue (EOP, 2013).

Based on the information provided in the EOP it is important that all providers be prepared and trained to work in all disaster categories because they can be assigned to work in any of the categories in the event of a disaster. Providers who typically provide care in an outpatient clinic setting may be called on to provide lifesaving interventions for Category I patients. Providers who may have little or no experience in acute care may be asked to provide care to acute care patients. There are multiple scenarios and possibilities for which the providers may be called to action. Therefore, assessment of current preparedness and providing training/education to better prepare them for an effective emergency or disaster response is important**.**

In addition to an EOP, the facility also has a Hazard and Vulnerability Analysis (HVA) (see Appendix A). The HVA is a document that provides a systemic approach for hospitals to

identify hazards that may affect their facility and allows a community to predict probability of disaster/emergency events. The risk associated with each hazard is analyzed to prioritize planning, mitigation, response and recovery efforts. The facility's HVA calculates the risk/relative threat related to each disaster/emergency event from 0-100% risk. The following categories are rated on a scale from 0-3 meaning not applicable, low, moderate and high respectively:

- Probability of the event; likely hood the event will occur
- Human impact; possibility of death or injury
- Property impact; physical losses and damages
- Business impact; interruption of services
- Preparedness; preplanning
- Internal resources; time, effectiveness, resources
- External resources; community/mutual aid staff and supplies

The risk percentage for a specific event is calculated based on the rating in each category (see Appendix A). The HVA is essential in guiding future training and education so that the preparedness of providers matches the high probability/impact events.

CHAPTER FOUR. PROJECT DESIGN

Methods

A needs assessment survey was conducted to assess each healthcare provider's emergency and disaster preparedness at the designated rural healthcare facility. The needs assessment survey was developed using aspects of a survey developed by Hohman (2008) and supported by the literature review. The needs assessment survey was distributed to all healthcare providers (physicians, nurse practitioners, and physician assistants) within the clinic and hospital of the healthcare facility. The assessment was conducted via an email survey utilizing Qualtrics to assess their knowledge and beliefs about emergency/disaster preparedness and care of victims as a first receiver. The needs assessment specifically addressed the following information: (see Appendix B)

- Basic demographic information
- Experience/education regarding emergencies/disasters
- Provider comfort level with core competencies of emergencies/disasters
- Perception of type of emergencies/disaster most likely to affect them
- Preference on type of emergencies/disaster to focus education on
- Preference of education modality
- The amount of time able or willing to dedicate to emergency/disaster education

The needs assessment was analyzed to assess health care providers' current emergency/disaster preparedness, knowledge, perceived competency with skills, and overall care of victims of all providers at the facility. Lack of standardized competencies, as discussed in the literature review, made it difficult to interpret which competencies to include in the needs assessment. Also, due to the complexity of disaster/emergency care there were a considerable

number of competencies needed to effectively care for the victims such as hazardous material (HAZMAT) care, triage, communication, incident command etc. Therefore, it was decided to concentrate on skills related to patient care and trauma. The trauma competencies also reflect competencies put forth by the American College of Emergency Physicians, National Organization of Nurse Practitioner Faculties, Emergency Nurses Association, and basic skills of Advanced Trauma Life Support.

The results regarding the providers' perception of types of emergencies/disasters likely to affect them was compared to the facility's Hazard and Vulnerability Analysis (HVA) to identify congruencies or gaps (see Appendix A). Based on the results of the needs assessment recommendations were made to the facility for consideration of future education and training related to emergency/disaster preparedness. In addition, a training/exercise schedule was developed and distributed to the organization.

Timeline of Project Phases

Table 1

Timeline of Project

Intervention	Completion Date
Development/Proposal	December 2016
Needs Assessment Distribution	July, 2017
Evaluation of Needs Assessment	August/September, 2017
Final Defense	March, 2018

Resources

The major resource needed was the time commitment from the providers to complete the needs assessment. Analysis of the needs assessment was completed utilizing Qualtrics.

Protection of Human Subjects

This project was conducted in accordance with the North Dakota State University Institutional Review Board's policies and protection of human subjects. For the purposes of this project, subjects included were physicians, nurse practitioners, and physician assistants employed at the participating facility. Participation of the subjects was voluntary, and consent was implied when providers chose to complete the survey. Participants were able to withdraw from participation at any time without penalty, which was relayed to them in the participant information form (see Appendix C). There was minimal risk to the participants in this project as the only potential foreseen risk was loss of confidentiality due to the demographic information provided and the limited number of total participants.

Adequacy of Protection of Human Subjects

There was no active recruitment of participants in the conduction of the project, as all providers at the participating facility were sent an email inviting participation which was voluntary. The email included a link for the participant information form (see Appendix C), and Qualtrics to complete the needs assessment electronically. Qualtrics is a web-based survey tool that allowed participants to respond anonymously and assisted the study investigator in organizing the data. Consent was implied with completion of the needs assessment survey. In order to keep all responses confidential, the Qualtrics survey tool was set to anonymous for the needs assessment responses. Results were securely stored in Qualtrics and access to the results were available only to the coinvestigator and investigator.

International Review Board Approval

Approval for protocol #PHI17036 was received from the North Dakota State University Institutional Review Board (see Appendix D). The surveying of providers was constituted as exempt for IRB approval.

CHAPTER FIVE. EVALUATION

The evaluation plan for this project involved individually evaluating each objective. Each objective was evaluated through the administration and analysis of specific questions in the needs assessment survey.

Evaluation of Objective One

The first objective was to identify the current emergency/disaster preparedness knowledge, experience, and education level of rural health providers at a rural healthcare facility. This objective was evaluated by the administration of the needs assessment to providers at a rural healthcare facility. Questions six through seventeen addressed objective one (see Appendix B). These questions pertained to previous care of disaster/emergency victims, previous care of victims related to specific disaster events, and previous care of disaster/emergency victims with special considerations. The questions also pertained to previous education/training received including: what types of disaster/emergency events in which they have received education/training and what methods were used to receive this training. This section of questions also addressed if the participant was knowledgeable of their role in a disasters/emergency according to the facility's EOP and knowledge about the facility's disaster drills.

Evaluation of Objective Two

The second objective was to identify barriers to training participation, preferred methods of learning and time dedication to emergency/disaster education in an effort to increase participation of training and education of rural healthcare providers. This objective was evaluated by the administration of the needs assessment to providers at a rural healthcare facility. Questions twenty-nine through thirty-five addressed objective two (see Appendix B). This section of questions addressed if the project participants completed the facility's

disaster/emergency education and if not, why. The questions also addressed what additional training the participants felt they needed, time available to participate in training, and the preferred method of receiving the training.

Evaluation of Objective Three

The third objective was to identify the healthcare providers' perceived level of competency to care for victims of emergencies/disasters and perform skills related to their care. This objective was evaluated by the administration of the needs assessment to providers at a rural healthcare facility. Questions eighteen and nineteen addressed objective three (see Appendix B). The questions addressed the participants comfort level with specific competencies related to care of disaster/emergency victims. The questions also addressed the participant's perceived competency in relation to the overall care of disaster/emergency victims.

Evaluation of Objective Four

The fourth objective was to identify the healthcare providers' perceived likelihood that a specific emergency/disaster event will occur, knowledge of how to care for victims of specific events, and comfort level with caring for victims of the events. This objective was evaluated by the administration of the needs assessment to providers within a rural healthcare facility. Questions twenty through twenty-eight addressed objective four (see Appendix B). These questions referred to specific disaster events that addressed participant's perception of different disaster events likely to affect the community, familiarity with the facility's policy related to the specific disaster events and their confidence in caring for victims affected by specific disaster events.

CHAPTER SIX. RESULTS

The needs assessment survey implemented via Qualtrics was delivered electronically via an email link to the 21 providers employed by the rural healthcare facility. Over a six-month period of data collection 12 responses were recorded (response rate of 57.14%). The responses included: seven physicians (58.33%), three nurse practitioners (25%), and two physician assistants (16.67%). The majority of those who responded (83.33%) primarily practice in a clinic/primary care setting. Years of experience included 50% of providers practicing less than 5 years, 16.66% had practiced for 5-10 years, and 33.33% had practiced for greater than 15 years.

Current Emergency/Disaster Knowledge, Experience, and Education

Experience

Of the 12 responses to the survey, 41.67% of providers had cared for disaster/emergency victims and 58.33% had not. The data were further divided into specific types of disaster/emergency events including biologic agents, chemical agents, bombing/explosives, mass shootings, mass casualty events, and pandemics. None of the providers reported caring for victims of biologic agents, 25% of providers had cared for victims affected by chemical agents and victims of a mass casualty events, 16.67% had cared for victims of explosives/bombings and victims of pandemics, and 8.33% had cared for victims of a mass shooting.

Education

From the 12 responses to the survey, 83.3% indicated that they had received education/training or professional development related to disaster/emergency events. The providers that had previous education/training were asked to indicate what type of event they received the education/training in and to select all that applied to them (see Figure 2). Participants indicated that the event they had the most previous training in was natural disaster

events. Less than half of the providers previously received education/training on biologic, chemical, radiologic, mass casualty, pandemic, and surge capacity events.

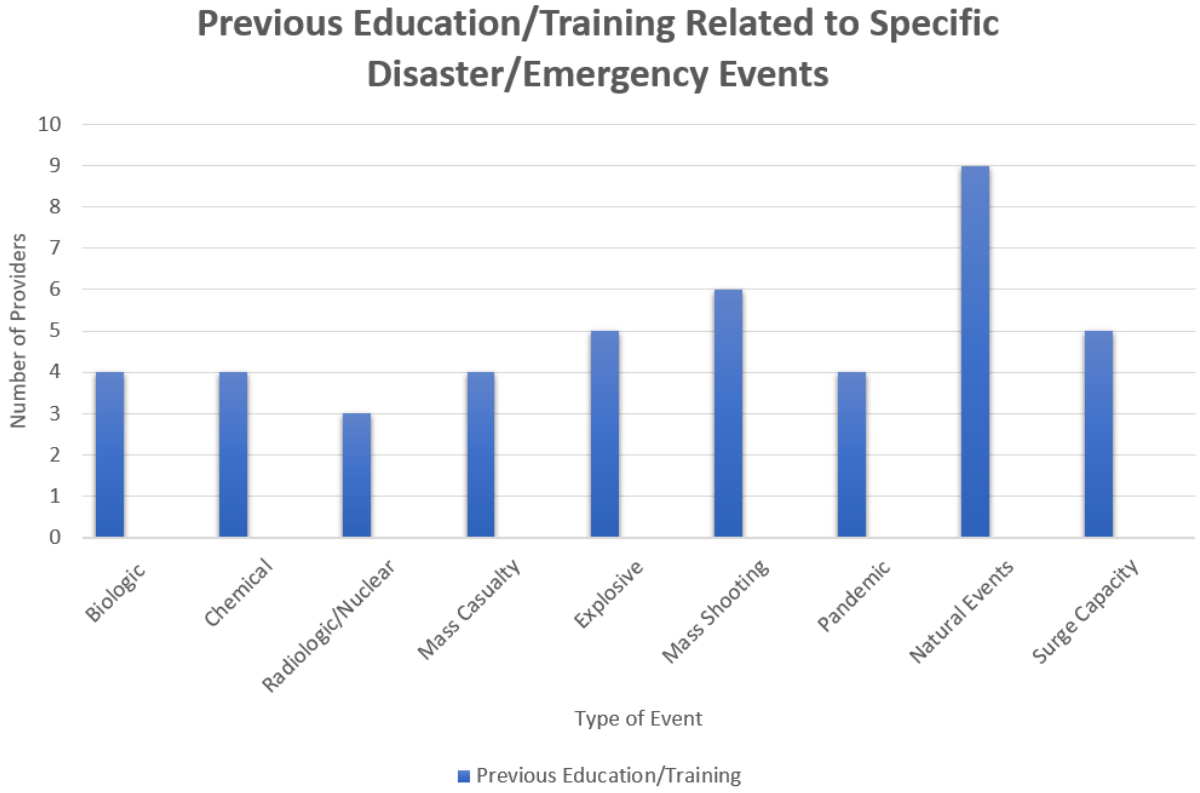

Figure 2. Previous Education/Training related to Specific Disaster/Emergency Events

Those that had received education were also asked to indicate the education/training modalities utilized. Of these providers, six received their education from classroom lecture, five through full-scale disaster drills and/or continuing education, four received hands on practice and or internet based, three had mannequin simulation, and two utilized CD-ROM/video.

Knowledge

From the 12 responses to the needs assessment 83.3% reported being familiar with their role according to the facility's EOM in the event of a disaster. Regarding the annual education required by JCAHO, seven providers reported their facility does an annual drill, three providers

report their facility does a drill more than once a year and two providers reported that their facility does not conduct an annual disaster drill.

Experience/Education and Knowledge for each Type of Provider

Experience

Of the seven physicians that responded, five reported caring for victims of a disaster. The three nurse practitioners (NP) whom responded denied any experience related to care of disaster victims. The two physician assistants (PA) whom responded answered "no" related to care of victims of emergency/disasters; however, one PA reported having cared for patients affected by chemical agents and patients related to a pandemic which contributed to the cumulative results.

Education

The seven physicians that responded reported education/training or professional development in the past related to disaster/emergency events. When asked to indicate which types of disasters physicians have received training/education the breakdown indicated:

- 100% related to natural disaster
- 85.71% related to mass shooting
- 71.43% related to surge capacity and explosives
- 57.14% related to mass casualty events
- 42.85% related to biologic events, chemical events, and pandemics
- 28.57% related to radiologic events

The way in which training was received varied for the physicians with 42.85% -71.45% reporting class room, hands-on, literature review, mannequin simulators, and full-scale disaster drills.

Of the nurse practitioners, one reported receiving education/training or professional development in the past related to disaster/emergency events. The identified training was related to natural disaster events in the form of internet-based education and "what was required by the organization". Both responding PA's related that they have had education/training or professional development in the past related to disaster/emergency events. One PA had training in biologic events, chemical events, radiologic/nuclear events, and pandemics. The other PA indicated training related to natural events. Past education/training was completed through classroom lecture, internet based learning, and full-scale disaster drills.

Knowledge

All the responding physicians reported being familiar with their role according to the facility's EOP in the event of a disaster/emergency. One responding nurse practitioner and physician assistant reported being unfamiliar with their role according to the EOP.

Regarding knowledge of the facility's annual disaster drill, one physician reported that no disaster drills were conducted, four reported annual drills were conducted and two reported that drills were conducted more than once a year. One NP reported that a disaster drill was not conducted annually. While two nurse practitioners acknowledged that a disaster drill was done annually. One physician assistant reported an annual disaster drill while one reported drills were conducted more than once a year.

Types of Emergencies/Disasters Most Likely to Affect the Providers/Community

Providers were asked to identify what type of emergency/disaster events they felt were likely to affect their community (see Figure 3). The providers were also asked about their knowledge of the policy in place at their healthcare facility related to the specific type of emergency/disaster event (see Figure 3). Providers felt that natural disasters were most likely to

occur, and all providers reported being aware of the policy related to natural disasters. None of the providers felt a biologic or radiologic event was likely to affect their community. Other than radiologic events, more than half of the providers reported being familiar with all policies related to the specific disaster events.

Lastly, they were asked to rate their comfort level with caring for victims of the specific emergency/disaster (see Figure 4). Providers were least confident in caring for victims of radiologic/nuclear events and most confident in caring for victims of natural disasters. However, none of the providers felt confident caring for victims of chemical events.

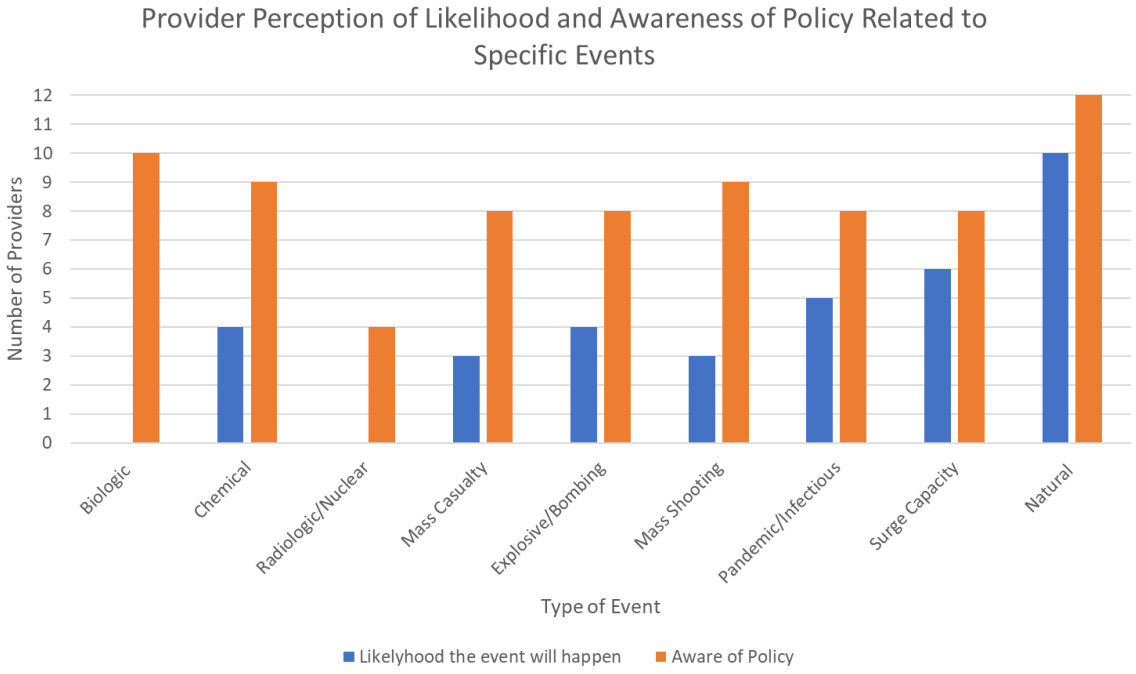

Figure 3. Provider's Perceived Likelihood an Event Will Occur & Knowledge of Facility Policy

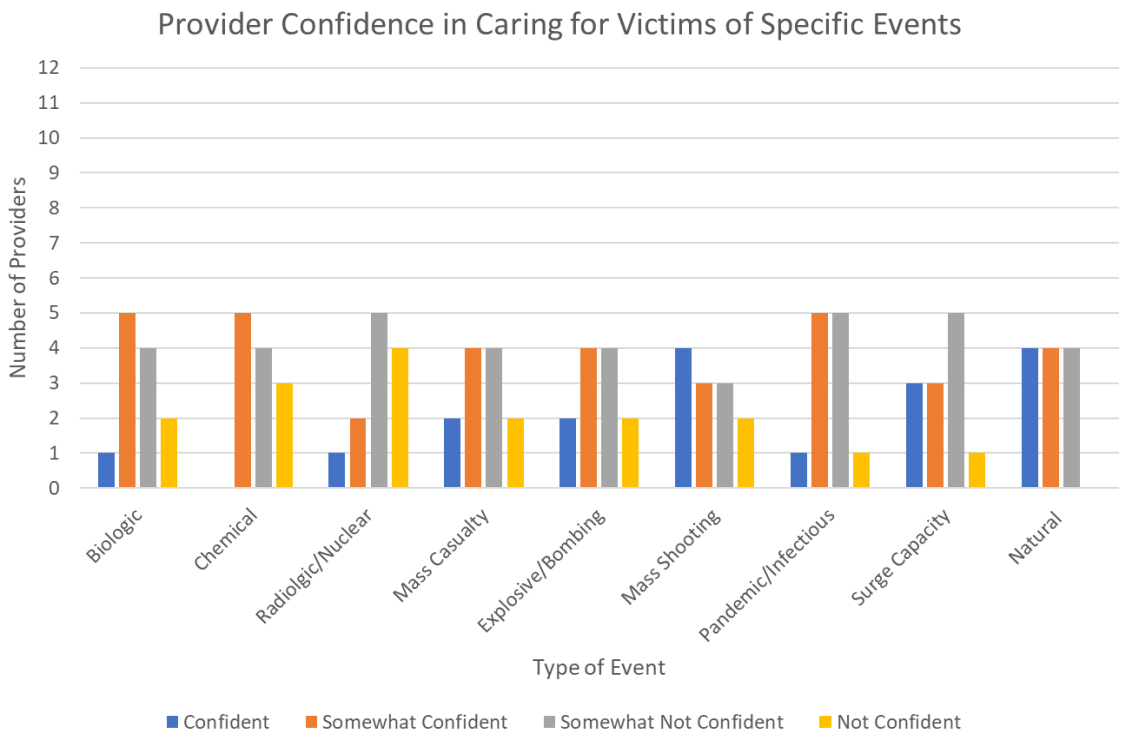

Figure 4. Provider's Level of Confidence in Caring for Victims of Specific Disasters

Barriers to Participating in Training, Preferred Methods of Learning and Time Available to Dedicate to Emergency/Disaster Education

Participation and Barriers

When asked about participation in disaster/emergency preparedness education/training within the facility, 83.33% report they participated. Those who responded that they do not participate in training indicated the lack of time to complete the education and "being new to the facility" as barriers to participating. One provider reported that they participate by "online required education".

Preferred Methods of Learning

When asked what their preferred method of was receiving disaster/emergency preparedness training/education, the providers responded with the following when given the option to select all that apply:

- 66.66% hands on practice
- 58.33% classroom lecture
- 33.33% internet based
- 25% mannequin simulators
- 25% seminar/conferences
- 16.66% full scale disaster drill
- 16.66% CD-ROM

When asked what type of additional education the provider felt they needed in order to respond to a disaster/emergency event the following responses were recorded: “We have received good education on these topics,” “drills,” “periodic review,” “none” and “at the time of the event we would need some event specific refreshers but, the resources are available”.

Time Available

When asked what day of the week providers would be willing to participate in disaster/emergency preparedness education, providers were able to select all that apply. The following days were selected; Monday (6 responses), Tuesday (4 responses), Wednesday (3 responses), Thursday (4 responses), Friday (4 responses). The time of day most preferred to participate in disaster/emergency education was 12pm. Providers were asked how much time they would be willing to spend for one education/training session; five would be willing to spend one hour, five providers reported two hours and two did not indicate an amount of time. On yearly basis eight of 12 providers responding were willing to participate in one education/training event.

Perceived Level of Competency Related to Care of Victims of Emergencies/Disasters

Skill Competency

Providers were asked to rate their comfort level with a select set of core competencies related to care of disaster/emergency victims (see Figure 5). The following competencies were compiled from competencies put forth from the American College of Emergency Physicians, National Organization of Nurse Practitioner Faculties, Emergency Nurses Association, and are skills of Advanced Trauma Life Support:

- Responding to rapidly changing physiologic status of disaster/emergency victims based on the type of event
- Prevent and mitigate risk to self and others through appropriate decontamination and appropriate use of personal protective equipment
- Triaging patients to maximize survivability using the facilities chosen triage process
- Assessing, intervening, and managing airway and breathing
- Assessing and intervening on circulatory status
- Assessing and treating lacerations and wounds of varying degrees.
- Assessing and managing cervical spine
- Reducing and immobilizing fractures and dislocations

Overall there was a wide range of comfort levels related to specific competencies/skills related to the care of disaster/emergency victims. At least half of the providers felt comfortable in the management of circulatory status and treatment of lacerations and wounds. And a total of nine providers felt at least somewhat comfortable in the management of disaster/emergency victims related to: response of physiologic changes, utilization of appropriate PPE,

breathing/airway management, management of circulatory status, and treatment of lacerations/wounds.

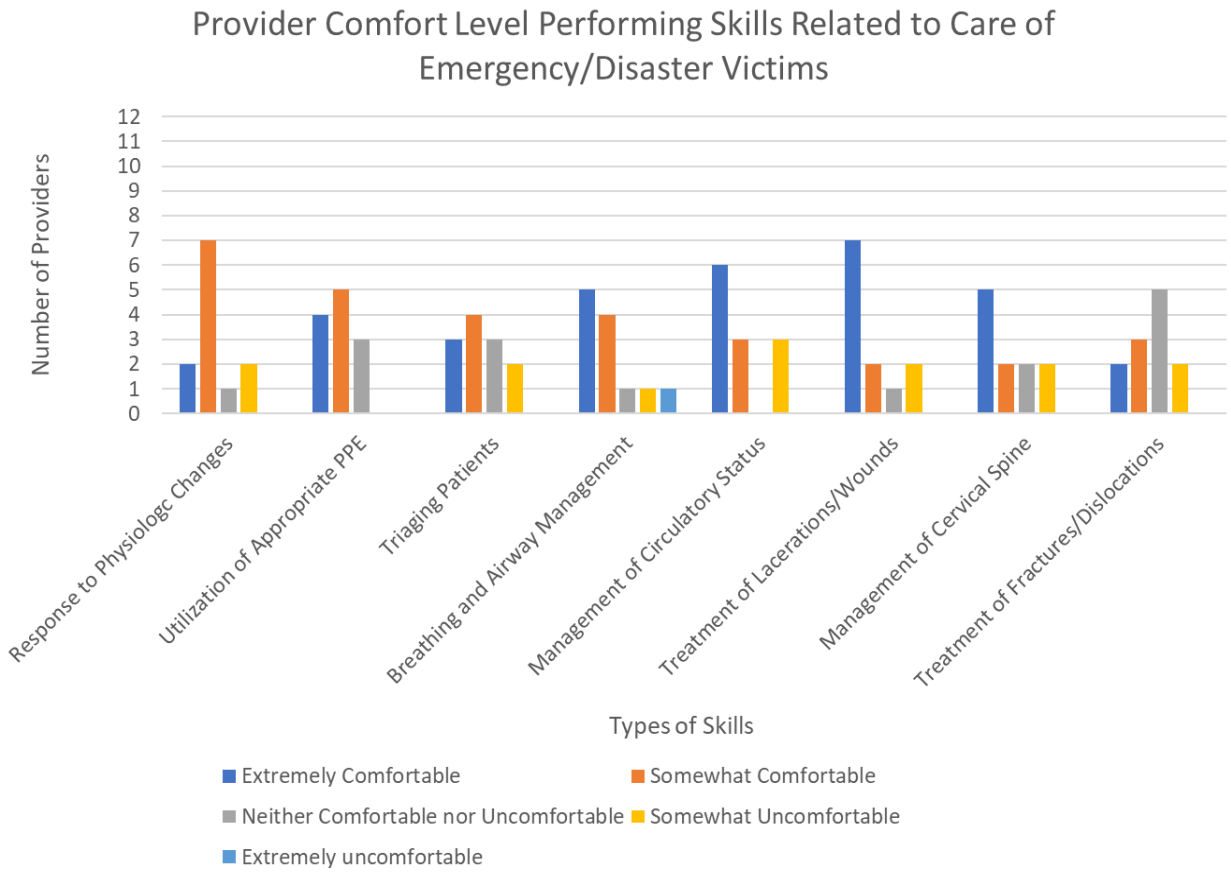

Figure 5. Providers' comfort level with select core competencies related to care of emergency/disaster victims.

Overall Competency

Providers were asked what their perception of overall competency in caring for emergency/disaster victims. The options included:

- Novice (no education or experience)
- Advanced beginner (basic education and participation in two or less disaster drills/ responses)

- Competent (disaster preparedness education and participation in three or more disaster drills or responses; would feel comfortable addressing disaster needs)
- Proficient (advanced disaster preparedness education and participation in four or more disaster drills or responses, would be able to assume leadership in directing response to a disaster)
- Expert (advanced disaster preparedness, participation in leading disaster drills, participation in one or more responses to actual disaster, have assumed leadership role in directing response to disaster drill or actual event, would be able to delegate responsibilities and lead response)

The definitions of each competency correlate with the definitions used in the Hohman (2008), study of disaster preparedness of North Dakota nurse practitioners. Figure 6 displays the results of how the 12 providers responded.

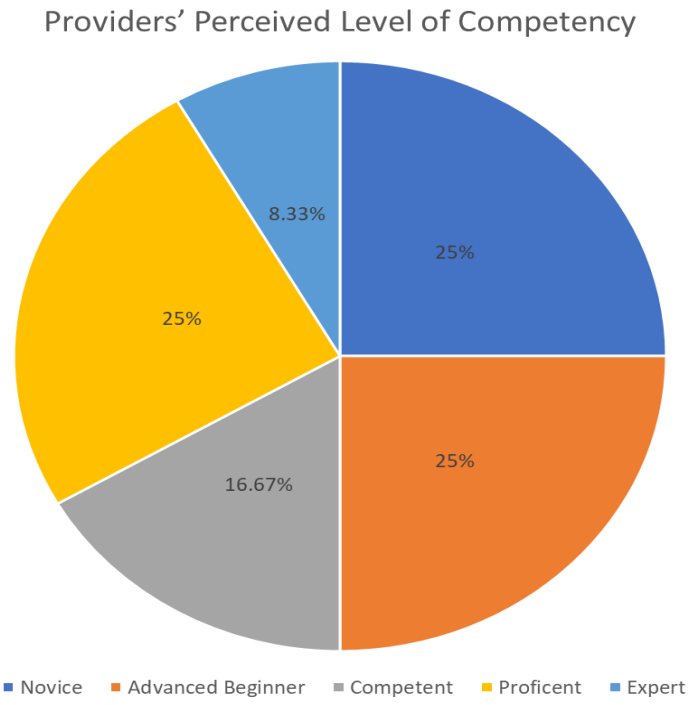

Figure 6. Providers' Perceived Overall Competency Related to Care of Emergency/Disaster Victims

CHAPTER SEVEN. DISCUSSION AND RECOMMENDATIONS

Discussion

Experience/Education & Competency

Analysis of the needs assessment distributed at the healthcare facility showed a wide range of disaster/emergency experience/education and perceived competency related to disasters/emergencies. This wide range seemed to be associated with the wide range of years of experience. Four of the providers whom responded had greater than 15 years of experience and all had experience with caring for a variety of types of disaster/emergency victims. The most experienced providers perceived themselves as at least proficient in responding to a disaster/emergency event, meaning they have had advanced disaster preparedness education, participation in four or more disaster drills or responses, and feel they would be able to assume leadership in directing a response to a disaster. It would appear, in this sample that more years of experience in practice increases providers' perception of their overall competency to care for victims of disasters.

Six of the participating providers had less than five years of overall experience. However, one of these six individuals with less than five years of experience had experience in caring for a victim of disaster related to chemical agents. This same individual perceived themselves as competent in responding to disaster/emergency events, meaning they have had disaster preparedness education, participate in three or more disaster drills or responses, and would feel comfortable addressing specific disaster needs.

The five other providers with less than five years of experience reported minimal to no education or experience. These five individuals also considered themselves advanced beginners, meaning they have received basic education and participation in two or less disaster

drills/responses or, novice meaning they have received no education or experience. Again, this seems to indicate that years of experience in practice affect the providers' perception of their competency in caring for victims of disasters.

Ten providers reported being familiar with their role in the event of a disaster/emergency; however, two providers did not know their role. The two providers who did not know their role have been practicing for less than five years and one of them has received no education regarding disaster/emergency preparedness.

A trend was perceived related to past disaster/emergency experience/education, perceived competency, and the type of provider. Five of the providers were advanced practice providers (APP) and identified themselves as either a nurse practitioner or physician assistant. One of the APPs that responded had experience caring for victims of chemical agents and considered himself/herself competent in responding to any disaster. The remaining APPs had no experience in caring for disaster victims of any type and considered themselves either an advanced beginner or novice. Three of the APP's reported receiving education/training in the past regarding disaster/emergency preparedness. All seven of the physicians indicated past education/training for a variety of different disaster/emergency events. While five of the physicians reported experience with caring for victims of varying types of disasters/emergencies. Two physicians considered themselves an advanced beginner while one considered themselves competent, three proficient, and one expert in their ability to respond to a disaster/emergency event.

These responses suggest years of overall practice experience parallels with having had experience in caring for victims of a disaster/emergency as a first receiver. The same trend existed with having had previous disaster education with a wide range of varying types of

disasters. In conclusion, participants with more years of overall practice experience had a higher perceived confidence in their ability to care for victims of disasters/emergencies.

Barriers to Participation/Future Education

Most participants responded that they do participate in disaster training at their facility and no common trends of barriers to participation could be identified. Although not consistent, two barriers that were identified included lack of time and being new to the facility. Providers indicated that for future education the majority would prefer hands on practice/training. Full scale disaster drills and CD-ROM were the least preferred method. However, in the past 33.3% had received education by hands on practice, 50% by classroom, 41.6% participated in full scale disaster drills for past education, and 16.6% utilized CD-ROM/video for education/training in disaster/emergency preparedness.

Although the facility conducted semiannual full-scale disasters as required by JCAHO, two of the providers reported their facility did not perform annual disaster drills. Both providers had been employed by the facility and practicing for less than five years. One of the two providers was not familiar with their role in the event of disaster/emergency events and had no previous experience or education/training in disaster/emergency events.

Future scheduling of training indicated weekdays were preferred over weekends with Mondays having the highest response rate and Wednesdays being the least favorable day of the week. Most would be willing to attend an educational/training session that ranged from 1-2 hours in length and were willing to participate in one session per year.

Perception of Possible Disasters Compared to HVA

Providers were surveyed on what they felt were likely disaster/emergency events to occur within their community. The type of disaster events included in the survey were taken from the

facilities Hazard and Vulnerability Analysis (HVA). Most of the disaster/emergency events selected were considered a moderate to high probability according to the facility's HVA. Those that were included and identified as low probability were included for consistency throughout the survey. Providers were asked about their knowledge of the facility's policy for each specific event. The providers were also asked to indicate how confident they would be in caring for victims of these specific events using a Likert scale; confident, somewhat confident, somewhat not confident, and not confident. The provider's responses were compared to the HVA to assess for gaps between the providers' perception of probability/preparedness and potential gaps in training. The HVA measured preparedness as low, moderate, and high; which is measured by considering the status of current plans, training status, insurance, availability of back-up systems, and community resources. Appendix A can be referenced throughout this section related to the HVA.

Biological Event

As shown previously all the respondents felt a biologic event was not likely to occur within the community in which they work. A biologic hazard is any bacteria, viruses, fungi, other microorganisms and their associated toxins that could adversely affect human health (OSHA, 2017). This correlated with the HVA in that biologic events were rated a low probability with high human impact. Most of the providers (9 of 12) reported feeling somewhat confident to somewhat not confident in their ability to respond and care for victims of biologic events when asked to identify their comfort level on a Likert scale from confident, somewhat confident, somewhat not confident and not confident. However, no providers have cared for victims of biologic agents as first receivers and 33% have received education/training regarding biologic events. According to the HVA there is moderate preparedness for a biologic event. Overall the

relative risk/threat of a biologic event according to the HVA is 26% on a scale of 0%-100% (threat increases with percentage).

Chemical Event

Most providers (8 of 12) felt a chemical event was not likely in the community in which they work. A chemical hazard is any chemical or toxin that can cause a wide variety of adverse reactions to human health through exposure, contact or chemical reactivity (OSHA, 2017). The HVA indicates a high probability of a chemical event and a high probability of a mass casualty related to a chemical event with high human impact. The providers' perception of low likelihood of a chemical event is interesting considering the amount of industry, major roadway and railways that exists within the community. The HVA breaks down chemical events by external exposure, mass casualty hazmat, and small casualty hazmat and terrorism chemical with a relative threat/risk of 61%, 94%, 89%, and 26% respectively. Of the 12 providers that responded 50% indicated they were either somewhat not confident to not confident when asked to identify their comfort level on a Likert scale from confident, somewhat confident, somewhat not confident and not confident. While 25% of providers indicated experience caring for victims of chemical events as first receivers and 33% indicated receiving past education/training. The HVA indicates a low to moderate level of preparedness as well for all aspects of chemical events including mass casualty chemical events.

Radiologic Event

Radiologic events were not felt to be likely in the community or affect the facility according to the providers. This is interesting as the facility itself has a radiology center for patient imaging. Radiologic hazards include exposure to any uncontrolled release of radioactive material (OSHA, 2017). The HVA differentiates radiologic events by internal exposure, external

exposure, and terrorism with a relative threat/risk of 30%, 31%, and 31% respectively. The providers' view correlates with the HVA of the facility as all type of events are considered a low probability with high human impact. The preparedness level according to the HVA is low and this would correlate with the providers response as the majority (9 of 12) felt somewhat not confident to not confident in caring for victims of radiologic/nuclear disasters when asked to identify their comfort level on a Likert scale from confident, somewhat confident, somewhat not confident and not confident. Only 25% reported past education/training related to radiologic/nuclear disasters.

Mass Casualty Event

Most providers (9 of 12) felt a mass casualty event was not likely in the community in which they work. This again is interesting as the community is comprised of agricultural, industrial economics, major highways, and railroads increasing the probability of mass casualty events. The HVA breaks down mass casualty by hazmat related, medical/infectious related, or trauma related and by size indicating greater than five patients as mass casualty or less than five patients as a small mass casualty. Hazmat mass casualty was previously described with chemical events and medical/infectious will be discussed with pandemics. Mass casualty events related to trauma with greater than five patients are considered a moderate probability in the facility's HVA with low human impact and less than five patients for the same type of mass casualty is considered a high probability with low human impact. The relative threat/risk for trauma mass casualty with greater than five patients and trauma mass casualty with less than five patients is 26% and 33% respectively according to the HVA. The majority of providers (8 of 12) reported their confidence in caring for victims of a mass casualty as being either somewhat confident to somewhat not confident when asked to identify their comfort level on a Likert scale from

confident, somewhat confident, somewhat not confident and not confident. However, only 25% have cared for victims of mass casualty as first receivers and 33% have had past education/training regarding mass casualty events. The HVA indicates a high level of preparedness for trauma related mass casualties.

Explosion/Bombing Event

Most providers (8 of 12) felt that explosion/bombing events were not likely to happen in the community in which they work. The HVA did not specifically address explosions or bombing events. The HVA did indicate a bomb threat for the facility and this would be considered a low probability with moderate human impact and moderate preparedness. Only 16.67% of providers reported caring for victims of explosives/bombings and 41.6% have received past education/training on explosion/bombing events. However, provider confidence for explosion/bombing event is split across the range of confident to not confident with the majority feeling either somewhat not confident or somewhat confident when asked to identify their comfort level on a Likert scale from confident, somewhat confident, somewhat not confident and not confident. It is difficult to compare provider preparedness with the HVA bomb threat preparedness as the question was specifically about events rather than threats.

Mass Shooting Event

Mass shooting was felt to be not likely by most providers (9 of 12). Again, the HVA did not specifically address mass shooting. The HVA did recognize an active shooter in the facility and this was thought to be a low probability with high human impact and low preparedness. The majority of providers' confidence in caring for victims of mass shooting is confident to somewhat confident when asked to identify their comfort level on a Likert scale from confident, somewhat confident, somewhat not confident and not confident; despite only one of them having

cared for victims of mass shooting. Half of providers reported having past education/training in mass shooting response. For analysis of preparedness according to the HVA this should be compared to the mass casualty preparedness as the role of the providers would likely change in the event of an active shooter in the building as they would not be providing extensive care to victims but rather helping keep as many people safe as possible including themselves which was not assessed in the needs assessment.

Pandemic/Infectious Outbreak

Just over half of the providers (7 of 12) felt a pandemic or infectious outbreak occurring within the community was not likely. The HVA differentiates epidemic and mass casualty related to medical/infectious causes. The HVA indicates a low probability with moderate human impact for mass casualty related to medical/infectious causes and moderate probability with moderate human impact for epidemic events. The relative threat/risk for mass casualty related to medical/infectious causes is 15% and for epidemic events is 33%. The majority of providers reported to be somewhat confident to somewhat not confident in caring for victims of a pandemic or infectious outbreak when asked to identify their comfort level on a Likert scale from confident, somewhat confident, somewhat not confident and not confident. And 16.67% reported caring for victims of a pandemic and 33% have had past education/training in pandemic/infectious outbreaks. However, the HVA indicates a high preparedness level for both medical/infectious causes and epidemic events.

Surge Capacity

The providers were split (6 of 12) on the likelihood of a surge capacity event impacting the community. The HVA indicates surge as an influx of patients related to an external event and includes addressing the influx of families or visitors related to the event. According to the HVA

there is a moderate probability with no human impact and a moderate amount of preparedness. The relative threat/risk according to the facility's HVA is 33%. Although 50% of the providers were somewhat confident in caring for victims related to surge capacity when asked to identify their comfort level on a Likert scale from confident, somewhat confident, somewhat not confident and not confident. This question was likely poorly asked, as preparedness of surge capacity is less related to the confidence of the provider but rather more dependent on the overall planning and preparedness of the facility to provide the needed additional resources. According to the American College of Emergency Physicians (2016), surge capacity is the ability to manage a sudden influx of patients and is dependent on a well-functioning incident command system, space, supplies, and staff. Past education/training related to surge capacity was received by 41.6% of providers.

Natural Event

The majority of the providers (10 of 12) felt that a natural event was likely in the community in which they work with only two indicating it was not likely. This correlates well with the HVA as most natural events listed including; tornado, severe thunderstorm, snow storm, blizzard, ice storm, temperature extremes, and drought have a moderate to high probability. The providers were split equally with four being somewhat not confident, four somewhat confident, and four confident in caring for victims of natural disasters when asked to identify their comfort level on a Likert scale from confident, somewhat confident, somewhat not confident and not confident. But 75% of them have received past education/training related to natural events. However, according to the HVA the facility has a high level of preparedness for all the listed natural disasters.

Limitations

The largest limitation to this practice improvement project was the small number of participants. The health system in which the project was implemented has a total of 21 providers and after 6 months of collecting data and sending out three reminders via email, twelve responses were collected. The small number of responses gives limitation to the generalizability of this project to the disaster/emergency preparedness of all providers at the participating facility. Given the small number of total providers at the facility, receiving all responses in order to make significant recommendations and changes to the facility's disaster/emergency preparedness was vital.

Generalizations between NPs, PAs, and Physicians are limited due to the limited number of overall participants and limited number of participants for each type of provider. Of those that participated there were only seven physicians, three nurse practitioners, and two physician assistants. Therefore, it is difficult to make generalizations regarding how the education for each type of provider effects disaster preparedness. Generalizability could be reached if this study was replicated at multiple rural health sites to reach a representative sample of each type of provider and all rural health providers.

Recommendations for Project Site

Based on the results of the needs assessment findings, future education should include provider specific hands on, classroom style, or combination format education. Due to the wide range of preferred time of day, I would recommend conducting this education at various times throughout the day to increase participation. Although providers were willing to only spend approximately an hour to two hours in length on disaster/emergency education a year this will not be enough time. Centers for Medicare and Medicaid (CMS) (2018), updated their

requirements for disaster preparedness which not only requires that the facility participate in a full-scale drill and conduct one other exercise a year but, also includes the following requirements for training:

- Initial training in emergency preparedness policies and procedures to all new and existing staff, individuals providing on-site services under arrangement, and volunteers, consistent with their expected roles.
- Provide emergency preparedness training at least annually.
- Maintain documentation of the training.
- Demonstrate staff knowledge of emergency procedures.

Regardless of when the facility decides to hold education/training research shows that providing regular ongoing interprofessional disaster education, training, and drills improves disaster response (Veenema et al., 2016). Therefore, it is recommended that providers participate in several training/education sessions focused on provider competencies and roles. Individual provider training/education/preparedness, is a building block for success in both drills and actual events therefore this education should be in addition to full scale disaster drills and not used as replacement (Jung et al., 2016). By focusing on individual provider preparedness outside of full scale disaster drills other facility/system issues can be better addressed during the drills and more extensive hands-on training can be provided to the individual provider to strengthen the overall outcomes of full scale drills and events.

Recommendations also include utilizing the knowledge and experience of the more experienced staff to enhance the knowledge of the less experienced staff specifically to educate those with less confidence in performing competencies/skills. The facility should also introduce Basic Disaster Life Support training for providers to increase their skills and competencies.

There are some published competencies for the healthcare workforce that have been identified based on retrospective evaluation of disaster response lessons learned or proposed via a systematic consensus-building approach however; there is not a specific set of competencies or skills that have been identified to guide curriculum or have significant impact in improved disaster outcomes (Veenema et al., 2016). Therefore, the facility should base its competency training on those that the providers are least comfortable with and will be most utilized in the highly probable events listed in the HVA.

Disaster/emergency training and education on a consistent basis for all employees is recommended. Disaster education and training needs to be included in the orientation for new employees/providers as there were providers with less than 5 years of experience who were unfamiliar with their role according to the EOP, unaware that the facility held full scale disaster drills and had no experience/education/training in disaster/emergency preparedness. It is essential to ensure all providers, including new providers, can perform in their defined role in the event of a disaster because individual provider preparedness is the building blocks to success in actual events (Jung et al., 2016). The article by Veenema et al. 2016, went as far as recommending employer requirements for training and testing for continuing education related to disaster. If providers are not willing to volunteer to participate in training/exercises at the facility it is recommended that the employer require participation; as documentation of provider training and providers' knowledge of emergency procedure is required by CMS (2018).

Based on information collected from the needs assessment the recommendation would be to place emphasis of future education on disaster/emergency events related to chemical events as this proved to be the biggest gap between the providers perception of probability and preparedness of the event compared to the HVA. Education on mass casualty events of various

types is recommended to better prepare providers to consider possible needs of varying victims as there is a gap in the probability and preparedness between the providers perceptions and the HVA related to varying mass casualty events.

Lastly, the HVA should be further differentiated to include specific types of mass casualty related to trauma. It is important to include different types of events in the HVA because the type of trauma/injury makes a difference in how the providers respond. Therefore, explosive/bombing events and mass shootings should be incorporated into the HVA rather than compiling all mass casualty events into a mass casualty trauma.

Suggested Training/Exercise Schedule

Based on the results of the needs assessment and the above discussion, a suggested training/exercise schedule was developed (see Appendix E). The developed schedule is intended for administrators within the facility to utilize for provider disaster/emergency training. Utilization of this training schedule will strengthen the providers' knowledge and skills which will result in an improvement of disaster/emergency preparedness at the healthcare facility.

As a starting point, it is recommended each provider be oriented to their role as described in the Emergency Operations Plan (EOP) to ensure there is understanding of what their role is and how to function in this role. This should also be done upon initial employment and on a yearly basis for all providers so that they become familiar with their role and address any changes in the EOP on an annual basis.

It is recommended that providers work on common skills needed to care for victims of a disaster/emergency on a bi-annual basis. There is utility for cross training when doing the skills training so that all providers feel comfortable with each skill to avoid having only specific providers feeling comfortable with a specific skill. Skill/competency training conducted bi-

annually, and all selected competencies reviewed annually. By dividing the skill/competency training into two sessions it allows providers to focus on three different recommended competencies at each of the training sessions and learn the competency well, rather than trying to learn all the competencies in one setting. Competencies should include; how to respond to physiologic changes, airway management, circulatory management, cervical spine management, treatment of wounds/lacerations, and treatment of fractures and dislocations as these were skills that providers were less comfortable in performing and are the competencies put forth by various professional organizations as previously described.

Recommended skill/competency training also includes Hazardous Material (HAZMAT) training, as only a limited number of providers had past education with or were familiar with their role/policy related to biological, chemical and radiologic events. HAZMAT training should include utilization of proper PPE, decontamination setup, and how to care for and decontaminate victims after a specific exposure.

A suggestion for the facility is to focus on a specific hazard/disaster/emergency event on a yearly basis and review the protocols, drill, and have tabletop exercise related to that hazard/disaster/emergency event as this would incorporate the all-hazard approach to training that is recommended by CMS (2018). Cross training would also be beneficial in a drill to ensure that there are multiple providers that can be utilized in various roles throughout the drill. A full-scale drill is not included in this schedule because the schedule is meant specifically for providers but, full-scale drills should continue to be done as already arranged with community and county involvement and participation of the providers should be strongly encouraged as this can be a way to assess what the providers have learned in training/exercises and continue to identify training gaps.

Implications for Practice/Future Research

Based on the data collected, the rural healthcare facility and their providers will be better prepared to care for victims of emergencies and disasters with implementation of the training/education plan developed. Through the practice improvement project, the participating healthcare facility was able to identify the needs of their providers and current gaps/barriers in disaster education and training. The plan was developed to address the identified needs, gaps, and barriers in current training. Continued analysis will be needed at this facility after time has been allowed to implement the education/training plan to evaluate its impact.

Future research should also include qualitative research to further expand on and have increased insight of the providers' perception of disaster/emergency preparedness. In order to fully address the providers' knowledge of their role, qualitative information regarding the providers' definition of their role would have helped identify correlation with their role as defined by the EOP. Qualitative research should also address what the providers' previous education/experience in disaster/emergency preparedness entailed. Additionally, the projects should be replicated at similar rural healthcare facilities to be able to make better generalizations and give increased validity and reliability to the project.

In addition, it would be beneficial for future use of the needs assessment survey to further differentiate years of overall experience for the providers. In the current survey years of experience was differentiated in 5-year increments. However, someone in their first year of practice may have a different response than someone in their second or third year simply due to lack of exposure and the overall transition to practice.

In the future, other critical access hospitals can mirror the project to better prepare rural healthcare providers for care of emergency and disaster victims by identifying gaps in

emergency/disaster preparedness. Ultimately, community members that rely on healthcare facilities within rural areas that adopt the practice improvement project and implement a training/exercise schedule will receive the biggest benefit by having trained healthcare providers available to provide the best care possible in emergency/disaster situations.

Applications for Doctor of Nursing Practice Roles

As a Doctor of Nursing Practice (DNP) prepared provider, there is a responsibility to continue to advance the roles of advanced practice nursing and advocate for change to ensure we are practicing to the best of our ability. By completing the needs assessment regarding disaster preparedness of rural healthcare providers it became evident that nurse practitioners may not be prepared for disasters as the participating NPs reported none to limited experience or education/training in disaster/emergency preparedness and they considered themselves novice in their ability to care for disaster victims. Although this cannot be said with certainty due to the limited number of NPs that completed the survey; APRNS need to continue to evaluate the level or preparedness of their profession by expanding on the existing research, policy development, current practice, and continuing/developing education in all levels of nursing (Veenema et al.,2016).

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APPENDIX A. HAZARD AND VULNERABILITY ANALYSIS

Hazard and Vulnerability Analysis

INSTRUCTIONS:

Evaluate potential for event and response among the following categories using the hazard specific scale.

Issues to consider for **probability** include, but are not limited to:

1 Known risk
2 Historical data
3 Manufacturer/vendor statistics

Issues to consider for **response** include, but are not limited to:

1 Time to marshal an on-scene response
2 Scope of response capability
3 Historical evaluation of response success

Issues to consider for **human impact** include, but are not limited to:

1 Potential for staff death or injury
2 Potential for patient death or injury

Issues to consider for **property impact** include, but are not limited to:

1 Cost to replace
2 Cost to set up temporary replacement
3 Cost to repair

Issues to consider for **business impact** include, but are not limited to:

1 Business interruption
2 Employees unable to report to work
3 Customers unable to reach facility
4 Company in violation of contractual agreements
5 Imposition of fines and penalties or legal costs
6 Interruption of critical supplies
7 Interruption of product distribution

Issues to consider for **preparedness** include, but are not limited to:

1 Status of current plans
2 Training status
3 Insurance
4 Availability of back-up systems
5 Community resources

Issues to consider for **internal resources** include, but are not limited to:

1 Types of supplies on hand
2 Volume of supplies on hand
3 Staff availability
4 Coordination with MOB's

Issues to consider for **external resources** include, but are not limited to:

1 Types of agreements with community agencies
2 Coordination with local and state agencies
3 Coordination with proximal health care facilities
4 Coordination with treatment specific facilities

Action Plan Notes:

a. Plan not yet developed
b. Plan approved
c. Training program developed
d. Support materials not on hand
e. Support materials on hand
f. Staff trained
g. Drill/Exercise conducted
h. Goals not met
I. Goals met
/P= Partial

Complete all worksheets including Natural, Technological, Human and Hazmat. The summary section will automatically provide your specific and overall relative threat.

Revised: 4/11
Revised: 5/2014
Revised: 7/2015
Revised: 03/2016

HAZARD AND VULNERABILITY ASSESSMENT TOOL
2017 NATURALLY OCCURRING EVENTS

EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	
	Likelihood this will occur	*Possibility of death or injury*	*Physical losses and damages*	*Interruption of services*	*Preplanning*	*Time, effectiveness, resources*	*Community/ Mutual Aid staff and supplies*	*Relative threat**
SCORE	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 - 100%*
Tornado	2	3	3	3	1	2	1	48%
Severe Thunderstorm	3	1	1	1	1	1	1	33%
Snow Fall / Winter Storm	3	1	1	1	1	1	1	33%
Blizzard	2	2	1	2	1	1	1	30%
Ice Storm	2	2	1	2	1	1	2	33%
Earthquake	1	3	3	3	2	2	2	28%
Temperature Extremes	2	2	2	2	1	1	2	37%
Drought	2	1	0	1	1	2	2	26%
Flood, External	1	1	2	3	1	1	2	19%
Fire, Internal	1	2	3	2	1	1	1	19%
Epidemic	2	2	1	3	1	1	1	33%
AVERAGE SCORE	1.91	1.82	1.64	2.09	1.09	1.27	1.45	33%

**Threat increases with percentage.*

RISK = PROBABILITY * SEVERITY		
0.33	0.64	0.52

HAZARD AND VULNERABILITY ASSESSMENT TOOL
2017 TECHNOLOGIC EVENTS

EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	
	Likelihood this will occur	*Possibility of death or injury*	*Physical losses and damages*	*Interruption of services*	*Preplanning*	*Time, effectiveness, resources*	*Community/ Mutual Aid staff and supplies*	*Relative threat**
SCORE	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 - 100%*
Electrical Failure	2	1	1	1	1	1	1	22%
Generator Failure	1	1	2	3	1	1	1	17%
Fuel Failure / Shortage	1	0	1	1	1	1	1	9%
Natural Gas Failure	1	1	1	1	1	1	1	11%
Water Failure	2	1	1	3	1	1	1	30%
Sewer Failure	1	1	2	2	1	1	1	15%
Fire Alarm Failure	1	1	1	1	1	1	1	11%
Communications Failure	1	1	2	3	1	1	1	17%
Medical Gas Failure	1	2	1	2	1	1	1	15%
Medical Vacuum Failure	1	2	1	1	1	1	1	13%
HVAC Failure	1	1	2	3	1	1	1	17%
Information Systems Failure	2	1	2	3	1	1	1	33%
Hazmat Exposure, Internal	1	2	2	2	1	1	1	17%
Supply Shortage	1	1	1	2	1	1	1	13%
Structural Damage	1	3	3	3	1	1	1	22%
AVERAGE SCORE	1.20	1.27	1.53	2.07	1.00	1.00	1.00	17%

**Threat increases with percentage.*

RISK = PROBABILITY * SEVERITY		
0.17	0.40	0.44

HAZARD AND VULNERABILITY ASSESSMENT TOOL
2017 HUMAN RELATED EVENTS

EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	
	Likelihood this will occur	*Possibility of death or injury*	*Physical losses and damages*	*Interruption of services*	*Preplanning*	*Time, effectiveness, resources*	*Community/ Mutual Aid staff and supplies*	*Relative threat**
SCORE	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 - 100%*
Mass Casualty >5 patient Incidents (trauma)	2	1	1	2	1	1	1	**26%**
Mass Casualty <5 Incident (trauma)	3	1	1	1	1	1	1	**33%**
Mass Casualty Incident (medical/infectious)	1	2	1	2	1	1	1	**15%**
Terrorism, Biological	1	3	2	3	2	2	2	**26%**
VIP Situation	1	1	0	2	1	1	2	**13%**
Infant/PEDS Abduction	1	1	1	2	1	1	1	**13%**
Hostage Situation	1	3	1	3	1	1	2	**20%**
Civil Disturbance	1	1	1	1	1	1	1	**11%**
Bomb Threat	1	2	1	2	2	2	1	**33%**
Active Shooter	1	3	3	3	3	3	3	**56%**
Violence in the Workplace	2	2	2	2	3	3	3	**33%**
Influx Pts related to response to external events - Family, visitors present	2	0	2	3	2	1	1	**33%**
AVERAGE	**1.20**	**1.50**	**0.90**	**1.80**	**1.10**	**1.10**	**1.20**	**24%**

**Threat increases with percentage.*

RISK = PROBABILITY * SEVERITY		
0.24	**0.57**	**0.42**

HAZARD AND VULNERABILITY ASSESSMENT TOOL
2017 EVENTS INVOLVING HAZARDOUS MATERIALS

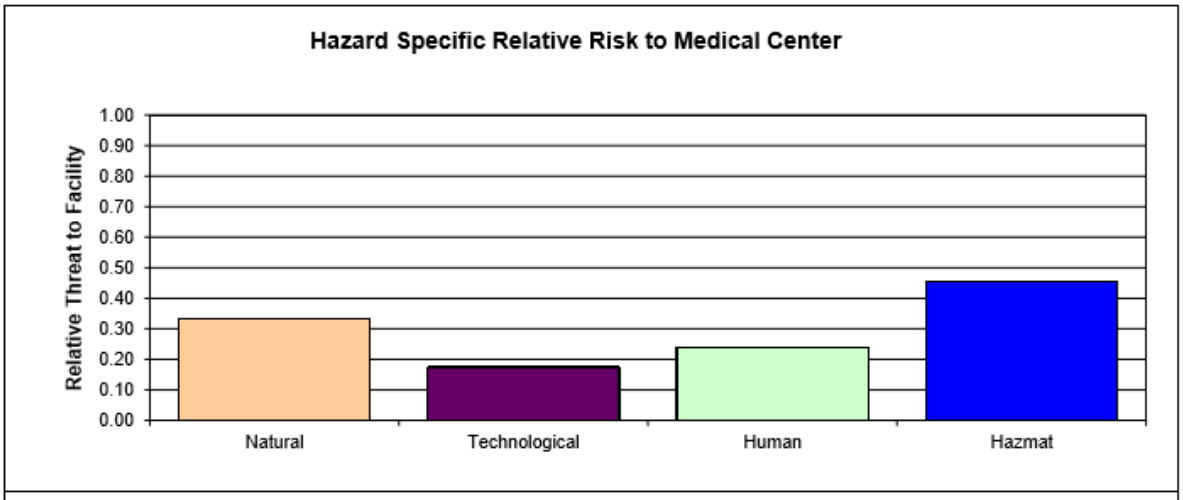
EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)						RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPAREDNESS	INTERNAL RESPONSE	EXTERNAL RESPONSE	
	Likelihood this will occur	*Possibility of death or injury*	*Physical losses and damages*	*Interruption of services*	*Preplanning*	*Time, effectiveness, resources*	*Community/ Mutual Aid staff and supplies*	*Relative threat**
SCORE	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = Low 2 = Moderate 3 = High*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 = N/A 1 = High 2 = Moderate 3 = Low or none*	*0 - 100%*
Mass Casualty Hazmat Incident *(From historic events at your MC with >= 5 victims)*	3	3	2	3	3	3	3	94%
Small Casualty Hazmat Incident *(From historic events at your MC with < 5 victims)*	3	3	2	2	3	3	3	89%
Chemical Exposure, External	3	3	1	2	2	2	1	61%
Small-Medium Sized Internal Spill	2	2	1	1	1	1	1	26%
Large Internal Spill	1	2	2	2	1	1	1	17%
Terrorism, Chemical	1	3	2	3	2	2	2	26%
Radiologic Exposure, Internal	1	3	2	2	3	3	3	30%
Radiologic Exposure, External	1	3	2	3	3	3	3	31%
Terrorism, Radiologic	1	3	2	3	3	3	3	31%
AVERAGE	1.78	2.78	1.78	2.33	2.33	2.33	2.22	45%

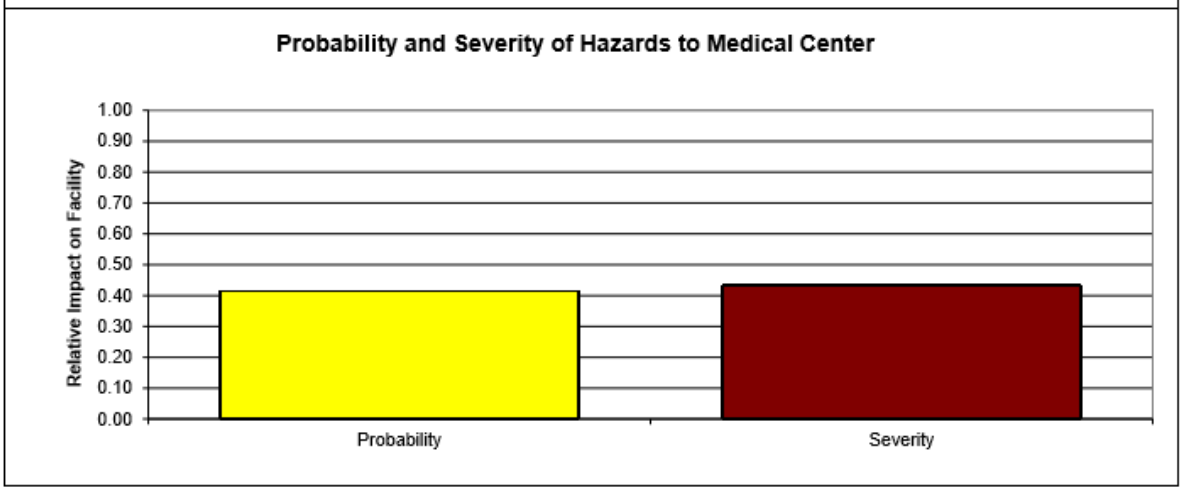
**Threat increases with percentage.*

RISK = PROBABILITY * SEVERITY		
0.45	0.59	0.77

2017 SUMMARY OF PERHAM HEALTH HAZARDS ANALYSIS

	Natural	Technological	Human	Hazmat	Total for Facility
Probability	0.64	0.40	0.57	0.59	0.41
Severity	0.52	0.44	0.42	0.77	0.43
Hazard Specific Relative Risk:	0.33	0.17	0.24	0.45	0.18





APPENDIX B. DISASTER PREPAREDNESS NEEDS ASSESSMENT

NDSU NORTH DAKOTA STATE UNIVERSITY

Q1.
What type of provider are you?

- ○ a. Physician
- ○ Nurse Practitioner
- ○ Physician Assistant

Q2. What is your gender?

- ○ Male
- ○ Female

Q3.
What setting do you primarily practice in?

- ○ Clinic/Primary Care
- ○ Inpatient Hospital/Acute Care
- ○ Walk-in Clinic/Same Day Clinic/Urgent Care
- ○ Emergency Department

Q4.
How many years have you been employed in your current position?

- ○ Less than 5 years
- ○ 5-10 years
- ○ 11-15 years
- ○ Greater than 15 years

Q5.
How many years have you practiced with your current licensure?

- ○ Less than 5 years
- ○ 5-10 years
- ○ 11-15 years
- ○ Greater than 15 years

Q6.
Have you cared for victims of a disaster/emergency?

- ○ Yes
- ○ No

Q7.
Have you cared for patients affected by biological agents?

- ○ Yes
- ○ No

Q8.
Have you cared for patients affected by chemical agents?

- ○ Yes
- ○ No

Q9.
Have you cared for victims of a mass casualty event?

- ○ Yes
- ○ No

Q10.
Have you cared for victims of explosives/bombings?

- ○ Yes
- ○ No

Q11.
Have you ever cared for victims of a mass shooting?

- ○ Yes
- ○ No

Q12.
Have you ever cared for victims of pandemic?

- ○ Yes
- ○ No

Q13.
Have you cared for victims of a disaster/emergency that have special considerations for care?
(Select all that apply)

- ☐ Pediatrics
- ☐ Geriatrics
- ☐ Mental Disability
- ☐ Physical Disability
- ☐ Culturally Sensitive

Q14. In the event of a disaster/emergency event, are you familiar with what your role is in accordance with the facility's Emergency Opera following is a link to Perham Health's EOM:
http://perhamconnect/PerhamHealth/Perham%20HealthLiving%20Policies/DISASTER%20Manual/Emergency%20Operations%20Plan%

- ○ Yes
- ○ No

Q15.
Have you received any education/training or professional development in the past in regard to disaster/emergency events?

- ☐ Yes
- ☐ No

If YES, identify the type of event you have received education for. (select all that apply)

- ☐ Biological events
- ☐ Chemical events
- ☐ Radiological/Nuclear events
- ☐ Mass Casualty events
- ☐ Explosives/Bombings
- ☐ Mass Shooting
- ☐ Pandemic/Infectious outbreaks
- ☐ Natural Event (I.E. Tornado/Fire/Thunderstorm)
- ☐ Surge Capacity (I.E. Influx of patients in response to an event either internal or external and including family/visitors)

Q16.
How have you received disaster/emergency preparedness education/training in the past?
(Select all that apply)

- ☐ CD-ROM/Video
- ☐ Classroom lecture
- ☐ Hands on practice
- ☐ Internet based
- ☐ Literature Review/Continuing Education
- ☐ Mannequin simulators
- ☐ Telehealth
- ☐ Full scale disaster drills
- ☐ Other

Q17.
Does your facility conduct annual disaster drills (i.e. test disaster plans and procedures, including personnel education, facilities and materials)?

- ○ Yes, annually
- ○ Yes, more than once a year
- ○ Yes, less than once a year
- ○ No

Q18.

Of the below listed competencies put forth by the, American College of Emergency Physicians, National Organization of Nurse Practitioner Faculties, Emergency Nurses Association for Nurse Practitioners please rate how comfortable you are with performing the skills.

Extremely comfortable	Somewhat comfortable	Neither comfortable nor uncomfortable	Somewhat uncomfortable	Extremely uncomfortable
Responding to the rapidly changing physiological status of disaster/emergency victims based on the type of event (I.E. Change in mental status, changes in respiratory status, change in cardiovascular status, crush injury, explosive injuries, penetrating trauma)				
○	○	○	○	○
Extremely comfortable	Somewhat comfortable	Neither comfortable nor uncomfortable	Somewhat uncomfortable	Extremely uncomfortable
Ability to prevent and mitigate risk to self and other through appropriate decontamination and appropriate use of Personal Protective Equipment (PPE) including providing treatment while utilizing PPE?				
○	○	○	○	○
Extremely comfortable	Somewhat comfortable	Neither comfortable nor uncomfortable	Somewhat uncomfortable	Extremely uncomfortable
Triaging patients of a disaster event in order to maximize survivability according to your facilities triage process (I.E. START, JumpStart)				
○	○	○	○	○
Extremely comfortable	Somewhat comfortable	Neither comfortable nor uncomfortable	Somewhat uncomfortable	Extremely uncomfortable
Assessing and intervening with breathing and airway management? (I.E. Placement of advanced airway, oral airway, nasal airway, high flow oxygen)				
○	○	○	○	○
Extremely comfortable	Somewhat comfortable	Neither comfortable nor uncomfortable	Somewhat uncomfortable	Extremely uncomfortable
Assessing and intervening on circulatory status? (I.E. Application of tourniquet, intraosseous access, intravenous access)				
○	○	○	○	○
Extremely comfortable	Somewhat comfortable	Neither comfortable nor uncomfortable	Somewhat uncomfortable	Extremely uncomfortable
Assessing and treating lacerations and wounds of varying degree? (I.E. Suture repair, debridement, treating burns, amputations, explosion/blast injury, crush injury)				
○	○	○	○	○
Extremely comfortable	Somewhat comfortable	Neither comfortable nor uncomfortable	Somewhat uncomfortable	Extremely uncomfortable
Clinically assessing and managing cervical spine? (I.E. C-spine precautions, spinal immobilization)				
○	○	○	○	○
Extremely comfortable	Somewhat comfortable	Neither comfortable nor uncomfortable	Somewhat uncomfortable	Extremely uncomfortable
Reducing and immobilizing fractures and dislocations				
○	○	○	○	○

Q19. Select the definition below which illustrates how competent you feel to responding during a disaster/emergency event?

- ○ Novice- (No education or experience)
- ○ Advanced Beginner-(Basic education and participation in 2 or less disaster drills/ responses)
- ○ Competent-(Disaster preparedness education and participation in 3 or more disaster drills or responses; would feel comfortable addressing disaster needs)
- ○ Proficient -(Advanced disaster preparedness education and participation in four or more disaster drills or responses, would be able to assume leadership in directing response to a disaster)
- ○ Expert- (Advanced disaster preparedness, participation in leading disaster drills, participation in one or more responses to actual disaster, have assumed leadership role in directing response to disaster drill or actual event, would be able to delegate responsibilities and lead response)

Q20.
Do you feel a biologic event is likely in the community in which you work?
(please address all sections of the question)

- ☐ Yes
- ☐ No

Are you aware of the policy in place at your facility for care of these victims?

- ☐ Yes
- ☐ No

To what extent do you feel you would be confident in caring for victims related to biologic events?

- ☐ Confident
- ☐ Somewhat Confident
- ☐ Somewhat Not Confident
- ☐ Not Confident

Q21.
Do you feel a chemical event is likely in the community in which you work?
(Please address all sections of the question)

- ☐ Yes
- ☐ No

Are you aware of the policy in place at your facility for the care of these victims?

- ☐ Yes
- ☐ No

To what extent do you feel you would be confident in caring for victims related to chemical events?

- ☐ Confident
- ☐ Somewhat Confident
- ☐ Somewhat Not Confident
- ☐ Not Confident

Q22.
Do you feel a radiologic/nuclear event is likely in the community in which you work?
(Please address all sections of the question)

- ☐ Yes
- ☐ No

Are you aware of the policy in place at your facility for the care of these victims?

- ☐ Yes
- ☐ No

To what extent do you feel you would be confident in caring for victims related to radiologic/nuclear events?

- ☐ Confident
- ☐ Somewhat Confident
- ☐ Somewhat Not Confident
- ☐ Not Confident

Q23.
Do you feel a mass casualty event is likely in the community in which you work?
(Please address all sections of the question)

- ☐ Yes
- ☐ No

Are you aware of the policy in place at your facility for the care of these victims?

- ☐ Yes
- ☐ No

To what extent do you feel you would be confident in caring for victims related to mass casualty events?

- ☐ Confident
- ☐ Somewhat Confident
- ☐ Somewhat Not Confident
- ☐ Not Confident

Q24.
Do you feel a explosion/bombing event is likely in the community in which you work?
(Please address all sections of the question)

- ☐ Yes
- ☐ No

Are you aware of the policy in place at your facility for the care of these victims?

- ☐ Yes
- ☐ No

To what extent do you feel you would be confident in caring for victims related to explosion/bombing events?

- ☐ Confident
- ☐ Somewhat Confident
- ☐ Somewhat Not Confident
- ☐ Not Confident

Q25.
Do you feel a mass shooting event is likely in the community in which you work?
(Please address all sections of the question)

- ☐ Yes
- ☐ No

Are you aware of the policy in place at your facility for the care of these victims?

- ☐ Yes
- ☐ No

To what extent do you feel you would be confident in caring for victims related to mass shooting events?

- ☐ Confident
- ☐ Somewhat Confident
- ☐ Somewhat Not Confident
- ☐ Not Confident

Q26.
Do you feel a pandemic or infectious outbreak is likely in the community in which you work?
(Please address all sections of the question)

- ☐ Yes
- ☐ No

Are you aware of the policy in place at your facility for the care of these victims?

- ☐ Yes
- ☐ No

To what extent do you feel you would be confident in caring for victims related to pandemic or infectious outbreaks?

- ☐ Confident
- ☐ Somewhat Confident
- ☐ Somewhat Not Confident
- ☐ Not Confident

Q27.
Do you feel a surge capacity (i.e. Influx of patients in response to an event either internal or external and including family/visitors) event is likely in the community in which you work?
(Please address all sections of the question)

- ☐ Yes
- ☐ No

Are you aware of the policy in place at your facility for the care of these victims?

- ☐ Yes
- ☐ No

To what extent do you feel you would be confident in caring for victims or families related to surge capacity?

- ☐ Confident
- ☐ Somewhat Confident
- ☐ Somewhat Not Confident
- ☐ Not Confident

Q28.
Do you feel a natural event (i.e. tornado, fire, thunderstorm etc.) is likely in the community in which you work? (Please address all sections of the question)

- ☐ Yes
- ☐ No

Are you aware of the policy in place at your facility for the care of these victims?

- ☐ Yes
- ☐ No

To what extent do you feel you would be confident in caring for victims of natural events?

- ☐ Confident
- ☐ Somewhat Confident
- ☐ Somewhat Not Confident
- ☐ Not Confident

Q29.
Have you participated in disaster/emergency preparedness education/training within your facility?

- ☐ Yes
- ☐ No

If NO, what has been a barrier to you participating (select all that apply)

- ☐ Lack of time to complete education
- ☐ General lack of education programs
- ☐ Lack of qualified staff to teach the education
- ☐ Lack of funding for education
- ☐ Lack of resources to obtain education (ex: Internet access, computers, audiovisual)
- ☐ Does not apply, as I participate in disaster preparedness education
- ☐ Other

Q30. In order to respond to a disaster/emergency event as a provider, what type of additional education do you believe you need?

Q31.

What day of the week would you prefer to participate in disaster/emergency preparedness education?
(Select all that apply)

- ☐ Sunday
- ☐ Monday
- ☐ Tuesday
- ☐ Wednesday
- ☐ Thursday
- ☐ Friday
- ☐ Saturday

Q32.
What time of day would you prefer to participate in disaster/emergency preparedness education?

- ○ 0700
- ○ 1200
- ○ 1700
- ○ Other

Q33.
What is your preferred method for receiving disaster/emergency preparedness education?
(Select all that apply)

- ☐ CD-ROM
- ☐ Classroom lecture
- ☐ Hands on practice
- ☐ Internet based
- ☐ Mannequin simulators
- ☐ Telehealth
- ☐ Seminar/Conference
- ☐ Full scale disaster drills
- ☐ Other

Q34. How much time would you be willing to dedicate to each disaster/emergency preparedness educational event/training

- ○ 1 hour
- ○ 2 hours
- ○ 3 hours
- ○ 4 hours
- ○ Other

Q35.
How many disaster/emergency preparedness educational events/trainings would you be willing to participate in per year?

- ○ 1
- ○ 2
- ○ 3
- ○ Other

APPENDIX C. PARTICIPANT INFORMATION

NDSU **North Dakota State University**
Department of Nursing
Campus Address
NDSU Dept. 2670
PO Box 6050
Fargo, ND 58108-6050
701.231.7395

Disaster Preparedness of Rural Healthcare Providers

My name is Laura Rupp. I am a graduate student in Nursing at North Dakota State University, and I am conducting a research project to determine the educational needs in regards to Disaster Preparedness specifically in rural healthcare providers. It is our hope, that with this research, we will then be able to conduct/create an educational tool for disaster education.

Because you are a provider at Perham Health, you are invited to take part in this research project. Your participation is entirely your choice, and you may change your mind or quit participating at any time, with no penalty to you.

It is not possible to identify all potential risks in research procedures, but we have taken reasonable safeguards to minimize any known risks. These known risks may include: loss of confidentiality due to the demographic information provided

By taking part in this research, you may benefit by receiving education related to care of patients during a disaster. However, you may not get any benefit from being in this study. Benefits to others are likely to include improved care of patients who present to Perham Health in the event of a disaster.

It should take about 5-10 minutes to complete the questions about disaster preparedness. Use the attachment to this email in order to enter the survey.

This study is anonymous. That means that no one, not even members of the research team, will know that the information you give comes from you.

If you have any questions about this project, please contact me at laura.rupp@ndsu.edu, or contact my advisor Adam Hohman at adam.hohman@ndsu.edu

You have rights as a research participant. If you have questions about your rights or complaints about this research, you may talk to the researcher or contact the NDSU Human Research Protection Program at 701.231.8995, toll-free at 1-855-800-6717, by email at ndsu.irb@ndsu.edu, or by mail at: NDSU HRPP Office, NDSU Dept. 4000, P.O. Box 6050, Fargo, ND 58108-6050.

Thank you for your taking part in this research. If you wish to receive a copy of the results, please email laura.rupp@ndsu.edu

APPENDIX D. IRB APPROVAL

NDSU NORTH DAKOTA STATE UNIVERSITY

August 30, 2016

Dr. Adam Hohman
Nursing

Re: IRB Certification of Exempt Human Subjects Research:
Protocol #PH17036, "Disaster Preparedness of Rural Healthcare Providers"

Co-investigator(s) and research team: Laura Rupp

Certification Date: 8/30/2016 Expiration Date: 8/26/2019
Study site(s): Perham Health, Sanford
Sponsor: n/a

The above referenced human subjects research project has been certified as exempt (category # 2) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, Protection of Human Subjects). This determination is based on the original protocol submission with information sheet (received 8/26/2016).

Please also note the following:
• If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
• The study must be conducted as described in the approved protocol. Changes to this protocol must be approved prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
• Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
• Report any significant new findings that may affect the risks and benefits to the participants and the IRB.

Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.
Sincerely,

Kristy Shirley
Digitally signed by Kristy Shirley
DN: cn=Kristy Shirley, o=NDSU, ou=Institutional Review Board, email=kristy.shirley@ndsu.edu, c=US
Date: 2016.08.30 09:19:11 -05'00'

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult http://www.ndsu.edu/research/integrity_compliance/irb/. This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

INSTITUTIONAL REVIEW BOARD
NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | ndsu.edu/irb
Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo ND 58102

APPENDIX E. TRAINING/EDUCATION SCHEDULE

Suggested Training/Exercise Schedule for Rural Healthcare Providers

Training/Exercise for Providers	Fiscal Year 2018											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Skills/Competency Training[1]			X					X				
HAZMAT Training[2] (Biologic/Chemical/Radiologic)					X							
Hazard Specific Protocols[3]		X										
Cross Training[4]			X					X		X		
Orientation to your role in the event of an Emergency/Disaster[5]	X (Yearly)											
Drill[6]										X		
Tabletop[7]				X								

[1] Skills/Competency Training: Select from the following list to focus on 3 different competencies per training. (Response to physiologic changes, Airway Management, Circulatory Management, Cervical Spine Management, Treatment of wound/laceration, Treatment of Fractures/Dislocations).
[2] HAZMAT Training: To include appropriate utilization of PPE, decontamination protocol/training, related to biologic, chemical and radiologic events both internal and external.
[3] Hazard Specific Protocols: Review roles and policy for specific protocols via computer-based training with a suggested posttest to evaluate learning. Alternate the type of hazard on a yearly basis to include; biologic, chemical, radiologic, mass casualty, explosives, mass shootings, pandemic, surge capacity, natural disasters.
[4] Cross Training: Cross train various providers into various roles as described in the EOP. Also utilize physicians to teach various skills.
[5] Orientate/Review Providers to what their role is in the event of an emergency/disaster. Include how to utilize the facilities selected triage process.
[6] Drill each specific hazard on a yearly basis.
[7] Perform tabletop exercises for a specific hazard on a yearly basis
*Correlate HAZMAT training, Hazard Specific Protocols, Drill and Tabletop exercise to the same hazard throughout the year. This schedule should be in addition to the full-scale exercise completed on a yearly basis with your community.

APPENDIX F. PERMISSION TO USE IOWA MODEL

You have permission, as requested today, to review/use *The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care (Iowa Model).* Click the link below to open.

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The Iowa Model - 2015

Citation: The Iowa Model Collaborative. (In review). The Iowa Model Revised: Development and Validation.

In written material, please add the following statement:

- *Used/Reprinted with permission from the University of Iowa Hospitals and Clinics. Copyright 2015. For permission to use or reproduce, please contact the University of Iowa Hospitals and Clinics at (319)384-9098.*

If you have questions, please contact Kimberly Jordan at 319-384-9098 or kimberly-jordan@uiowa.edu.

APPENDIX G. EXECUTIVE SUMMARY

Background and Significance

Disaster preparedness within the healthcare system is essential to providing quality care to disaster victims. Since the September 11th, 2001 terrorist attacks, considerable effort has been put toward disaster preparedness; however, the efforts have been primarily aimed at urban settings and little has been done to address the needs of rural communities and the unique challenges they face in disaster preparedness. Disasters/emergencies continue to intensify throughout the world in both urban and rural areas. In 2012, natural disasters alone caused 10,783 deaths, 104 million people were affected worldwide and economic damages in the United States related to natural disasters were as high as $290 billion (Ito & Managi, 2015). In 2017 FEMA reported 137 disaster declarations which included major disaster such as Hurricane Harvey and Irma with data from these disasters still being accumulated (FEMA, 2018). As technology continues to advance, the number of man-made disasters and the significance of natural disasters will continue to evolve and have greater impact on humanity (Klima, et al., 2012). If healthcare providers are not prepared to handle the impacts of disasters the associated negative outcomes of such events for patients, facilities, and communities could be exacerbated. Currently, there is a lack of core emergency/disaster training among physicians, nurses, hospital staff, volunteers, public health and safety personnel, (Scott et al., 2013). The lack of training in both urban and rural settings poses risk to patients, care providers, and healthcare facilities; however, these risks are modifiable with appropriate training (Scott et al., 2013).

Project Summary

The purpose of this project was to identify the current status of education/training of rural health care providers and identify gaps in training/education to better prepare them to care for

victims of disasters. A survey was conducted and distributed to 21 physicians, nurse practitioners, and physician assistants employed at rural clinic/critical access hospital. The survey consisted of quantitative questions and a minimal number of fill in the blank. The survey was distributed through the electronic survey engine "Qualtrics." Participation in the survey was voluntary and responses were anonymous, with six months of data collection completed. The survey addressed/identified: basic demographic information, knowledge of disaster/emergency preparedness and care of victims as a first receiver, past experience/education related to disasters/emergencies, comfort level with core competencies related to disasters/emergencies, perception of types of emergencies/disaster most likely to impact their facility, knowledge of policies and procedures regarding care of specific disaster victims, preference for future education/training, and barriers to participation in education/training.

The needs assessment was analyzed to assess current emergency/disaster preparedness to include the knowledge, perceived competency with skills and overall care of victims of all providers at the facility. The results regarding the providers' perception of types of emergencies/disasters to affect them was compared to the facility's Hazard and Vulnerability Analysis (HVA) to identify congruency or gaps (Appendix E). Recommendations were made to the facility for consideration of further emergency/disaster preparedness education and training based on the results of the needs assessment and a training schedule was developed which was provided to them.

Results

The response rate to the needs assessment was 57.14%. Of those that responded 41.67% reported experience in caring for victims of disaster. While 83.3% had received past education/training and were familiar with their role according to the facility's Emergency

Operations Manual (EOM). Providers felt natural disasters were most likely to affect their community (83.33%). Participation in education/training was reported by 83.33% of providers. Those that reported not participating in education/training indicated a lack of time and new employment as barriers. For future training 66.66% of respondents would prefer hands on training and were willing to spend 1 hour per year on training/education. Regarding their ability to care for victims of disaster/emergency, most providers considered themselves novice (25%), advanced beginner (25%), and proficient (25%). Overall, results indicate that most respondents had experience and are currently participating in education/training; however, the majority still consider themselves novice or advanced beginner in their ability to care for disaster/emergency victims.

Recommendations

Based on the results of the needs assessment, recommendations include provider specific hands on, classroom style, or combination format education. Although providers were willing to only spend approximately an hour in length on disaster education this will not be enough time to address the needs of the providers to better prepare them for disaster/emergency events. Due to the wide range of preferred time of day, conducting this education at various times throughout the day may increase participation. Regardless of when the facility decides to hold education/training, research shows that providing regular ongoing interprofessional disaster education, training, and drills improves disaster response (Veenema et al., 2016). Individual provider training/education/preparedness is a building block for success in both drills and actual events; therefore, this education should be in addition to full scale disaster drills and not used as replacement (Jung et al., 2016). By focusing on individual provider preparedness outside of full scale disaster drills other facility/system issues can be better addressed during the drills and more

extensive hands-on training can be provided to the individual provider to strengthen the overall outcomes of full scale drills and events.

Recommendations also included utilizing the knowledge and experience of the more experienced staff to enhance the knowledge of the less experienced staff specifically to educate those with less confidence in performing competencies/skills. The facility could also introduce Basic Disaster Life Support training for providers to increase their skills and competencies. There are some published competencies for the healthcare workforce that have been identified based on retrospective evaluation of disaster response lessons learned or proposed via a systematic consensus-building approach; however, there is not a specific set of competencies or skills that have been identified to guide curriculum or have significant impact in improved disaster outcomes (Veenema et al., 2016). Therefore, the facility should base its competency training on those skills that the providers are least comfortable with and will be most utilized in the highly probable events listed in the HVA.

Disaster/emergency training and education on a consistent basis for all employees is recommended. Disaster education and training needs to begin sooner for new employees/providers as there were providers with less than 5 years of experience that were unfamiliar with their role according to the EOM, unaware that the facility held full scale disaster drills, and had no experience/education/training in disaster/emergency preparedness. It is essential to ensure all providers, including new providers, can perform in their defined role in the event of a disaster as individual provider preparedness is the building blocks to success in actual events (Jung et al., 2016). Veenema et al. 2016, went as far as recommending employer requirements for training and testing for continuing education related to disasters.

Based on the information collected from the needs assessment the recommendation would be to place emphasis of future education on disaster/emergency events related to chemical events as this proved to be the biggest gap between the providers perception of probability and preparedness of the event compared to the HVA. Education on mass casualty events of various types is recommended to better prepare providers to consider possible needs of varying victims as there is also a gap in the probability and preparedness between the providers responses and the HVA.

Further recommendations would be to differentiate within the HVA to include specific types of mass casualty related to trauma. It is important to include different types of mass casualty events in the HVA because the type of trauma/injury makes a difference in how the providers respond. Therefore, explosive/bombing events and mass shootings should be incorporated into the HVA.

Lastly, the facility should implement a training/exercise schedule for the providers that focuses on competency/skill training, HAZMAT training, specific hazard protocols, cross training, orientation to their role, drills and tabletop exercises. By following this suggested training/exercise schedule providers will have increased knowledge of how to care for victims of a disaster and help improve the facility's overall preparedness for disasters/emergencies.