Improving Mass Casualty Readiness in the Emergency Department: A Quality

Improvement Project

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I look forward to working closely with my fellow Doctor of Nursing Practice to help change the healthcare field.

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Abstract

The problem under investigation: Rural hospitals are usually unprepared for mass casualty events.

Background: A mass casualty event is an incident that overwhelmingly causes strain on emergency medical services, staff, resources, capacity, and equipment (DeNolf & Kawaii, 2020).

Methods: A quality improvement project to improve mass casualty preparedness in a rural area of Missouri (Aspers & Corte,2019). The population of interest included sixty staff members, including nurses, providers, registration, security, unit secretaries, and patient care technicians (Bothwell Regional Health Center, 2022). The theoretical framework mirrored Dr. Kurt Lewin's change theory which includes the unfreezing, changing, and refreezing model (Chatha, 2020).

Interventions: This project implemented the following interventions: a pre-test, formal education, a NetLearning module, a post-test, and finally, participate in a mock scenario. After the project's implementation, the legal team, medical director, board of directors, and executive leadership team reviewed it for final approval.

Results: The scores for the pre-test ranged between 50% and 100%, with a mean score of 73%.

Conclusions: Maintaining sustainability is vital after the implementation portion of the project. The host site should complete continuing education, mock scenarios, and ongoing training. Remaining confidence in their training would allow nurses to take the Certified Trauma Nurse (CTN) examination, distinguishing them from their peers (Deshaies, 2022). Lastly, ongoing public education is achievable by presenting poster education at the state and regional-level committee conferences.

   Keywords: Mass Casualty, Preparedness, Emergency Department, AHRQ, FEMA, CDC, Toolkit, Pre-Test, Post-Test, NetLearning, Mock Scenarios.

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Introduction

More often than not, the emergency department is the first point of contact for patients who have a life-threatening illness or injury. For emergency health services to be effective, the emergency department must be open, operational, and ready for anything that comes through the door (Chatha, 2020). Staff who work in the emergency department must be competently trained to treat and attempt to sustain the life of all patients who present to the department. Instances of when patients may present to the emergency department may vary from acute abdominal pain to a broken bone to being a part of a mass casualty event (Coster et al., 2017).

The prevalence of mass casualty in the United States is not uncommon due to many catastrophic events happening almost daily (Carroll et al., 2017). The relevance of being ready for a mass casualty does fall on the frontline staff and the leadership team. During a mass casualty event, the staff will look to their leadership for guidance, support, and essential communication (Leadership in Emergencies Toolkit, 2021).

This DNP project will highlight the importance of ensuring the emergency department staff are adequately trained and remain trained at all times for a mass casualty event. Multiple studies have shown that the United States has had many catastrophic events over the last ten years (CDC, 2021). A hospital that does not have an updated mass casualty policy or a procedure will cause a chaotic setting due to the surge of patients (Hugelius, Becker, & Adolfsson, 2020).   A surge of patients due to a mass casualty event can cause overcrowding in the emergency department, causing a shortage in bed availability, including in the ICU. The supply chain will be affected, and the possibility of patient outcomes may be affected (Moran et al., 2021). The DNP project will prevent

a complete failure, inadequacy, and disruption of patient care by revising the current (poorly written) policy in place to implement existing standards of care during a mass casualty, operational updates for the executive leadership team, real-life scenario training, net-learning modules, and annual training. Knowledge competency will be evaluated by pre-test and post-training testing. The importance of this DNP project will be to richly improve the current mass casualty readiness policy in the emergency department setting through a quality improvement project. Doing so will ensure patient care goes uninterrupted, the continuity of care for the community, and the staff and hospital remain safe.

Background

A mass casualty event is an incident that overwhelmingly causes strain on emergency medical services, staff, resources, capacity, and equipment (DeNolf & Kawaii, 2020). Examples of mass casualty events include but are not limited to active-shooter incidents, terroristic events, explosions, natural disasters, motor vehicle accidents, mass-transit incidents, extreme weather events, and national health pandemics (Lomaglio et al., 2019). Hospital systems often get very little notice of incoming patients when a mass casualty event occurs. Due to the lack of warning, hospitals must be prepared at all times (Guidance for Hospitals to Prepare and Train for Mass Casualty Incidents, 2021).

According to the Federal Emergency Management Agency (FEMA), preparedness is best defined as the readiness to be able to respond to any mass casualty (disasters, emergencies, and crises) at any given time (FEMA, 2021). It is of particular note that emergency preparedness does not only cover being able to respond rapidly, but it provides Governors the ability to declare a state of emergency, which starts allocating and redistributing additional staff, supplies, and funding (FEMA, 2021).

Many people do not clearly understand how hospitals are affected by disasters or mass casualty events. Mass casualty events strain the staff and hospital system, especially the emergency department. After an event, the first notable effect is a surge in patients presenting to the hospital via ambulance or ambulatory means. This surge immediately strains the emergency department as the victims likely take up all open beds (Guidance for Hospitals to Prepare and Train for Mass Casualty Incidents, 2021). Patients presenting to the hospital after a mass casualty event will require a lot of supplies such as medication, equipment, bandages, and other life-saving supplies, possibly causing a shortage of much-needed supplies (Joy, 2017). The more serious the mass casualty is, blood transfusions may be required, perhaps depleting the current blood bank supply (Miskeen et al., 2021). A surge of patients presenting to the emergency department (who need to be hospitalized) may affect the number of open beds within the hospital (Joy, 2017). It will be necessary for the executive leadership team to coordinate with the providers to downgrade eligible ICU patients and discharge eligible stable patients, thus creating more open bed availability (Hospital Surge Capacity and Immediate Bed Availability, 2021). The executive leadership team may need to consider reallocating open areas such as cath labs, L&D, PACU, and cafeterias as additional holding areas (Leadership in Emergencies Toolkit, 2021).

It is with sorrow that the United States is not new to mass casualty events. One may wonder about the number one type of mass casualty in the United States. With great sadness, the number one mass casualty event in the United States is mass shootings, most happening in schools or workplaces (Melmer et al., 2019). However, as mentioned previously, mass casualty events are caused for several reasons. Over the past ten years, some of the deadliest types of mass casualty events include but are not limited to:

Mass Shootings

The Federal Bureau of Investigation (FBI) investigated two hundred seventy-seven mass shooting events, causing 1,485 deaths and 968 injuries (Boyd & Molyneux, 2021). Most mass shootings occur in high-population areas such as schools and places of work (Mass Shootings in America, 2021).

Weather

One hundred sixty-three weather-related events caused 6,024 deaths (Enloe, 2019). While tornados and hurricanes cause most weather-related deaths, other weather-related mass casualty events include drought, flooding, freezes, severe storms, cyclones, wildfires, and winter storms (WMO, 2021).

Health Pandemic

From 2020 through current times, the Novel Coronavirus pandemic caused a national and world emergency declaration and has caused over 808,000 deaths (CDC, 2021). The discovery of different variants and mutations is the cause of this ongoing virus (CDC, 2021). COVID-19 has placed a significant strain on the healthcare system that many healthcare providers have never seen before (Balser et al., 2021).

Motor Vehicle Accidents (mass transit)

The CDC estimates that around 3,700 people die daily from motor vehicle accidents, the number one cause of mass transit types of mass casualty events (CDC, 2020). Other mass transit accidents considered mass casualty events include subway, plane, and bus accidents (CDC, 2020).

After the initial onset of the disaster, the public looks to the medical community to tend to the injured, deceased, and walking-wounded. In this stage of the mass casualty event, all eyes are on the medical professionals (MSEMA, 2018). Most hospitals find themselves unprepared for a mass

casualty from a lack of training, not following the correct mass casualty triage process, inadequate staffing, not reallocating staff to understaff areas, overcrowding (holding inpatients in the ER) due to a surge of patients, and lack of space in the hospital (Christian, 2019). When evaluating why hospitals are unprepared for mass casualty events, research reveals the number one cause is a lack of training and annual training (Hollister et al., 2021). The reports say the hospitals' policies tend not to be updated or existent (CDC, 2021). If the policy lacks credibility, the nursing leadership cannot properly train their staff to understand how and when to reallocate them. The executive leadership team would not have a thorough understanding of managing a patient surge (Hollister et al., 2021). For this reason, the planned DNP project would greatly benefit the hospital in preparing for a mass casualty event by revising the current policy, implementing new training as previously discussed, and evaluating the outcomes via pre-test and post-test scores.

Problem Statement

A critical access point, such as the emergency department, unprepared for a mass casualty event, undoubtedly sets the hospital, patients, and staff up for failure (Chatha, 2020). From the SQUIRE 2.0 standpoint, a hospital that is not prepared for a mass casualty event will cause "meaningful disruption, failure, inadequacy, distress, confusion, or other dysfunction in a healthcare service delivery system that adversely affects patients, staff, or the system as a whole, or that prevents care from reaching its full potential" (Squire 2.0 Guidelines, 2021). Examples of how a mass casualty event can disrupt an entire hospital setting may include but are not limited to insufficient surge planning, inadequate staffing, overcrowding, dwindling supplies, and increased mortality rates (Racht, 2019). Through the successful implementation of this Doctor of Nursing Practice (DNP) project, there will be an improvement in emergency preparedness in the acute care setting. The proposed plan will implement changes in the current policy to improve mass casualty

readiness in the emergency department. The current policy was outdated, with the most recent update in 2013. The policy will include updates on the most current peer-reviewed and science-based mass casualty event planning (FEMA, 2021). Competency analysis will be evaluated by incorporating net-learning training modules, annual competency training, and real-life scenarios delivered by the local EMS, fire department, police department, and the public to create a real hands-on experience (FEMA, 2021).

Project Question

The project question is: Do emergency department staff and the executive leadership team **(P)** who have participated in the new training modules and hands-on experience **(I)** reveal a higher post-test compared to the pre-test **(C),** which will ensure uninterrupted patient care, continuity of community care, ensure staff safety, and protect the current supply chain **(O)** within a four-week project timeframe **(T)**?

- Population: Emergency Department staff and executive leadership team

- Intervention: ED staff education training session and new/updated mass casualty policy implementation.

- Comparison: The comparison will be a pre-test competency evaluation compared to a post-test after implementing the DNP project, along with current practice versus stimulated mass casualty scenarios.

- Outcomes: The outcomes after project implementation show uninterrupted patient care, the hospital will still adequately serve its community, the staff will remain safe, and the supply chain will not jeopardize. The revised policy will also include improved ED staff knowledge and compliance.

- Time: Timeframe for project implementation will be five weeks.

Search Methods

The search engines utilized included the Jay Sexter Library, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Publisher/Medline (PubMed), MedlinePlus, Centers for Disease Control and Prevention (CDC), Agency for Healthcare Research and Quality (AHRQ), and The National Institutes of Health (NIH). The PICOT question ensured that various search engines received appropriate queries when searching for credible articles. When simply entering mass casualty into the search engines, it was evident that both inclusions and exclusions were necessary to narrow down unwanted results. The research was conducted using peer-reviewed studies in the United States within five years. Inclusion criteria also utilized included full-text, emergency department, and preparedness. These inclusion criteria were essential to ensure the most recent and updated results. Next, exclusion criteria were limited to peer-reviewed studies on mass casualty events while conducting a literature search. Other exclusion criteria utilized included outpatient settings, long-term settings, and clinics—exclusions during this search narrowed down the types of disasters classified as mass casualty events.

When utilizing the entire PICOT question and appropriate keywords, the number of results were as follows: Jay Sexter Library (379 results), CINAHL (443 results), PubMed (274 results), MedlinePlus (25 results), NIH (62 results), CDC (10 pages), and AHRQ (20 results). After completing exhaustive research, twenty articles were about mass casualty preparedness, emergency management, leadership roles during mass casualties, how to prepare for mass casualties, and models to follow when training for mass casualties.

Review of Study Methods

DNP students must thoroughly understand completing adequate research (Davis et al., 2021). After conducting an exhaustive literature search, the project lead gained valuable knowledge about

being unprepared for a mass casualty event. During the research portion, the project lead gained knowledge of definitions, review of the existing policy, what topics need to be discussed and added to the current policy, aims, expectations, and a vast amount of knowledge of updated guidelines regarding how to prepare for a mass casualty incident (CDC, 2021). The research methodologies included cross-sectional, randomized, controlled, peer-reviewed, expert, and qualitative and quantitative studies. The exhaustive research and various research methodologies are relevant to the DNP project because it provides extensive, valuable, and scholarly evidence to change the existing policy regarding mass casualty events in the emergency department (Chien, 2019). The research is also relevant to the DNP project as it will improve patient outcomes.

Review Synthesis

Every emergency department needs to be able to respond to amass casualty events. This DNP project will improve the competency of the emergency department staff and the executive leadership team. Preparing for a mass casualty event in the emergency department ensures no disruption to patient care, reduces emergency department overcrowding, prevents depletion of critical supplies, and still serves the community (Guidance for Hospitals to Prepare and Train for Mass Casualty Incidents, 2021). Implementing an official policy ensures that all emergency department and executive leadership staff receive the same training and gain the same content knowledge. An effective policy also ensures that all staff has written documentation to review if necessary (Chaghari et al., 2017).

A literature review showed most emergency departments are less prepared for a mass casualty event than many believe (Minemyer, 2018). In fact, many hospitals first realized their lack of readiness during the COVID-19 pandemic due to the surge of patients through the emergency department, causing bottlenecking because of the lack of beds throughout the hospital

(Grimm, 2020). A lack of communication from the executive leadership team prevented the discharge of stable patients, downgrading stable patients from the intensive care unit, and did not allow for additional space such as the PACU, L&D unit, and pediatric floor utilized for extra space (Abelson, 2020). At one point, hospitals used parking garages for additional space to place patients because of the executive leadership teams' poor communication and corrective action (Polus, 2020). Key concepts derived from the literature review include hospitals needing an updated policy related to mass casualty events and the importance of communication from the executive leadership team (Grossman, 2020). The common pattern around the nation reveals that many hospitals are underprepared for mass casualty events (Minemyer, 2018). When reviewing the current mass casualty policy, many gaps are evident. The existing gaps include a lack of mass casualty triaging, a plan for discharging stable patients, and a lack of planning to open additional patient care areas.

The current policy contains many gaps concerning being prepared, which, if not corrected, will lead to detrimental effects such as overcrowding, staff burnout, depletion of critical supplies, and poor patient outcomes due to the lack of supplies and staff (Coster et al., 2017).

A literature review reveals the most updated protocols for preparing for a mass casualty event (CDC, 2021). Results from the ARHQ search showed excellent information for the executive leadership team regarding how to prepare for a mass casualty event from a leadership standpoint (Adini et al., 2006). The executive leadership team must step in during a mass casualty event because the hospital will look to them for guidance (Herhkovich et al., 2016). The executive leadership team will also ensure the hospital continues to run without disrupting patient care. The emergency department director shall communicate with the executive leadership team (Herhkovich et al., 2016).

Impact of the Problem

An emergency department that lacks preparation for a mass casualty incident could negatively impact the entire hospital and the community (Carmichael, 2021). When a mass casualty event occurs, the first responders will likely transport the patients to the closest hospital, even if that hospital is not designated as a trauma center (Chatha, 2020). Evidence shows that smaller hospitals receiving mass casualty patients are more likely to see overcrowding in the emergency department, a reduction in the number of open beds, depletion of critical supplies, and a policy not up-to-date with the current mass casualty protocols (Root, 2020). A smaller hospital is typically not equipped or staffed to take in a significant surge of patients (Goniewicz et al., 2021).

The executive leadership team of small-scale hospitals must be familiar with the updated mass casualty protocols to ensure their hospital continues to function without disrupting patient care (Root, 2020). An executive leadership team unfamiliar with mass casualty events could cause chaos within the hospital (Goniewicz et al., 2021). Leadership will need to know their specific role during an emergency, such as meeting with the medical director to discharge stable patients, downgrading stable patients from the ICU, and working with unit managers to open up other care areas (Grossman, 2020).

Addressing the Problem with Current Evidence

According to a literature review, the World Health Organization (WHO) recommends that the trainer utilize the seven implementation steps when implementing new policies and procedures or revising current policies and procedures (WHO, 2021). The seven steps to implementation include defining the project, reviewing the planning group, analyzing potential problems, analyzing available resources, describing roles and responsibilities, describing management

structure, and developing strategies (Lomaglio et al., 2019). Following these seven guidelines would be the first step in closing the current policy and procedures gap. Methods will be reviewed and analyzed because there are times when changes will occur during the implementation process (Lomaglio et al., 2019).

When making changes or revisions to current policies, it would be wise to utilize the different hospital committees to assist with this action. Hospitals (especially Magnet hospitals) typically have nurse-led shared-governance committees (Hess, Weaver, & Speroni, 2020). Incorporating the thoughts and ideas of these committees would provide input from the nurses and oversight leadership who work on the frontlines (McKnight & Moore, 2021).

Evidence Gaps and Controversies

The evidence gaps and controversies exist in many hospitals across the nation, including hospitals, specifically the emergency department, that are unprepared for mass casualty incidents (Hugelius, Becker, & Adolfsson, 2020). Best practices for correcting policy gaps and controversies include developing a theme (Shaikh et al., 2018). The theme development for this project will discuss the relevant background, what is currently understood, and steps that should be taken to correct the current gaps and controversies.

Theme Development

Relevant Background

The Agency for Healthcare Research and Quality (AHRQ) has specific guidelines for preparing a hospital for a mass casualty (AHRQ, 2021). Language should include allocation of equipment, reallocating staff to prevent workforce shortages, a decision guide should a hospital need to evacuate, and information for the executive leadership team should the time come to open additional space to prevent overcrowding (AHRQ, 2021). The AHRQ has a plethora of

information, including toolkits hospitals can use for training, rewriting policies, and improving their current preparedness comfort level (AHRQ, 2021). The methodology utilized by the AHRQ includes mixed methods such as quality improvement and secondary data analysis. The AHRQ is specifically interested in quality improvement; however, data analysis collected during the improvement process greatly helps the agency focus on new initiatives.

The AHRQ recommends the emergency department train for potential mass casualty events with the assistance of the executive leadership team, local authorities, and the community (AHRQ, 2021). The AHRQ also recommends annual training at a minimum to maintain the staff's competency level (AHRQ, 2021). Training with the assistance of the leadership team, local authorities, and the community will create a sense of trust between the hospital and the community (AHRQ, 2021). When the local authorities know that a rural hospital has proper training in mass casualty, it lessens the burden from outside agencies and promotes patient outcomes (AHRQ, 2021).

What is Currently Understood

The current standards included in all mass casualty event policies have staffing plans, reallocation of supplies, prevention of overcrowding, a proper triage process, and thorough training (Chatha, 2020). Reallocating staff would ease the burden on staffing issues that may arise from the influx of patients (Weisleder & Vidaurre, 2020). Ensuring enough supplies and obtaining more when needed is essential during a mass casualty event (Hershkovich et al., 2016).

The executive leadership team will need to work closely with the director of emergency services and the chief medical officer to start discharging stable patients to create additional space (Grossman, 2020). Thorough and annual training is essential for emergency preparedness (Grossman, 2020). An emergency department cannot predict when a mass casualty event will

happen, so all staff should be trained and prepared (Hugelius, Becker, & Adolfsson, 2020). The methodology included in this leadership training has mixed methods, such as observation and experiments. Experiments allow the leadership to make necessary changes in real-time to better assist during a mass casualty event.

Discussion of National Guidelines

Another national guideline regarding emergency preparedness, as discussed by the Federal Emergency Management Agency (FEMA), sets a framework for mass casualty preparedness. FEMA recommends developing whole community plans, integrating continuity plans, building adequate supply chains, stabilizing the frontline staff, and restoring services (FEMA, 2021). Developing whole community plans is vital to involve local authorities and the community to establish trust between the hospital and the community it serves (AHRQ, 2021). FEMA believes in having annual training so that the emergency staff maintains mass casualty event competency (FEMA, 2021). Regarding supply chains, an emergency department can prove competency for an emergency, but if the supply chain has disruption, patient care may be compromised (FEMA, 2021). Stabilizing the frontline staff ensures adequate care for the staff caring for the surge of patients. The executive leadership team may need to reallocate staff to areas with staffing shortages (Weisleder & Vidaurre, 2020). After mass casualty incidents, restoring services is essential to keeping the doors open and serving patients who come through the emergency department (FEMA, 2021).

The Joint Commission has stated any healthcare establishment receiving funds from The Centers for Medicare and Medicaid Services (CMS) must participate in emergency preparedness (JACHO, 2021). For this reason, The Joint Commission believes there are three essential keys to mass casualty preparedness: Safeguarding human resources, maintaining business continuity, and

protecting physical resources (JACHO, 2021). The Joint Commission believes safeguarding human resources means caring for staff and patients when expanding on these keys (JACHO, 2021). Maintaining business continuity means keeping patient care areas open to all patients presenting to the emergency department despite a surge of patients from a mass casualty incident – an emergency department going on "divert" is not optimal in most cases (JACHO, 2021). Maintaining an abundance of supplies and the ability to restock as needed is a vital example of protecting physical resources (JACHO, 2021). The methodology utilized by FEMA and JACHO includes mixed methods such as secondary data analysis and surveys. JACHO is well known for conducting surveys to better assist hospitals in making changes to promote improved patient outcomes.

Contextual Information

When conducting a walkthrough of the department with the director of emergency services, the facility had several gaps in mass casualty preparedness. The host site is considered a rural area, so the hospital is on a smaller scale in size (Bothwell Regional Medical Center, 2021). The first significant gap was the lack of space for decontamination. The host site has one small decontamination area directly outside the ambulance bay. A temporary decontamination tent with showers should provide ample space in a chemical spill or biohazard emergency. There was no proper mass casualty triage process (green, red, and black tagging). There is no mention in the current policy about meeting with the executive leadership to open additional space to prevent overcrowding in the emergency department (Grossman, 2020). Lastly, there is nothing in the current policy regarding education, training, or evaluation of competency proficiency. The type of methodology, in this case, includes observation/participant observation during the walkthrough of the emergency department and observing the current throughput of patients starting at the point

of triage through the bed assignment.

Research and national guidelines prove that training and annual departmental education are fundamental to mass casualty preparedness. Agencies such as the AHRQ and the Joint Commission readily have educational materials and toolkits to improve mass casualty preparedness in the emergency department. Addressing the lack of training will be essential in making this site project successful (AHRQ, 2021). Meeting with the director of the emergency department, the executive leadership team, and stakeholders will aid in making improvements and changes to the current policy. Improving the triage process will make mass casualty triaging more efficient and save lives (AHRQ, 2021). The AHRQ and the Joint commission promote and support working with the local authorities and community during the training process to help the training process and build trust between the hospital and the community (AHRQ, 2021).

Lack of Staff Knowledge

A lack of staff knowledge can hinder patient care. The importance of providing professional staff education is essential. As mentioned throughout the various sections, hospitals and emergency departments must understand mass casualty preparedness. Education delivered through PowerPoint presentations has shown to be effective as it provides a visual aid to participants (Corwin, Prunuske, & Seidel, 2018). PowerPoint presentations allow learners to ask questions during and after the presentation. Using PowerPoint presentations in the hospital setting will enable learners to complete their education, such as during daily huddles.

PowerPoint presentations, pre-tests, and post-tests would be beneficial in collecting data to support knowledge competency before and after the PowerPoint presentation (Corwin, Prunuske & Seidel, 2018). The presenter can use this information to make changes to the presentation, if needed, to prepare the learners better. The concept of providing education is to ensure learning

competency. The scores collected from the test would give the presenter the information if the learners achieved competency after the presentation (Corwin, Prunuske, & Seidel, 2018).

Mock Scenarios

Studies reveal that hands-on training is the best type of training as it gives the participant a better sense of understanding (Chaghari et al., 2017). Participating in mock scenarios can improve staff competency through simulated training (Carmichael et al., 2020). Simulated scenarios are an effective learning tool for participants as they provide a visual and audio aid in learning. These scenarios allow the participants to get hands-on experience and will enable them to train in real-life and real-time scenarios (Carmichael et al., 2020). Overall, mock scenarios are a training model that has been an effective learning tool for medical providers.

Mock scenarios have been essential in the healthcare industry for several years (Kiernan, 2018). Examples of other simulated scenarios used in the industry include simulation labs (sim labs) that create real-life scenarios for training (Kiernan, 2018). Mock scenarios allow the learners to practice hands-on simulations to make mistakes in a controlled environment. These scenarios provide comprehensive education and opportunities for learning (Padilha et al., 2019).

Conclusion with Resolution

The best practice standard is to keep the emergency department running without disruption (CDC, 2021). The executive leadership team will need to consult with the medical director to arrange for the discharge of stable patients and the downgrading of stable patients from the ICU (Christian, 2019). Opening additional spaces such as PACU, the L&D department, and the pediatric unit will help with overcrowding in the emergency department and keep the flow of patients moving (Christian, 2019). These actions will bridge the gap in the current policy, which consists of four sentences, including, "The ER will remain open to the public during a mass

casualty event and {bed-board} will be responsible for patient movement" (Grossman, 2021). While there are many gaps in the mass casualty policy, this is just one example, and the remaining gaps will be discussed later in the project. The context of the proposal and DNP project will be to have the emergency department staff and the executive leadership team educated and trained on the most updated mass casualty event protocols (Carmichael, 2021). A revision of the current policy will change according to scholarly literature, peer-reviewed evidence, and science-based information (Chaghari, 2017).

Project Aims

This project aims to improve mass casualty readiness in the emergency department through a quality improvement process. Aims include improving mass casualty preparedness, current policies and procedures through research and implementation, and staff competency and knowledge of mass casualty preparedness.

Project Objectives

In the timeframe of this DNP Project, the host site will:

1. Update current hospital policies based on the AHRQ's mass casualty preparedness guidelines.

2. Administer a pre-test and post-test that will measure knowledge competency with a goal of all employees scoring a 100% on the post-test.

3. Improve employee compliance with current national standards regarding mass casualty readiness in the Emergency Department within a five-week implementation. At the end of the training, the goal is to have all emergency department staff participate in the mock scenarios.

Theoretical Framework

This DNP project's implementation framework will mirror Dr. Kurt Lewin's framework. Dr. Lewin's theoretical framework consists of a change model involving unfreezing, changing, and refreezing (Harrison et al., 2021). Using Dr. Lewin's framework will guide the project lead with the correct and necessary steps in "undoing" a current policy, making necessary changes, and then "locking" those new changes into place (Harrison et al., 2021). Following this concept will allow for successful project implementation, especially when making a policy change essential and mass casualty (Harrison et al., 2021). The project lead reviewed Dr. Lewin's theoretical framework in detail (**Appendix "A"**).

Historical Development of the Theory

Using Dr. Lewin's implementation framework consists of unfreezing, changing, and refreezing concepts would incorporate changes to the current policy (Harrison et al., 2021). To say that one will go into a medical facility and change an existing policy without researching or understanding the DNP process would not end positively. One must have a solid plan with substantial research before changing current policies (Harrison et al., 2021). Having done the research with a solid understanding of peer-reviewed articles will ensure that changes to existing policies are accurate, evidence-based, and contain updated information from reputable sources (Harrison et al., 2021). Dr. Lewin was a German-American Psychologist, and his extensive background consisted of studying Psychology in Germany before earning his Doctorate from the University of Berlin (Ash et al., 2021). Dr. Lewin studied childhood and adult Psychology, focusing on human behavior (Ash et al., 2021). After graduating, Dr. Lewin joined the German Army during World War 1 (WW1). After leaving the military, Dr. Lewin moved to the United States in 1933 and practiced Child Welfare Research (Ash et al., 2021). Twelve years later, Dr.

Lewin became the Director of Research of Group Dynamics until he died in 1947. Dr. Lewin was well known for his accomplishments through his education, contributions to many journals, and co-authored books (Ash et al., 2021).

Application to DNP Project

Dr. Lewin's theoretical framework and change concepts will ensure a safe and effective revision of the current policy. The unfreezing framework allows the current policy to be subject to potential change (Harrison et al., 2021). As mentioned previously, significant gaps in care are derived from the current policy as it is missing a lot of critical data and is outdated (Harrison et al., 2021). The changes portion of the framework allows for changes, updating the policy with the newest information, and deleting erroneous guidelines (Harrison et al., 2021). The refreezing portion of the framework locks the updated policy until the next review date (Harrison et al., 2021).

Major Tenet of the Kurt Lewin's Theoretical Framework

Preparing for a mass casualty event takes a lot of training, education, and dedication. Reviewing the current policy garnered many gaps in evidence-based practice, peer-reviewed research, and a lack of updated information from the AHRQ. Utilizing Dr. Lewin's framework will enable the project to use the concepts of unfreezing, changes, and refreezing (Harrison et al., 2021). The unfreezing portion of Dr. Lewin's framework essentially opens the current policy to make the necessary changes for quality improvement (Harrison et al., 2021). The change portion of the framework is when official changes are made to the existing policy to delete outdated or erroneous information, add new information as guided by the AHRQ national guidelines, and update current information (Harrison et al., 2021). The refreezing portion of the framework is the solidification of changes made to the policy after meeting with the stakeholders until new changes occur or the next review date (Harrison et al., 2021).

Unfreezing

The unfreezing portion of the theoretical framework will allow for potential change. At the host site, gaps in the current policy include outdated material, missing information, and erroneous material (Harrison et al., 2021). The unfreezing portion will allow this policy to be reviewed, changed, updated, and rewritten to reflect updated national guidelines about mass casualty preparedness (Harrison et al., 2021). The unfreezing portion is the first step in making changes to policies. Still, it is also essential because one may view it as breaking a bond that holds the current understanding of mass casualty apart. Due to several care gaps during earlier processes, the unfreezing portion can sometimes be unsettling (Harrison et al., 2021).

Change

The change portion of the theoretical framework allows revisions to the current policy. Potential changes may include removing incorrect data, updating current data to reflect updated guidelines, and adding additional information to ensure the policy reflects current research and national guidelines from the AHRQ (Harrison et al., 2021). Changes in the current policy will come from the mock scenarios, pre-test and post-test information (Harrison et al., 2021). It is important to note that the project lead will discuss policy changes with all essential stakeholders, including employees, the emergency department director, the chief medical officer, the legal department, and human resources before implementation.

Refreezing

The refreezing portion of the theoretical framework is essentially locking in the updated policy until the next review date (Harrison et al., 2021). After completing the pre-test, education, mock scenarios, and post-tests, all information will be reflected in the updated policy and remain until a new policy change or the next review date (Harrison et al., 2021). The refreezing portion

is the readiness of the emergency department and the executive leadership team to accept the changes and incorporate the new and updated policy in the future (Harrison et al., 2021).

Population of Interest

The direct population for this DNP project will target all emergency department staff as this project only covers this particular department, including all staff who work in the emergency department and are crucial to patient care (Chaghari et al., 2017). Staff in the emergency department have nurses, providers, techs, unit clerks, and registration (Chaghari et al., 2017). Only the nursing staff, providers, and techs will have to attend the mock scenario for this project. Staff such as unit clerks and registrars would not have to attend the mock scenario as it would not pertain to them. Their specific roles would be to continue registering disaster victims, announce the appropriate hospital code for mass casualty (influx of patients), and page consults as needed, which they would learn how to do during the educational sessions, pre-test, and post-test. All staff working in the emergency department and the executive leadership team will participate in the pre-test, educational sessions, and pre-test. While many different staff members make up an emergency department, all staff will have specific roles (Chaghari et al., 2017). A great example would include the difference in nurse functions versus a unit clerk. Another direct population that will be vital to the success of this DNP project is the executive leadership team (Chatha, 2020). The leadership team will need to know their specific roles to help the flow during a mass casualty (Chatha, 2020). Like the example between the nurse and the unit clerk, the staff who make up the executive leadership team will also have different roles. For example, the Chief Nursing Officer's (CNO) functions versus the Chief Operating Officer's (COO) would differ significantly (Chatha, 2020). The inclusion criteria for the direct population of interest are essential because the nurses, providers, and patient care techs will be on the frontline providing emergent care during the mass

casualty (Chatha, 2020). The exclusion criteria are for team members who are not on the frontline but play a critical role in the emergency department. The unit clerks and registrars will continue registering patients and announcing the code for mass casualty (influx of patients), and page consults when needed. (Chatha, 2020).

The indirect population for this DNP project would be the patients involved in the mass casualty. Patients are an indirect population because they play no part in the training or improvement process. The inclusion criteria are essential because the nurses, providers, and patient care techs will be on the frontline providing emergent care during the mass casualty (Chatha, 2020). The exclusion criteria are for team members who are not on the frontline but play a critical role in the emergency department. The unit clerks and registrars will continue registering patients and announcing the code for mass casualty (influx of patients), and page consults when needed (Chatha, 2020).

After implementation, it will then be that the entire hospital will receive unit-specific training as directed by the leadership team. Since the executive leadership includes unit managers, the managers can work together to deliver training and education to their specific unit. It is of particular note that unit-specific training and education will differ significantly from the current DNP project.

Setting

The host site is an acute care setting in rural western Missouri. The hospital is a small non-profit community facility with only 25 emergency department beds and 108 inpatient beds (Bothwell Regional Medical Center, 2021). The hospital is limited to emergency services, surgical services, laboratory services, radiology services, certain oncology services, and women's health services. It is critical to note that this hospital (currently) is ONLY a level III trauma-receiving

hospital, is NOT stroke-certified, and does NOT have a cath-lab (Bothwell Regional Medical Center, 2021). If a patient arrives at the hospital with one of the above conditions, they will ultimately have to be transferred to another receiving hospital by ground transport. With a population of just under 22,000 residents, the demographics reveal 89.12% White, 5.09% Black, 2.58% Hispanic, 0.67% Asian, 0.09% Native American, and 0% Hawaiian/Pacific Islander (Sedalia Missouri Population History, 2022). Of this population, 85% have a high school diploma, 15.8% have a bachelor's degree, and only 5% have a graduate or terminal degree (Sedalia Missouri Population History, 2022). The host site uses Cerner as its electronic health records (EHR) system.

Stakeholders

Stakeholders play a significant role in the healthcare industry. Some key stakeholders included in this DNP project will consist of emergency department staff, the executive leadership team, the Chief Medical Officer, the legal department, the public relations department, human resources, local authorities (law enforcement, fire, and EMS), and community citizens (Grossman, 2020). During a formal roundtable meeting, the project lead will establish rapport with the different department leads. A plan to maintain rapport with the various leaders will be discussed but will most likely be through email or an encrypted messaging system such as WhatsApp. The emergency room staff's roles will include completing pre-test and post-test, attending an informational session, and participating in a mock scenario (Grossman, 2020). The executive leadership team will be responsible for completing the pre-test and post-test and attending an informative session – but will not need to participate in the mock scenario (Grossman, 2020). The Chief Medical Officer's role will be to facilitate the attendings and residents when they need to discharge stable patients (Grossman, 2020). The legal team will ensure the policy changes follow the legal guidelines (Grossman, 2020). The human resources department will be responsible for

answering any questions related to policy changes and enforcing them (Grossman, 2020). The public relations team will be crucial in asking the local authorities to help create the mock scenario and keep the community apprised of the upcoming plan (Grossman, 2020). The local citizens may participate by being "actors" in the simulation. A recording will be available for staff members who cannot attend future annual training. Consent from the "actors" is necessary for privacy reasons. This DNP project has no identified need for an affiliation agreement between the host site and Touro University Nevada (TUN). Written approval for the project lead to complete the DNP project has been received (**Appendix "B."**)

<div align="center">**Interventions**</div>

The interventions for this project to ensure successful implementation will span over a timeframe of four weeks. This timeframe is essential to ensure that all staff members have time to complete the required task for that given week so that all staff stays on track during the four-week improvement process. Overall, the plan for improvement consists of improving knowledge regarding mass casualty preparedness in the emergency department through testing, formal education, and involvement in a mock scenario. The quality improvement plan is to take place over a four-week time frame by completing the following:

Staff members will participate in a pre-test, a formal educational session, and a post-test to assess their knowledge regarding mass casualty preparedness. This tool will provide valuable information regarding early assessment and allow the project lead to tailor the formal education around the pre-test scores by administering a traditional paper format. The pre-test will consist of ten questions from the AHRQ training toolkit (AHRQ, 2021). A Qualtrics database will formulate data to analyze.

Staff will attend formal education that the project lead will facilitate. The education will

include a PowerPoint presentation developed by the AHRQ toolkit (AHRQ, 2021). Immediately after the PowerPoint presentation, a Q&A session will give the learners ample opportunity to address any clarifying questions. After completing the PowerPoint presentation, the staff members will complete a NetLearning module created with the education department's assistance. The NetLearning module will reinforce the information obtained during the PowerPoint presentation.

Staff will complete a post-test that is certain to measure their newly gained knowledge from the pre-test, PowerPoint presentation, and the NetLearning module. The post-test will consist of the same ten questions asked during the pre-test to improve scores and build their knowledge level. At this time, any staff not achieving a passing score of 100% will need remediation facilitated by the project lead. Remediation will consist of reading over the test questions together and finding the answer in the PowerPoint presentation. Reviewing the information together is sure to help the learner understand the material better and help the learner understand the material better and understand why they chose the incorrect answer.

Wrapping up, the staff will engage in a valuable learning opportunity through a mock scenario this week. The mock scenario will bring all four weeks to a close and help reinforce the learning over the past four weeks. The simulated scenario will allow the learners to engage in a hands-on experience. Lastly, this tool will be the last stop for any remaining confusion, questions, or uncertainty from the staff members.

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Tools

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The tools that will aid in the successful implementation of this QI project include a pre-test and post-test (**Appendix "C"**), formal education through a PowerPoint presentation (**Appendix "D"**), and a NetLearning module (**Appendix "E"**) and engaging in a mock scenario (**Appendix "F"**).

Pre-Test/Post-Test

The staff members will take a pre-test and post-test to determine their knowledge level regarding mass casualty preparedness before and after formal education. Both tests are derived directly from the AHRQ toolkit for consideration and will be paper-based. Specific content will include policy and procedures, chain-of-command, definitions, preparations, different agencies, and each employee's particular roles. The cognitive knowledge level assessed is "evaluated" as a pre-test and post-test. After completion, the project lead will enter the data into a Qualtrics database for analysis. Because the AHRQ encourages the use and distribution of the widely used mass casualty preparedness toolkit, there is no need to seek permission for reproduction; however, citations and reference is present. Due to self-writing the tests, a complete CVI process has been completed and is on file. The PowerPoint presentation was created through peer-review contribution and adopted by the Government.

Formal Education

Formal education through a PowerPoint presentation will engage the learner through a series of training. Learning content regarding mass casualties includes the purpose of presentation, learning objectives, definitions of mass casualty, examples of mass casualty events, roles of the healthcare provider, and hospital preparation plan for a mass casualty event. The Project lead created the PowerPoint presentation utilizing information from the AHRQ toolkit regarding mass casualty preparedness (AHRQ, 2021). Because the PowerPoint presentation was self-created, a complete CVI process has been completed and is on file. Because the AHRQ encourages the use and distribution of the widely used mass casualty preparedness toolkit, there is no need to seek permission for reproduction; however, a citation is present. Validation of the content was through peer review and adopted by the Government.

NetLearning Module

A NetLearning module is a computer-based educational system the hospital uses to provide education on a hospital-wide level. The project lead will work closely with the education department to create a module on mass casualty preparedness in the emergency department. The information in the module will derive from the AHRQ toolkit, validated through peer review and adoption from the Government (AHRQ, 2021). Specific content will include policy and procedures, chain-of-command, definitions, preparations, different agencies, and each employee's particular roles. Because the AHRQ encourages the use and distribution of the widely used mass casualty preparedness toolkit, there is no need to seek permission for reproduction; however, a citation is present (AHRQ, 2021).

Mock Scenario

The mock scenario will allow the learners to have a hands-on experience and put their newfound knowledge to use. The project lead will work closely with the local authorities to conduct a real-life scenario regarding a mass casualty event so that the staff will have the opportunity to build their knowledge base. The host site is agreeable to having the local authorities help facilitate a mock scenario. The project lead wrote the scenario (mass shooting scenario) for the simulation and will provide copies to all parties to ensure a smooth and safe simulation. A simulated scenario will allow the staff to ask clarifying questions in real-time. A similar scenario validates the scenario within the AHRQ toolkit. The project lead will evaluate the staff members who will simultaneously observe every part of the mock scenario. Because the AHRQ encourages the use and distribution of the widely used mass casualty preparedness toolkit, there is no need to seek permission for reproduction; however, a citation is present.

SPSS Software

Statistical Package for the Social Sciences (SPSS) is a widely known software utilized in research that aids the student in analyzing data collected. IBM developed the software. Validation of this tool by entering data into the software to analyze data collected during the research process. Since the software is purchased, no permission is necessary to use it.

Plan for Data Collection

As with any quality improvement process, data collection must occur to conclude accurate implementation. With this project, the data collected will show increased knowledge after completing the pre-test, PowerPoint presentation, NetLearning module, post-test, and participation in the mock scenario. While all portions outlined above are essential, the most crucial data to be collected includes the pre-test, the post-test, and the mock scenario, as they will show the overall improved knowledge level. The project lead will meet with the staff members during all portions of the objectives to ensure an understanding and serve as a mentor. Specifically, regarding the purposes, the pre-test and post-test comprise ten questions regarding definitions, roles, true or false questions, and chain-of-command questions. The formal education portion of the objectives is a PowerPoint presentation where the staff will have plenty of opportunities to ask questions. Next, the NetLearning module portion will help reinforce questions for the pre-test and post-test and the PowerPoint presentation. Lastly, the mock scenario will support all learning objectives and bring everything to a full circle of learning. The grading of the mock scenario will be conducted during the scenario and entered into the SPSS software for analysis. The pre-test, post-test, NetLearning, and mock scenario will provide the project lead with plenty of data entered into the SPSS software to analyze the data. The goal is simple: to improve knowledge regarding mass casualty preparedness. As mentioned before, those exam results are a part of the data entered into the SPSS

software for analysis. Those scores are also integral to SPSS software for analysis

The project lead will validate and prepare the data for analysis of the sixty eligible staff members participating in the training. By using the samples in their entirety, the data collection would be more efficient when reviewing data and analysis. Not only is confidentiality important in the healthcare setting, but also crucial in the data collection process. Since confidentiality is essential in research, the participants will be assigned a number ranging from {001 to 060}.

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Ethics/Human Subjects Protection

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Ethics and human subject protection are essential in ensuring the participants' safety with all research and project implementation measures. It provides a safety net to the participants, preventing wrongdoing, coercion, and illegal activity during the research process. The project lead's university requires an extensive Institutional Review Board (IRB) project determination review to ensure complete compliance with the Ethics and Human Subjects Protection Act. DNP students are required to submit all documents for an IRB review. If the records need further study, the packet proceeds to the university's next chain of command for consideration. DNP students must also complete the Collaborative Institutional Training Initiative (CITI) training modules, introducing everyone to the IRB process. The project team reviewed the determination form and all required documents and found no need for an IRB review. Completing data collection, analysis, or changes without IRB approval may void the project and cause the hospital or university to be assessed fines and penalties (White, 2020). The university's accreditation may be affected (White, 2020). Participating in this renowned project is that participants will have complete knowledge of mass casualty preparedness. The project lead sees no potential risk during project implementation. For compensation, there may be a possibility that overtime hours may occur, which will derive from the education department's budget rather than the emergency department's budget. The

recruitment methods are simple – it will be mandatory for all staff members to participate unless they are out on medical leave, FMLA, or vacation. Not only will the staff members be scored on their mock scenario, but they will also be filling out a Simulation Effectiveness Tool (**Appendix "G"**) that will benefit from the analysis of the SPSS software (Leighton et al., 2015). Finally, any parties have no conflict of interest during this improvement process.

Further, the host site's separate IRB process comprised The University of Central Florida, Orlando, Florida staff members, stakeholders, and the legal department meets under these circumstances. The host site sees this as an integral part of research and policy implementation to ensure that laws are in place. The host site reviewed the project lead's packet and approved it by the Attending Physician and Department Manager. After a thorough review, the project lead received authorization to proceed. From a legal standpoint, it's crucial to ensure that patients and test subjects are protected and that the risk for harm is null (White, 2020).

Analysis of Results

The project lead worked closely with the university statistician to determine the best approaches to using statistics for gathering data.   After consulting with the statistician, it was best determined to utilize the paired t-test. The chi-squared test was considered but ruled out as it would not provide enough information for analysis. The paired t-test best allows the project lead to determine if their desired process (pre-test/post-test, education, NetLearning, and Mock Scenario) will impact the subject (Liang, Fu, & Wang, 2019). As confidentiality is essential, the paired t-test works best when comparing two groups without identifiers. After completing the educational session, a paired t-test would allow the project lead to conclude their hypothesis to see if their process had the desired effect (Liang, Fu, & Wang, 2019).

The prominent data will likely come from the paired t-test (Liang, Fu, & Wang, 2019). As previously mentioned, the tool used to analyze the collected data is the IBM SPSS software.

The assumptions to be addressed include analyzing the data from the pre-test, the post-test, and the mock scenario to show an increased knowledge level after formal education. After reviewing the assumptions for the paired t-test, there is no potential for any violations (Zach, 2021). However, it is essential to note that changes can happen at the last minute with any research, which the project lead must be prepared to handle. The project lead should remember that if a violation occurs, it doesn't necessarily void the project, but rather the project lead would have to use a different sampling test, such as the Mann-Whitley U-Test.

Discussion and Interpretation of Results

Before the educational session, the staff took the pre-test, and the scores ranged between 50% and 100%. These scores are unsurprising as most nurses may never experience mass casualties (Goniewicz, 2021). The statistical assumption for the pre-test was 73%, with a 13.5% standard deviation (**Table 1**). The meaning of this statistical assumption is that since the scores ranged from a 50% to a 100%, the average pre-test score equals 73% (**Table 1**). Since there was a significant observation, there was no null scoring (Stunt, et al., 2021). Next, there were no statistical violations because of the fulfillment of a statistical experiment (Guetterman, 2019). After the education session and completing the NetLearning module, it was an honor to see all sixty staff members score a 100% on the post-test (**Table 1**). The statistical assumption for the post-test was 100% with a 0% standard deviation. Since there was a significant observation, there was no null scoring (Stunt, et al., 2021). Next, there were no statistical violations because of the fulfillment of a statistical experiment (Guetterman, 2019). When looking at the means scoring between the pre-test and post-test, the statistical assumptions showed a -27.00 and a 13.5%

standard deviation. A statistical assumption of -27.00 represents the "Bell Curve" part to show how far off a perfect score is (Mishra, et al., 2019). With this project, -27.00 was the deviation from the staff members scoring a 100%. With a standard deviation of 13.5, that score is lower on the bell curve, indicating the staff members were not too far off from having a perfect score (Mishra et al., 2019). Further, the statistical results showed a P = <0.001 score when looking at the two-sided t-test (**Table 2**). A result showing P = <0.001 shows strong evidence of not having a null hypothesis (Mishra et al., 2019). Another factor included in these statistical assumptions is the number of participants (Mishra et al., 2019). More accolades go to the staff, as all sixty staff members participated in the pre-test and post-test, which provided more data (**Table 3**).

Table 1

Knowledge Scores Pre and Post Education Session

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Post-Test	100	60	0.00000	0.00000
Pair 2	Pre-Test	73	60	13.57	1.75

Table 2

Paired Samples Test Results – Paired T-Test

		Paired Differences							Significance	
					95% Confidence Interval of the Difference					
			Std. Deviatio	Std. Error					One-	Two-
		Mean	n	Mean	Lower	Upper	t	df	Sided p	Sided p
Pair 1	Pre-test	-27.00	60	1.75151	-30.50	-23.50	-15.42	59	<.001	<.001

Summary

Strengths:

The strength of this project shows a solid evidentiary value of learning. An analysis will collect the pre-test and post-test data to enter into SPSS. After entering the data into SPSS, the paired value resulted in P = <0.001, revealing no possible null hypothesis. The analysis of the SPSS software showed a standard deviation of -27.00, which is the difference between the staff members achieving a perfect score. A standard deviation of -27.00 is considered low on the "Bell Curve" (Mishra et al., 2019). After the staff completed all the assigned components of the mandatory education, the post-test revealed all sixty participants scored a 100%. Undoubtedly, the increase in scores is due to the previous four weeks of training. After entering the data into the SPSS software for the post-test, the results show a standard deviation of 0 and a p-value = <0.001, again showing there would be no possible null hypothesis (Mishra et al., 2019). Another extraordinary strength is that the hospital has an updated policy and procedure on the hospital's INTRAnet.

Weaknesses:

One of the weaknesses noted during the project's pre-test phase was the disappointment of some of the staff members who did not score very well. The staff was reminded of a few items, including privacy, reminding the team that this was only a pre-test, and reassurance that the staff would see a better score by the end of the project timeline. Most nurses were not familiar with or trained with mass casualty patients, so their score did not represent their nursing knowledge (Goniewicz, 2021). The rationale behind the staff members scoring higher on their post-test was the formal education, question and answer session, and the NetLearning module. Another weakness is that the previous policy and procedures for mass casualty events lacked essential

information and were not up to date with the AHRQ guidelines. The AHRQ website has a free toolkit that hospitals can use to train, update their policies, and prepare (AHRQ, 2022).

Interpretation

Previous Literature

One of the essential components of data interpretation includes reviewing previous research literature for comparison to this project's results. One of the more meaningful articles revealed the importance of incorporating the surgical department in mass casualty training (Joshi et al., 2022). This idea is essential because many mass casualty victims may need surgical interventions to sustain life (Joshi et al., 2022). This article mentions that with the proper training tools, a hospital can quickly become a trauma center once the hospital has met all the perils (Hugelius, Becker, & Adolfsson, 2020). Compared to this project, the following article again shows the importance of closing the gaps between the unknown of mass casualty incidents and disasters (Hugelius, Becker, & Adolfsson, 2020). The article states that hospitals must ensure their staff is ready for the "unknown" (Goniewicz et al., 2021). This article revealed that the team became more knowledgeable about mass casualty readiness with proper training (Hugelius, Becker, & Adolfsson, 2020). One article reviewed was the staff's perspective on mass casualty readiness (Hugelius, Becker, & Adolfsson, 2020). The authors related that staff are not reluctant and are most often willing to participate in the training (Moran et al., 2021). This article was interesting because the project lead was initially unsure how reluctant the staff would be to a five-week training session (Hugelius, Becker, & Adolfsson, 2020). In conclusion, this project's data results align with the current literature.

Contextual Elements

In context, a hospital's preparedness for a mass casualty incident improves patient care (Moran, 2022). Instead of emergency vehicles/helicopters needing to divert away from the host site, they will no longer need that when they become a trauma-certified hospital (Moran, 2022). This designation will be necessary for more severe patients, especially if a patient is bleeding uncontrollably or is nearing the end of life (Moran, 2022). Rewriting the policy and procedure is vital to reflect the newest guidelines from the AHRQ (AHRQ, 2022). With the most recent training the staff members encountered and the updated policy, the hospital can apply to be a trauma-centered facility.

Outcomes

The researcher must examine the project's outcomes (Ranganathan, 2019). For this project, the staff met all the objectives. The team took the pre-test and post-test, participated in the formal education, completed the NetLearning module, and participated in the mock scenario. The mock scenario was an important tool, as it culminated all of the staff members' knowledge over the past five weeks. Mock scenarios improve learner outcomes (Ranganathan, 2019). Over the past five weeks, education has improved, given the statistical results displayed in the previous section. After the mock scenario, a debriefing, including completing the simulation effectiveness tool, occurred to obtain further data collection. According to the scoring, the staff strongly agreed that the mock scenario was unanimously practical (**Table 3**).

Table 3

Post Mock Scenario Knowledge
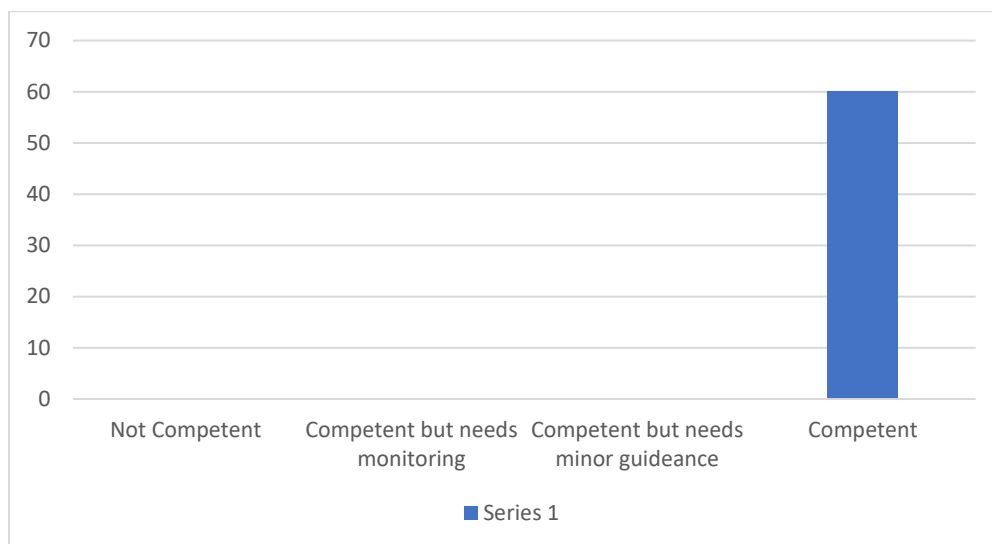
Cost Analysis

The hospital gives each department a budget (Walsh, 2019). The hospital will need to train other staff, practice drills, and have more mock scenarios annually to ensure competency levels remain. When the Director of Emergency Services believes she is ready to apply to become a trauma center, a group of surveyors will be there to monitor each section (Moran, 2021). It is noteworthy that becoming an accredited trauma center costs around $34,105,318.00, depending on the hospital's region (Mullins et al., 2017). Accredited as a certified trauma center outweighs the cost analysis, as the hospital can take care of more patients than they currently do (Choi et al.,2021). Once the project has concluded, the Director of Emergency Services stated they plan to continue the training and eventually apply to become an accredited trauma center. After completing this project, it will be necessary for the staff not to be complacent. The administration should continue education and mock scenarios to maintain staff competency.

Limitations

In research, limitations are considered flaws, skews, or shortcomings that may interfere with the project outcomes (Ross & Bibler, 2019). Factors that might have limited the project include:

Bias: A bias immediately noted during the project's planning stages was the number of departments used. It was best determined to use the emergency department because it is the first place of arrival for patients. This bias could have affected the outcome of the project because other departments were not utilized in the training and data collection but were mentioned heavily in the implementation portion of the project. One effort to minimize this limitation was to plan ongoing training for the rest of the departments led by unit-specific management and hospital educators. Otherwise, there were no other limitations noted during project implementation.

Design: Limitations related to the design portion of the project include the ideology of choosing to make this project a quality improvement project rather than any other type of study design. While different types of improvement may work, the best option was to make this project a quality improvement type because it improves patient care and the current policy. No other limitations there were noted in the design portion.

Data Collection: Limitations to the data collection portion of the project include having a smaller sample size of only 60 participants. It is unknown whether having a larger sample size would ultimately change the results or not. Another limitation regarding data collection includes reviewing and grading 120 tests and 60 mock surveys by hand due to the lack of computer access. Data recruitment was not an issue during implementation due to management requiring participation to be mandatory.

Data Analysis: Limitations related to the data analysis portion included deciding on the type of

statistical test to utilize during the project to yield results. The statistical test most appropriate was the paired t-test to analyze the difference between the pre-test and post-test. This statistical test provided a valuable measurement of the increase in knowledge after the previous four weeks of education and training. Where the limitations came into place was other statistical tests could have been utilized, such as the chi-square tests or the Mann-Whitley test. Unfortunately, with limited time, the paired t-test was the best option, given all the factors.

Limitation Reduction

Efforts to minimize limitations included maintaining the privacy of participants' grades, maximizing time management, recognizing and correcting biases, and limiting IRB violations. Meeting with the TUN statistician to ensure that correct statistical test(s) were being utilized and using feedback from my project team and mentor for content corrections were helpful. The limitation that was unresolvable was the small sample size mentioned previously.

Generalizability is the ability to share data with other areas or departments. In the case of this project, the entire project and results will be available to not only the different departments but the whole hospital (Patino & Ferreira, 2018). As more departments begin training for mass casualty preparedness (dependent on their unit), the host site will be closer to applying to become a trauma center. Limitations related to different departments implementing the education and project are that not all departments are the same (Patino & Ferreira, 2018). Some departments may need additional training, while others may need less training. This last statement also goes for internal validity, as not all hospitals are identical (Patino & Ferreira, 2018).

Conclusion

This quality improvement project related to mass casualty preparedness was to prepare the host site, a very rural hospital, to obtain the knowledge needed to improve their knowledge and

confidence. Over the past five weeks, the staff gained valuable knowledge that will prepare them for the future of mass casualty. The project aims included updating the current policy and providing extensive education analysis to monitor competency and understanding. The objectives supporting this project include updating the current host site's current policy with updated information gathered from AHRQ, FEMA, and the CDC. Interventions include a pre-test, formal education, a NetLearning exercise, a post-test, and a mock scenario. Nurses have consistently upheld high-quality standards of care, showing that incorporating evidence-based research improves patient outcomes. Policy change can sometimes be intimidating, but it becomes less daunting with education and training. Maintaining sustainability will ensure the team maintains its newly found understanding of mass casualty. Sustainability can be maintained through continuing education, expanding to different departments, continuing mock scenarios, and NetLearning. There are many ways of providing education to the public, such as presenting the project in public spaces, presenting a poster at local conferences, and giving speeches at local and regional meetings and conferences. In conclusion, healthcare is constantly changing due to research and advancements, and it is essential to ensure that medical staff is current on life-saving mass casualty policies.

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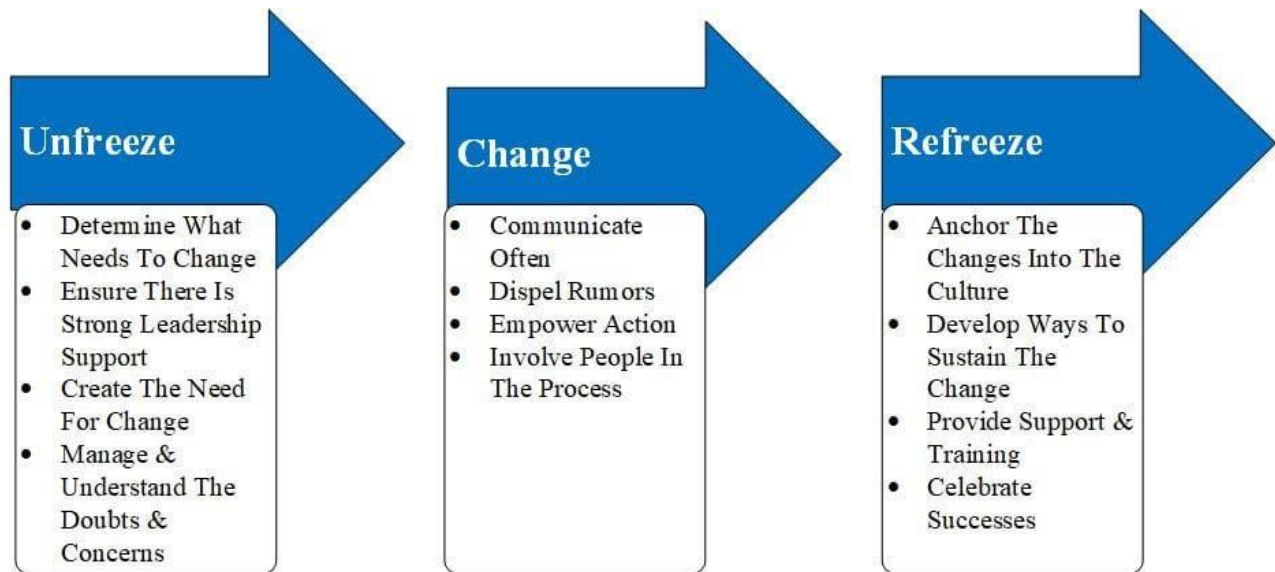
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Appendix A

Unfreeze
- Determine What Needs To Change
- Ensure There Is Strong Leadership Support
- Create The Need For Change
- Manage & Understand The Doubts & Concerns

Change
- Communicate Often
- Dispel Rumors
- Empower Action
- Involve People In The Process

Refreeze
- Anchor The Changes Into The Culture
- Develop Ways To Sustain The Change
- Provide Support & Training
- Celebrate Successes

Appendix B

Rothwell Regional
601 E 14th St.
Sedalia, MO 65301

Memo

To:	Jason Anderson
From:	Tricia Miller, MSN, CCRN, RN-C
cc:	Mark Hightower, MD, FACC
Date:	01/17/2022
Re:	Project Approval

Hi Jason!

Great news! I just received word from Mark that you are approved to complete your Doctorate project here in our Emergency Department. While I know Mark and I discussed your role during your project, I want to give a friendly reminder that at no time are you to provide any patient care. Otherwise, you are good to go!

Regards,

TM

Appendix C

Test Blueprint

Content	Level of Cognitive Skill							
	Assess	Remember	Understand	Apply	Analyze	Evaluate	Create	Total
Hospital Policy and Procedures		1	1					
Roles of staff during mass casualty event			1		1			
Chain of command during mass casualty event							1	
Hospital preparedness during mass casualty event				1		1		
Different types of mass casualty events	1	1	1					
Total	1	2	3	1	1	1	1	10

Appendix "C" (continued)

Relevance

1 = Not relevant at all
2 = Slightly relevant
3 = Moderately relevant
4= Highly relevant

Item	Rating Relevance
1. What are examples of mass casualty events? Select all that apply. a. Weather b. Shootings c. Single car accident d. Bombings e. Public transportation f. Health	4
2. Depending on the nature of the incident, a mobile command center may be operational. a. True b. False	2
3. At Bothwell Regional Medical Center, the code for announcing a mass casualty is: a. Code Red b. Code Pink c. Code Blue d. Code Purple	2
4. During a mass casualty event, the Charge Nurse is the first point of contact. a. True b. False	4
5. How can a hospital be prepared for a mass casualty event? Select all that apply: a. Monitor chain supply of medical equipment b. Have a policy and procedure in place regarding preparedness c. Conduct annual training d. Notify the mayor	3
6. What agencies are responsible for mass casualty events and training? a. Federal Emergency Management Agency b. Agency of Healthcare Research and Quality c. Centers for Disease Control and Prevention d. The White House e. The Supreme Court	4

Appendix C (continued)

7. Blood products are one of the first pieces of resources to be depleted. a. True b. False	3
8. Each employee will have a specific role during a mass casualty event. a. True b. False	4
9. It is NOT essential to designate a decontamination area outside the ER. a. True b. False	3
10. Mass casualty events do NOT require flexibility. a. True b. False	4

Appendix "C" (continued)

Relevance

1 = Not relevant at all
2 = Slightly relevant
3 = Moderately relevant
4= Highly relevant

Item	Rating Relevance
1. What are examples of mass casualty events? Select all that apply. a. Weather b. Shootings c. Single car accident d. Bombings e. Public transportation f. Health	4
2. Depending on the nature of the incident, a mobile command center may be operational. a. True b. False	3
3. At Bothwell Regional Medical Center, the code for announcing a mass casualty is: a. Code Red b. Code Pink c. Code Blue d. Code Purple	3
4. During a mass casualty event, the Charge Nurse is the first point of contact. a. True b. False	3
5. How can a hospital be prepared for a mass casualty event? Select all that apply: a. Monitor chain supply of medical equipment b. Have a policy and procedure in place regarding preparedness c. Conduct annual training d. Notify the mayor	4
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Appendix "C" (continued)

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10. Mass casualty events do NOT require flexibility. a. True b. False	4

Appendix "C" (continued)

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Appendix "C" (continued)

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9. It is NOT essential to designate a decontamination area outside the ER. a. True b. False	**2**
10. Mass casualty events do NOT require flexibility. a. True b. False	**4**

| Item	Expert 1	Expert 2	Expert 3	Mean Score
1	4	4	4	4
2	2	3	2	2.3
3	2	3	4	3
4	4	3	2	3
5	3	4	4	3.7
6	4	3	4	3.7
7	3	4	3	3.3
8	4	4	4	4
9	3	2	4	3
10	4	4	4	4

CVR = [(3-(3/3)) / (3/3)] with E representing the number of judges who rated the item as

The mean total of all of the means was 3.4, indicating that all of the questions were moderate/

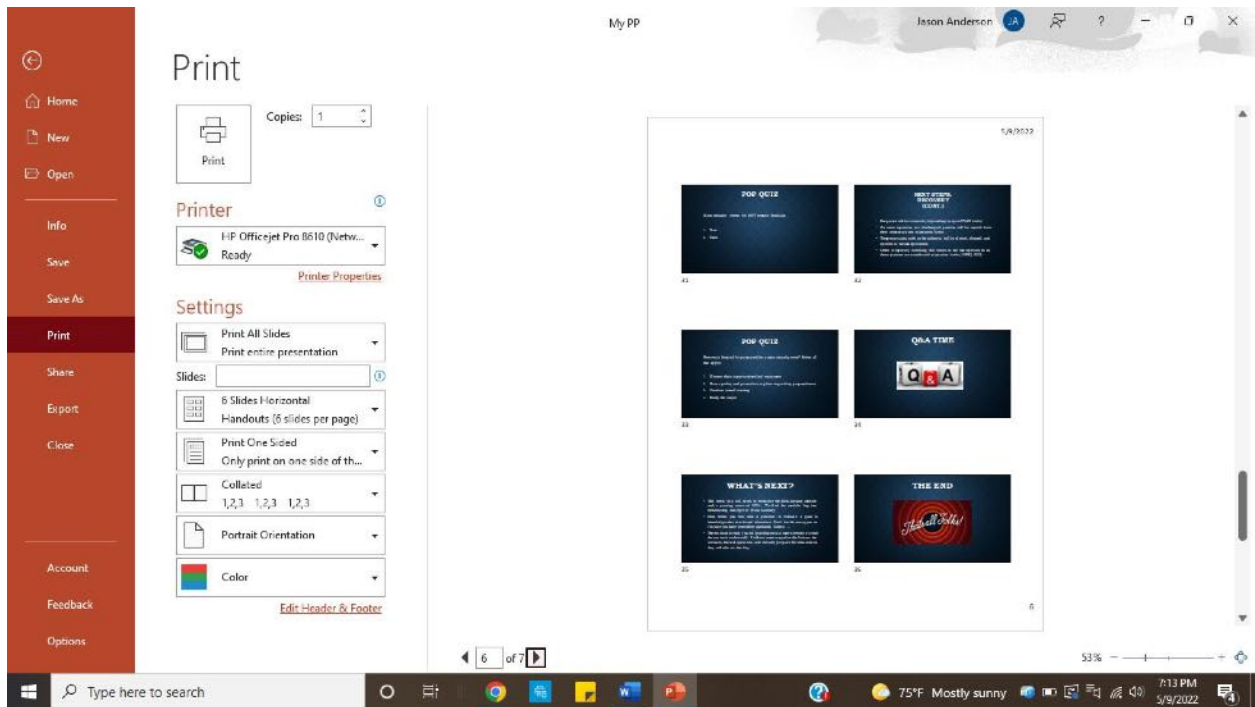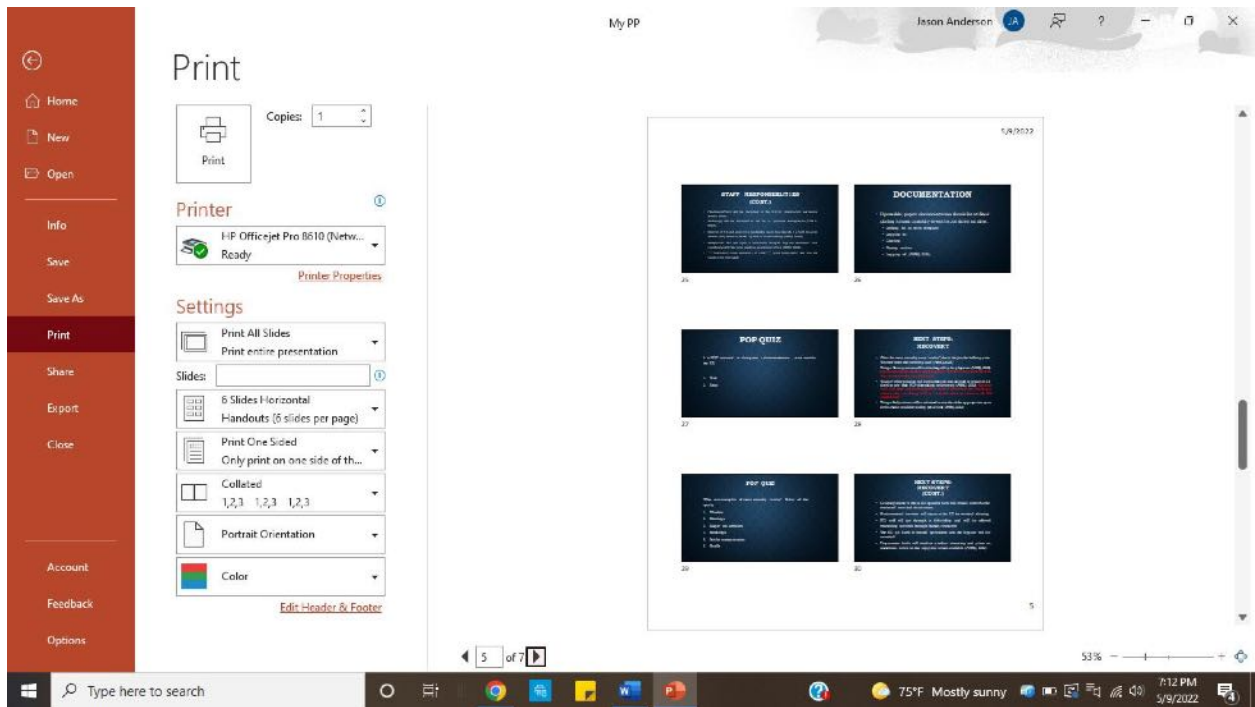highly relevant. The calculation is as follows: CVR = [(3-(3/3)) / (3/3)] and CVR = [(3-1) /2]

Appendix D
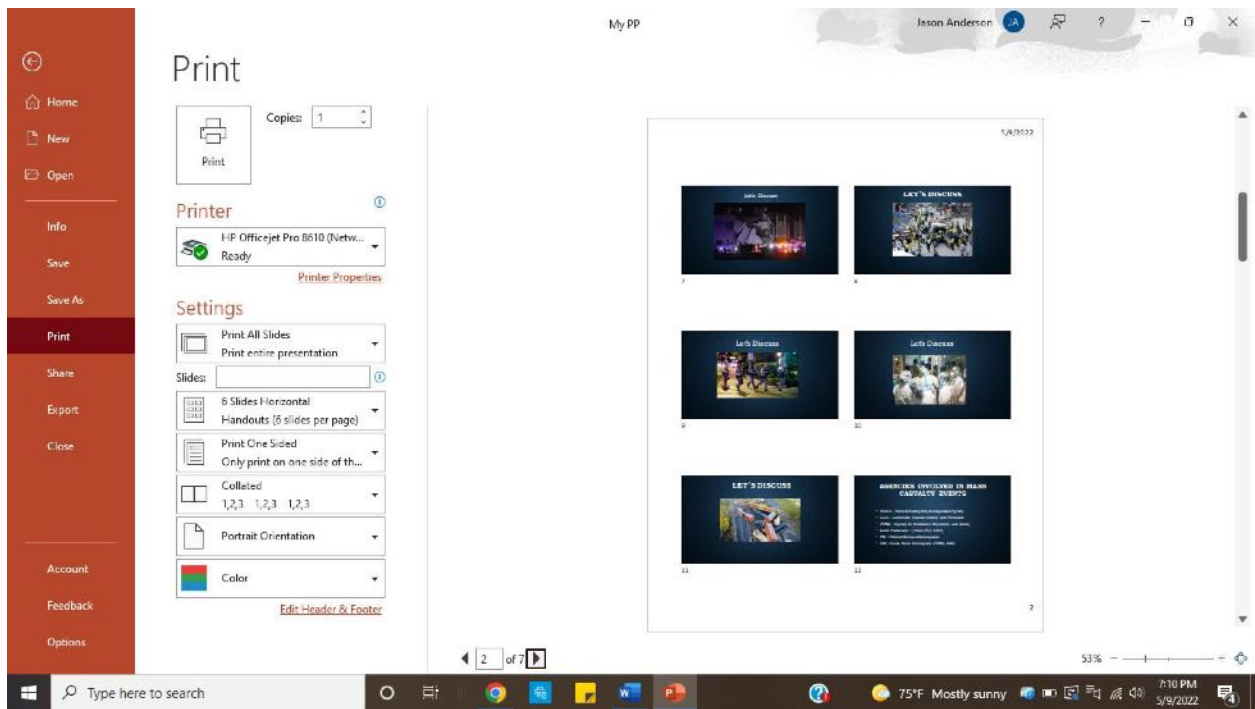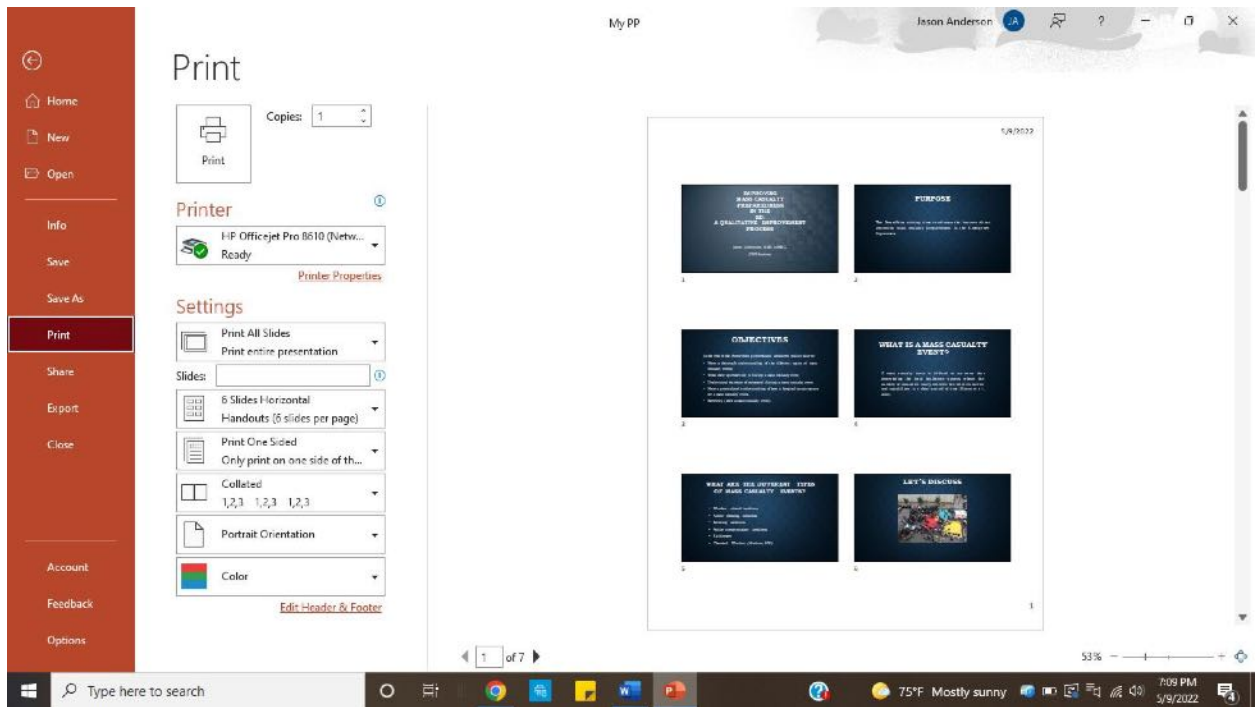
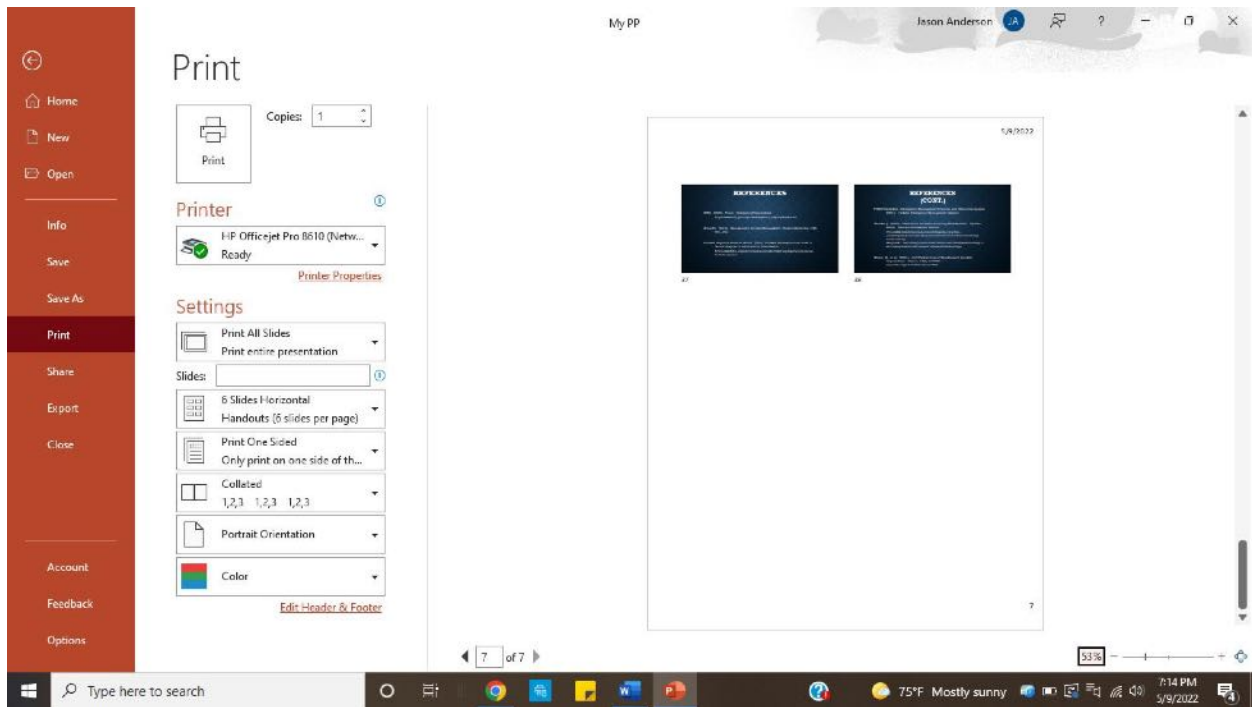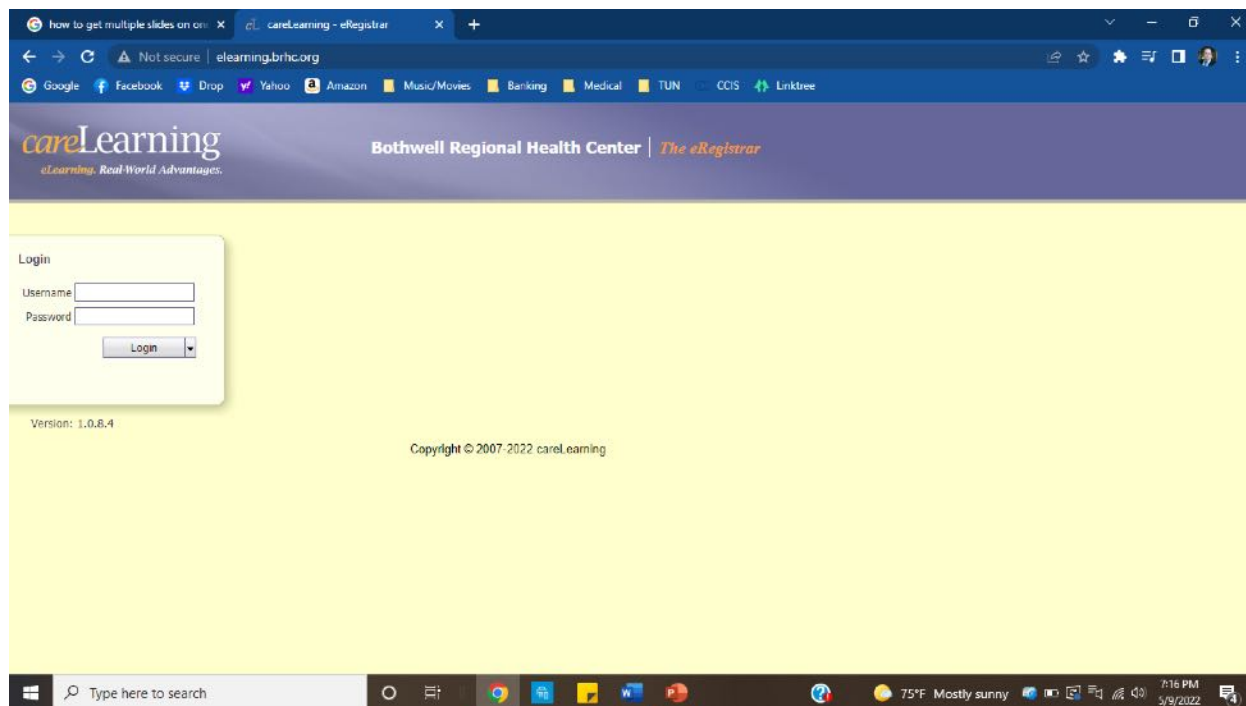**Appendix D (continued)**
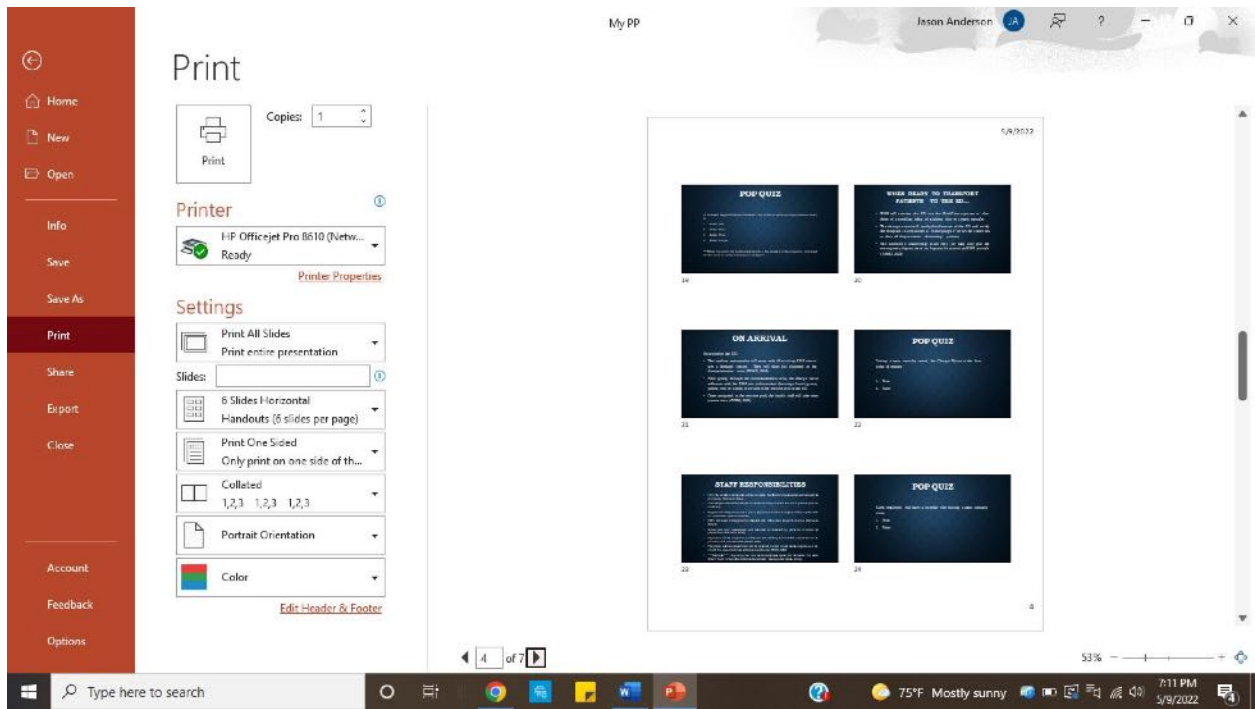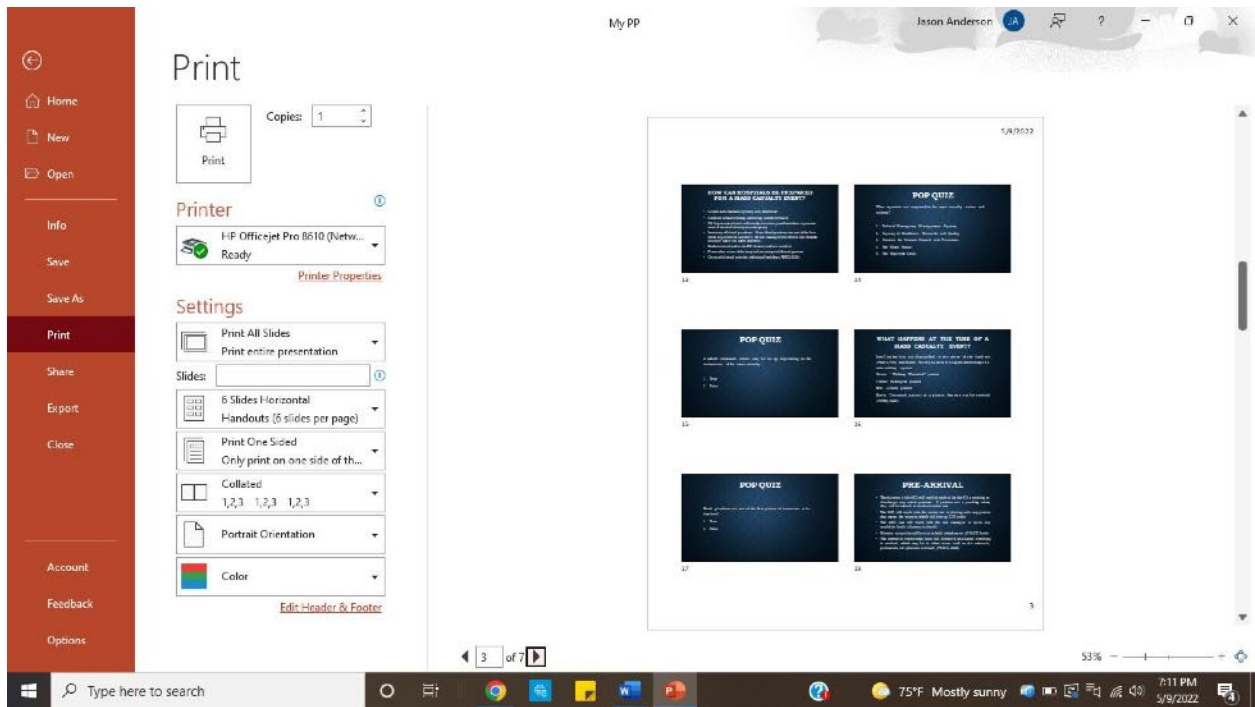
Appendix D (continued)

Appendix D (continued)

Appendix E

Appendix F

Mock Scenario

Purpose

This PowerPoint training aims to educate the learners about improving mass casualty preparedness in the Emergency Department.

Objectives

At the end of the PowerPoint presentation, attendees will be able to:

- Have a thorough understanding of the different types of mass casualty events.

- What their specific role is during a mass casualty event?

- Understand the chain of command during a mass casualty event.

- Have a generalized understanding of how a hospital can prepare for a mass casualty event.

- Recovery (after a mass casualty event)

Population

Emergency Department staff and executive leadership team.

Length in Time

1 hour plus any time for a Q&A session

Item Format

PowerPoint presentation and verbal explanation during the Q&A session

Scenario

The project lead will work closely with the local authorities (police, EMS, and fire) to create a realistic mass casualty event. The type of casualty chosen is a mass shooter scenario. A call over the MedCom system will notify the Emergency Department of an active mass casualty event. The charge nurse will notify the director of emergency services and the hospital operator to announce a "code purple" to prepare the hospital staff for incoming patients. Until the command center is

operational, the director of emergency services will act as the interim incident commander. Her job will ensure the movement of all non-critical patients to a different observation unit – creating additional space in the emergency department. At the same time, she will be responsible for ensuring all staff is present and requesting additional staff from other units.

Appendix F (continued)

The incident commander and all available staff will wait for incoming emergency vehicles in the corridor. Upon arrival, the incident commander will direct each staff member to take the patient and start treatment. This plan will continue with all patients. The medical providers (MD, NP, and PA) will round in every room to complete a trauma assessment and provide orders. Registration will also round on every patient to attempt to register every patient – or list the patient as a "John Doe" or "Jane Doe." One medical staff member will be assigned to the temporary morgue to ensure all patients are registered.

Patient processing is as follows:

- Green – These patients will be sent to the level 3 area and triaged as usual with close monitoring of the triage nurse.

- Yellow – These patients are more likely to worsen without any medical treatment. These patients will proceed to the level 2 area for minor treatment but close monitoring.

- Red – These patients will likely die of their injuries if not treated immediately. These patients will proceed to level 1 for immediate treatment. A medical provider is present in the level 1 area for every patient placed in that area.

- Black – These patients are nearing death or are already deceased on arrival. A medical provider will do a focused assessment, order comfort care for the nearing death patients, and call the time of death for the deceased patients. These patients will proceed to the temporary morgue.

A debriefing will commence afterward.

Appendix G

https://www.caehealthcare.com/media/files/Simulation-Effectiveness-Tool.pdf

This link is to the SET form staff members will utilize during the debriefing portion of the mock scenario.