The Golden Hour in an Active Shooter Event: A Community Risk Reduction Perspective

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

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Abstract

Creating a community risk reduction program designed to reduce effects of active shooter events is a complicated issue This research investigated the problem within the Salem Fire-EMS Department of not having a community risk reduction program in place to minimize morbidity and mortality of victims in an active shooter event. This problem puts people at a higher risk for increased permanent injuries and death. The purpose of this research is to identify the need for a community risk reduction program that trains civilians to provide rapid triage and treatment for victims in an active shooter event. Descriptive research methods were used to answer the following research questions:

- 1. Who are the potential stakeholders for this community risk reduction program?
- 2. What are the potential stakeholders expected to do in this community risk reduction program?
- 3. What resources are needed to move the proposed program through the Community Risk Reduction Model?
- 4. What training will be needed to effectively run this community risk reduction program to achieve its end goals?
- 5. What are the potential costs of this community risk reduction program?

The procedures used in this research utilized several approaches. Research instruments were used to gain perspective from within the Salem Fire-EMS Department, high risk groups for active shooters, and vendors that can assist in lowering morbidity and mortality of victims.

The results were consistent with a reaction to have a community risk reduction program designed to reduce effects on victims of active shooter events. However, once the practicalities of such a program were weighed several concerns lingered.

The recommendations that yielded from this research included developing a formative team within the Salem Fire-EMS Department to establish, implement, and evaluate an on-going community risk reduction program that keeps internal and external budgetary constraints in mind.

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The Golden Hour in an Active Shooter Event: A Community Risk Reduction Perspective

American culture in the last decade has been manipulated and forced to adapt by altering our lifestyles due to unthinkable acts of violence that frequently lead to tragic outcomes. Essentially every venue of life has experienced domestic terroristic episodes of active shooting events. For example, learning environments are changing by requiring our children to walk through metal detectors as they enter their schools. The school doors are locking as children and faculty enter with sophisticated security systems similar to those used in prisons that our nation's criminals occupy. Work environments are being monitored with high resolution video surveillance that arguably infringe on personal rights of the American worker. Leisure activities such as going to the mall to shop, attending a sporting event, or even taking a walk in the park are becoming increasingly less safe due to the real threat of active shooters targeting innocent people.

The security measures previously mentioned all fall in the broad and important category of community risk reduction interventions, which are designed to eliminate active shooter events. Installing high resolution video cameras, door locking mechanisms, metal detectors, and having added police presence are all part of law enforcement's efforts to provide community risk reduction measures to improve the overall health and safety of America.

Some community risk reduction actions mentioned regarding active shooter events center their efforts by adding physical blockades to slow or stop the active shooter. Other risk reduction initiatives have suggested allowing key people in high risk areas, such as educators, to carry firearms to help mitigate an active shooter loose in a school.

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Other efforts involve hiring more security personnel to patrol high risk areas. The fundamental problems with these community risk reduction measures are expense, intrusiveness, as well as being logistically and socially impractical in most situations.

The focus of this research will explore the feasibility of a community risk reduction program from an injury prevention and preservation perspective. This community risk reduction program will refocus efforts of active shooter event mitigation from physical blockades, as previously described, to a civilian action oriented program that teaches basic medical response to those injured in these events.

This community risk reduction program takes a defensive approach to active shooter events. The suggested program focuses on actions to take by civilians after the event has occurred compared to a program that focuses on how to stop the active shooter scenario from occurring. This defensive approach is unique, practical, and necessary. Active shooter events are occurring with alarming frequency with no signs of slowing in the near feature. A program to lower morbidity and mortality is necessary to slow the devastating effects of an active shooter event.

It is important to understand that in many active shooter events, professional medical interventions will be delayed. Police procedures to stop the active shooter threat will take time to implement and accomplish, which will delay the safe security level that is generally required for emergency medical services (EMS) to intervene with those that are injured. As an active shooter event unfolds, victims of the event may lie wounded and helpless in serious need of medical intervention that could save their lives. As time passes after a victim is wounded, the percentage of survival decreases exponentially, causing a phenomenon known as the golden hour of trauma.

Civilian medical intervention in the absence of trained professionals is the key to reducing morbidity and mortality in an active shooter event. Innocent victim's lives can be saved in an active shooter scenario with rapid triage and simple medical interventions that require little training, equipment, and skill. In the absence of this community risk reduction program that teaches simple and effective life-saving medical intervention to civilians, a victim's likelihood of permanent injury or death will rise for any given active shooter event.

The problem is Salem Fire-EMS Department does not have a community risk reduction program in place to minimize morbidity and mortality in victims of an active shooter event. This problem makes the City of Salem, Virginia at a higher risk for increased permanent injuries and death of innocent victims in active shootings. The Community Risk Reduction Model found in Appendix B will assist the Salem Fire-EMS Department in navigating and solving this problem.

The purpose of this research is to identify the need for a community risk reduction program that trains civilians to provide rapid triage and treatment for victims in an active shooter event. This research will use the Program Planning and Evaluation Framework found in Appendix A to navigate the formative phase of program design. This framework will assist the Salem Fire-EMS Department in the planning of this community risk reduction initiative. This research will focus on a perspective to highlight the previous frequency, location, and type of active shooter events that have been encountered. The research will also identify community risk reduction needs, resources, and stakeholders in an active shooter event.

The goal of this research is to ultimately preserve life by reducing morbidity and mortality when trained medical care isn't readily available. The Program Planning and Evaluation Framework is an adaptive model originally from the Centers for Disease Control and Prevention (CDC). This model is designed to aid organizations through cumbersome and complex program design and implementation. The model focuses on four primary areas of program evaluation. These four primary areas of evaluation are formative, process, impact, and outcome. This research will focus on the formative phase.

Descriptive research methods are being used to answer the following research questions:

- 1. Who are the potential stakeholders for this community risk reduction program?
- 2. What are the potential stakeholders expected to do in this community risk reduction program?
- 3. What resources are needed to move the proposed program through the Community Risk Reduction Model?
- 4. What training will be needed to effectively run this community risk reduction program to achieve its end goals?
- 5. What are the potential costs of this community risk reduction program?

Background and Significance

The City of Salem is a municipality in Virginia with a council-manager style government. Salem sprawls 14.31 square miles in the Shenandoah Valley between the Blue Ridge and Allegheny Mountains, along the Roanoke River with a population of 24,802 citizens (City of Salem, 2013).

The Salem Fire-EMS Department is an all-career personnel emergency services department that serves the City of Salem. The Salem Fire-EMS Department is currently comprised of 56 full-time and 28 part-time employees working 21 personnel to a shift at full staffing. The department is supported with an administrative staff to include one administrative secretary, one EMS billing specialist, one training officer, a fire marshal's office that includes two personnel, one EMS coordinator, one deputy chief of operations, and the chief of the department.

Salem Fire-EMS Department provides core services to the citizens, visitors, and businesses of the City of Salem and to surrounding areas through automatic and mutual aid agreements with other localities. The core services that are provided include fire suppression, emergency medical services to the Advanced Life Support (ALS) level, fire inspections, fire investigations, hazardous materials response as a member of the Virginia Hazardous Materials Regional Response Team, and specialized technical rescue as a member of the Virginia Division 6 Heavy and Technical Rescue (HTR) Response Team. Salem Fire-EMS Department responds to over 4,000 emergencies annually with an almost \$6 million budget.

The City of Salem has many high occupancy gathering places throughout its jurisdiction that potentially would serve as high target areas for an active shooter. Blair, Nichols, Burns, and Curnutt (2013) found in their research that between 2000 and 2010 across the nation there were a total of 84 active shooter incidents. Their research found that schools had the highest number of active shooting events at 29 incidents. Public venues were found to have the second highest number of active shooter incidents at 14. Retail and factory settings were third and fourth respectively with a total number of active shooter incidents of 13 and 11.

Educational environments are at the highest number of incidents between 2000 and 2010. This fact makes Salem's education system a high risk target area for an active shooter threat. The City of Salem has a robust educational system within its jurisdictional boundaries from public schools to a private liberal arts college. The public school system is comprised of four primary schools, one middle school, and one high school. The total student enrollment for Salem Public Schools is 3,839 students in grades kindergarten through 12. The Salem Public School System has nearly 600 employees (Salem City Schools, 2013).

Roanoke College is an independent, coeducational, four-year liberal arts college with an enrollment near 2,100 students. The students of Roanoke College come from 40 states and 25 different countries. Interestingly, 79% of students live on campus. The campus is spread over 80 acres with 56 buildings that house the college. There are 131 tenure-track faculty and many more non-tenure-track employees (Roanoke College, 2012).

Other high frequency targets for active shooters are warehouse and factory settings. The City of Salem has several large industrious warehouses and factories that would fall into this high risk category. Yokohoma Tire Corporation has a major manufacturing facility in Salem. This facility at one point produced 70% of all Yokohama passenger tires sold in the United States. This plant consumes a large geographical footprint and has hundreds of workers (Yokohama, 2014).

Other large manufacturing businesses that occupy space within the City of Salem are General Electric, U.S. Food Service, and Novozymes Incorporated to name a few. These businesses share similarities in number of employees, physical footprint, and identified risk as defined in previous research by Blair et al. (2013).

The City of Salem has many public venues that would entice an active shooter to create havoc. The City of Salem is home to the Salem Red Sox. The Salem Red Sox are the High Class-A baseball team in the Carolina League and a farm system team of the

Boston Red Sox. The Salem Red Sox play their games at Salem Memorial Baseball Stadium which is an open-air stadium that seats 4,968 spectators (Salem Red Sox, 2014). The open air stadium and minimal security is a potential high risk, highly populated venue for an active shooter incident.

The City of Salem hosts many National Collegiate Athletic Association (NCAA) events to include the Amos Alonzo Stagg Bowl. The Amos Alonzo Stagg Bowl is the NCAA Division III Football Championship held each December. The NCAA Division III National Basketball Championship is held at the Salem Civic Center each March. There are many other athletic tournaments that are not part of the NCAA at the various venues throughout the city. These athletic events are a large part of the local economy drawing thousands of visitors to the city each year. This makes these events a high risk target for an active shooter incident and a potentially challenging job for the Salem Fire-EMS Department to mitigate.

The City of Salem is a community friendly city that has many outdoor festivals, activities, concerts, and other large gathering events. In September of each year, the city is inundated with thousands of people for the Olde Salem Days Festival. Olde Salem Days Festival is an arts and crafts style event that attracts people of all race, socioeconomic status, and gender.

Table 1

High Risk Type	High Risk Areas
Schools/ Daycares	 East Salem Elementary School South Salem Elementary School G.W. Carver Elementary School West Salem Elementary School Andrew Lewis Middle School Salem High School Honeytree Early Learning and Daycare Salem Montessori School Roanoke College Mini World Daycare
Warehouse/ Factory	 Yokahoma Tire Corporation General Electric Corporation U.S. Foods Novozymes Kroger Wal-Mart
Public Venues/Festivals	 Olde Salem Days Salem Red Sox games NCAA events Salem Farmer's Market Salem After Five

City of Salem Active Shooter High Risk Areas by Type

Note. Table 1 summarizes the high risk areas within the City of Salem by type using the same guidelines that Blair et al. (2013) found in their research. The City of Salem has numerous high risk areas that could potentially entice an active shooter to create the next tragedy.

The Salem Fire-EMS Department operates with 21 personnel each day with full staffing. Most of the time, full staffing is not possible due to sickness, paid leave and other various forms of personnel leave the department encumbers. Generally, the department operates with 17 personnel at minimum staffing. This includes three staffed advanced life support ambulances, three advanced life support engines, one EMS

supervisor in a basic life support quick response vehicle, and an incident commander in a quick response vehicle.

In the past and presently, the Salem Fire-EMS Department at minimum staffing of 17 personnel will have a difficult time in the first phases of an active shooter event. The challenges the department will immediately face are the shortage of manpower, establishing effective incident management through unified command with Salem Police Department and other outside law enforcement agencies, resource allocation, and most importantly patient care to those injured in a timely fashion that minimizes morbidity and mortality.

Triaging and treating injured patients is a priority for Salem Fire-EMS Department in an active shooter event. Decreasing the morbidity and mortality rate of active shooter events is a national focus through many forms. There are gun control debates, mental health debates, and other forms of litigation that are being pursued by law makers. The unfortunate realization is the frequency of active shooter events is not decreasing with all of these actions being argued through various mediums.

Community risk reduction of these active shooter events can be handled in various forms based on capabilities of the organization. In the future, Salem Fire-EMS Department would like to reduce morbidity and mortality of active shooter events through a community risk reduction plan that accomplishes early patient recognition through accurate triage and treatment of life threatening injuries from those closest to the injured. This community risk reduction plan will be the subject matter of this research.

The problem is Salem Fire-EMS Department does not have a community risk reduction program in place to minimize morbidity and mortality in victims of an active shooter event. This problem makes the City of Salem, Virginia at a higher risk for increased permanent injuries and death of innocent victims of active shootings. The National Fire Academy's Community Risk Reduction Student Manual offers the City of Salem a useful tool in the Community Risk Reduction Model. This model outlines an effective process that can be followed to reduce the risk associated with an active shooter event by lowering morbidity and mortality through early triage and treatment of life-threatening injuries. This model focuses on preparing for the risk assessment of an active shooter event, conducting the risk assessment, building support behind the needs that will assist in mitigating the risk, identifying intervention strategies, forming a measurable action plan to mitigate the identified risk, and evaluation strategies to critique the implemented risk reduction plan in place. A copy of the Community Risk Reduction Model can be found in Appendix B of this document (p. SM 1-7).

One of the goals of the United States Fire Administration (USFA) is to "reduce risk at the local level through prevention and mitigation" (U.S. Fire Administration, 2012). This community risk reduction research will focus on preventing unnecessary increases to morbidity and mortality in an active shooter event by looking at creative ways to access wounded patients early by those closest to the injured such as faculty barricaded in a school on lockdown or a co-worker in a warehouse. Early triage and treatment of life-threatening injuries is the mitigation tool needed to reduce tragic outcomes in these types of events.

Asking civilians to help intervene in high risk situations will not be an easy mitigation effort to have buy-in from stakeholders. This community risk reduction initiative will require change within the Salem Fire-EMS Department and on the community level. This will require the research and the Community Risk Reduction Model to focus on change internally and externally. These community risk reduction plans generally require strong, visionary leadership accompanied by effective management of the change process. This research will help establish the stakeholders, the details needed to make this community risk reduction initiative work, and set a potential plan to move forward through the entire Community Risk Reduction Model (U.S. Department of Homeland Security, 2012, p. SM 5-3).

Literature Review

By conducting an extensive review of literature found at the National Fire Academy's Learning Resource Center in Emmitsburg, Maryland, various books, periodicals, and searches conducted on the World Wide Web, provided an abundance of resource materials. There are numerous methodologies to assist an organization in designing, implementing, and maintaining a community risk reduction plan created to reduce morbidity and mortality of patients involved in active shooter events. The following literature review is an overview of the most credible references found during this researcher's examination of past work pertaining to active shooters and community risk reduction initiatives designed to reduce morbidity and mortality of those injured.

Maslow's hierarchy of needs theory as it relates to personal safety is the second level of the most basic needs humans must achieve. As active shooters continually disrupt society by acting out in violence, this basic need is not met. This level in the hierarchy is the fundamental responsibility of public safety. Police, fire, emergency medical services, and emergency management all share responsibility to protect personal safety. How personal safety is protected can be achieved through many different community risk reduction programs. The problem is Salem Fire-EMS Department does not have a community risk reduction program in place to minimize morbidity and mortality in victims of an active shooter event. This problem makes the City of Salem, Virginia at a higher risk for increased permanent injuries and death of innocent victims of active shootings, thus potentially decreasing their hierarchical need for safety.



Figure 1. Description Maslow's hierarchy of needs

Figure 1 is a pictorial description of the relationship between Maslow's hierarchy of needs and personal safety. Personal safety falls in the second level of the hierarchy. More basic needs such as physiological demands come first.

(Source: Finkelstein, 2006)

To address the first research question, the potential stakeholders for a community risk reduction program designed to reduced morbidity and mortality in victims of an active shooter event are endless. In an effort to focus this community risk reduction program to achieve the greatest impact quickly, past research shows there are key focus groups that should be exposed to a community risk reduction program that reduces morbidity and mortality. As Blair et al. (2013) demonstrated in their research findings, the venues of active shooter events from 2000 to 2010 were spread over eight broad categories. Unfortunately their research also discovered that schools had the highest occurrence of active shooter events by more than doubling the second most frequent venue which was manufacturing and industry.

The first stakeholder group that will take priority and be focused on to reduce morbidity and mortality in victims of active shooter events are schools. Again, focusing on schools will achieve the greatest impact in the quickest amount of time. Schools are easy to reach a large amount of people at once due to their close proximity, frequent meetings, and willing audience.

Bill Lowe, an associate professor of emergency management at Jacksonville State University in Alabama found that most schools are ill-prepared for an active shooter scenario. He further explains that the need for employing mechanisms to stop active shooters in schools is as essential as a school librarian. Employing key personnel that are essential for the safety of students and faculty are paramount and should not be the first budget items cut from ledgers each fiscal year (McKay, 2013).

An example of the need for school personnel to be prepared to care for sick or injured victims of an active shooter event can be found in the Aurora, Colorado shooting where a gunman killed 12 people in a movie theatre. This gunman started his attack by releasing two canisters of pepper spray. Pepper spray inhibited the efforts of police and emergency medical services to respond to the victims because of the long lasting effects of the chemicals used in the agent. The delay in medical response could result in an increase in the morbidity and mortality of future patients in similar situations. A chemical agent release by an active shooter is only one hypothetical situation that could delay both law enforcement and medical intervention to the situation. Delays of any kind could be the time necessary to make a viable victim a deceased victim (McKay, 2013).

Bo Mitchell of 911 Consulting stated that schools and businesses alike, all suffer from one fundamental issue. He believes that schools and businesses are unprepared for all hazards emergencies. Mitchell refers to research conducted by the Government Accountability Office and National Association of School Resource Officers which reinforces the notion that schools that provide K-12 education lack preparedness. The

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research indicates that schools have emergency plans in place, but they are generally not an all hazards plan that addresses most scenarios that may be encountered. The research Mitchell refers to makes the point that most emergency plans train certain faculty, but not all school employees. In this community risk reduction program, key stakeholders in an educational environment are those often overlooked. These individuals would include cafeteria workers, bus drivers, contractors, and volunteers that may be forced to render medical care in the absence of trained providers (McKay, 2013).

Interestingly the Occupational Safety and Health Administration (OSHA) refers to schools as workplaces first, then a school second. With this notion established, all workplaces are mandated to exercise emergency planning and all employees shall be trained in emergency response annually. The levels of these training opportunities vary widely across the nation based on perceived risk, associated cost, politics, and other factors. This mandate is the perfect avenue to implement this community risk reduction program into high risk categories such as schools (McKay, 2013).

The Virginia Public School System has only recently required faculty to learn first aid and cardiopulmonary resuscitation (CPR). In July of 2013, every initial licensure or renewal licensure within the Virginia Department of Education must show proof that faculty have achieved certification in first aid and CPR. Beginning in the 2016-2017 school year, Virginia ninth graders will be required to learn first aid and CPR to be eligible to graduate from high school (Virginia Department of Education, 2014).

Following the formative evaluation flowchart within the Program Planning and Evaluation Framework, target populations have been clearly defined from previous research conducted by Blair et al. (2013). The community analysis in Table 1 shows numerous high risk areas within the City of Salem, Virginia that deserve in-depth public safety training that focuses on reducing morbidity and mortality in situations where trained medical providers may not be readily available.

The second research question asks, "What are the potential stakeholders expected to do in this community risk reduction program?" Staying within the scope of this research, the formative phase of program design is not intended to create the community risk reduction program in its entirity. Rather, the formative phase is intended to gain perspective on the issue, identify stakeholders, and begin working towards program creation. However, to gain complete perspective on the problem we still must take an early look at what training currently exists. Taking a look at previous available training for basic first aid is a starting point in crafting the bulk of this community risk reduction program. On the most fundamental level, non-medically trained stakeholders would be expected to learn basic lifesaving techniques, rapid triage and assessment, exercise concise decision-making, and remain calm. These expectations can be deployed rapidly on victims of active shooter events. Lifesaving techniques need to be easily learned, quickly deployed, and easily maintained until trained medical professionals can intervene. It is important to remember, while this research focuses on reducing morbidity and mortality in victims of active shooter events, these techniques can be applied to any medical or traumatic event. The diversity of this a community risk reduction plan designed to reduce morbidity and mortality in victims of active shootings is a positive selling point to increase stakeholder interest and buy-in.

In regards to the highest risk area found by Blair et al. (2013), schools, there is an entire book devoted to pediatric first aid and teachers. Jones and Bartlett Publishers in 2007 released a text book entitled *Pediatric First Aid for Caregivers and Teachers*. This textbook focuses on basic first aid that is ideal for minor injuries. The unfortunate

realization about active shooter events is most injuries are not minor. Active shooter injuries are mostly fatal. When injured victims survive the active shooter event, their injuries are often life-threatening that require more advanced medical interventions to reduce morbidity and mortality (American Academy of Pediatrics, 2007).

Hank Clemmensen in an article describes the need for injured victims of active shooter events to receive medical attention rapidly. He adds that fire and EMS departments need to build a more aggressive response to active shooter events to ensure viable victims get the medical attention they desperately need. Arlington County, Virginia has implemented a military-like tactical approach to active shooter events. This model applies tactical combat medicine techniques to civilian EMS. In theory, this model is a great approach to decreasing morbidity and mortality to injured victims of an active shooter by getting trained medical providers to the patient's side more quickly. Embedding EMS into tactical police units making first entries into an active shooter crime scene is a better alternative to letting victims lie wounded until the crime scene has been cleared and deemed safe by these tactical law enforcement teams (Clemmensen, 2013).

This proposed community risk reduction program will focus on teaching the nonmedically trained civilians to render similar lifesaving medical interventions using some of the same modalities that Clemmensen (2013) describes in his article. The goal of the content of this community risk reduction effort will be to reduce morbidity and mortality in active shooter events by controlling factors that cause death, such as hemorrhage and shock. The Prehospital Trauma Life Support (PHTLS) Manual recommends lifesaving maneuvers to be performed on trauma victims within the first ten minutes of the traumatic insult. These interventions will greatly increase the victim's chances of surviving the event. This ten minute treatment goal is referred to as the platinum ten minutes of trauma care. If interventions can be implemented in the first ten minutes and more definitive care be delivered within the first hour from injury insult, the victim's survival rate increases exponentially (National Association of EMT, 2011).

Blair et al. (2013) found that the active shooter events from 2000 to 2010 resulted in a median law enforcement response time of 3 minutes. Response times are remarkably good. On the contrary, the time of public safety answering point (PSAP) notification of active shooter to active shooter eliminated by death or arrest varied significantly. The majority (73%) of active shooter events were stopped within 9 minutes. Four of the eight outlier events resulted from a barricaded active shooter that took law enforcement over 7 hours to eliminate the threat. With this added perspective, law enforcement agencies across the country have been adding trauma care training to their repertoire. Similar training can be implemented to school workers, factory workers, public venue workers, and essentially any non-medically trained civilians to meet the platinum ten and golden hour benchmarks of trauma care.

The San Antonio Police Department has created a tactical medic program that consists of 40 officers trained and equipped to respond and provide care to injured victims in high risk areas. These specialized officers are providing care to victims until EMS can enter after the scene is deemed safe. In the situations where the PSAP to active shooter elimination time is long, these specialized police officers can reach and treat victims. Trained civilians with the appropriate equipment can achieve the same outcome (Smith, Manifold, & Wampler, 2013).

Civilians in a lockdown area that has victims of an active shooter will need to remain calm and make calculated decisions by weighing the risk versus benefits of rendering medical care. These decisions will increase the likelihood of altering morbidity and mortality from the active shooter event. Once the decision is made to render medical care, treatments need to be focused on immediate life-threatening injuries by simple medical interventions.

Making quick decisions about injuries is important to keep yourself safe and help those that have a high probability of survival versus those that likely will not live. There are many models that can be followed to assist in the decision-making process that allows for quick choices about injuries and treatments. The Simple Triage and Rapid Transport (START) model found in Appendix C is a triage method used by first responders to quickly classify adult victims during a mass casualty incident (MCI) based on the severity of their injury. The method was developed in 1983 by the staff members of Hoag Hospital and Newport Beach Fire Department located in California, and is currently widely used in the United States. The START Triage model flowchart is simple to understand and implement. The key decision-making indicators are easily identified for the non-medically trained responder, making this model ideal to teach and follow (National Association of EMT, 2011).

The JumpSTART (JS) Triage model is an adapted rapid patient assessment for pediatrics. Lou E. Romig MD, a pediatric emergency room and disaster physician at the Miami, Florida Children's Hospital, developed JS to help meet the needs of children and responders at disaster and mass casualty incident scenes. JS is now widely used for primary pediatric MCI triage in the United States and Canada and is gaining popularity around the world (National Association of EMT, 2011).

Basic hemorrhage control is as simple as remembering the pneumonic DEPT. DEPT stands for direct pressure, elevation, pressure point, and tourniquet. An easy to remember bleeding control diagram can be found in Figure 2. Simple maneuvers such as applying pressure with trauma dressings to open, profusely bleeding wounds can slow or even potentially stop a patient from bleeding to death (Califano, 2012)

Recommended algorithm for extremity hemorrhage control Direct Pressure Dressing (Hand) \downarrow Bleeding Controlled No Yes \rightarrow Wait for help \downarrow Pressure Bandage \downarrow Bleeding Controlled No Yes \rightarrow Wait for help \downarrow Tourniquet \downarrow Wait for help, manage shock

Figure 2. Recommended Extremity Hemorrhage Control Figure 2 is a simple flow diagram that highlights the easy to implement steps necessary to stop hemorrhage in extremities.

(Source: Califano, 2012)

Application of tourniquets to injured victims has been found increasingly more reliable at stopping uncontrolled extremity bleeding. Tourniquets are used in surgery everyday for hours at a time to reduce patient bleeding. The possibility of nerve or vascular damage is a better outcome than bleeding to death from a severe extremity injury. Civilian application of tourniquets is not an unreasonable skill to learn. Tourniquets are as simple as placement and turning a mechanism to increase circumferential pressure to stop hemorrhage (Califano, 2012). Civilians can easily be trained to recognize certain types of injuries that can be life-threatening. Injuries to the neck or torso such as stab wounds or gunshot wounds need immediate attention. There is no time to wait for trained medical providers in these cases. Caring for these types of wounds can be done by direct pressure with an occlusive dressing. An occlusive dressing is a different type of bandage that would normally be used to control bleeding. An occlusive dressing is an impermeable dressing that allows pressures within body cavities to be maintained more easily which assists in keeping lungs inflated (Califano, 2012).

Stakeholders closest to victims of active shooter events have numerous interventions that can be performed to reduce morbidity and mortality. These stakeholders are obviously in the most dangerous of positions physically and figuratively. Their actions are going to require training on decision-making, strict organizational oversight through policy and procedures, and organizational buy-in to reduce liability and further risk. Civilians can take relief in knowing that generally there is legal protection when performing these types of actions. The Good Samaritan Law is intended to protect those who choose to serve and tend to others who are injured or ill. These laws are intended to reduce bystanders' hesitation to assist, for fear of being sued or prosecuted for unintentional injury or wrongful death (Princeton, 2013).

To address Blair et al. (2013) highest risk group, schools, these stakeholders need improved emergency operation plans for active shooters. Schools need to adopt and implement definitive and swift actions to mitigate this real threat. Communications need improving for early notifications of an active shooter event in progress. Clear and precise roles and responsibilities need to be addressed in the emergency operations plan. Everyone within a school needs to understand their role and practice their responsibilities. Schools need to build redundancy in implemented systems to ensure operations can continue regardless of circumstances (Smith, 2013).

Question two of this research asks the question, "What are the responsibilities of the stakeholders in this community risk reduction plan?" Stakeholders need to learn at minimum basic first aid. Research has proven that injuries from an active shooter are severe. Basic first aid is a starting point for necessary training, but not the end point. A training program needs to be implemented that incorporates more advanced lifesaving modalities such as tourniquet application, occlusive dressing applications, wound and bleeding control to minimize cellular hypo-perfusion. This training program needs to be implemented in emergency operation plans and trained on regularly. Organizations need to have oversight in policy and procedures. Organizations also need to purchase the necessary equipment to increase the chances of survival in an active shooter event. Giving trained civilians the tools necessary to render care is essential.

Question three of this research asks, "What resources are needed to move the program through the Community Risk Reduction Model?" The resources needed to move this community risk reduction program through the model are both tangible and non-tangible items. Tangible items include training, equipment, and other physical objects that will assist civilians in treating and caring for victims. These items are easily obtainable through the budgetary process.

The more difficult resources that will be required to progress through the Community Risk Reduction Model are those that require organizational change, equity, and culture. One highly successful mechanism for facilitating organizational change in equity and culture involves rewarding people for behaving in the desired fashion. This desired behavior promotes adjustments to new standards, such as adapting with responsibilities by responding to an active shooter event. Organizations that are implementing change can demonstrate a higher success rate and less resistance from personnel by positive reinforcement for desired behavior by utilizing a recognition system. For example, awarding a service medal or ribbon for obtaining a specific benchmark in training is relatively inexpensive, but carries substantial influence on personnel. Awarding of a small token such as a medal or ribbon is a tangible item that demonstrates the inherent desire for personnel to be accepted and wanted within the organization. Personnel that sense the feeling of being wanted are more likely to promote change and reinforce management decisions with positive outcomes (Greenberg, 2010, p. 416).

The fourth research question asks, "What training will be needed to effectively run this community risk reduction program to achieve its end goals? Interestingly, training by civilians to compliment community risk reduction programs has been seen for decades. School teachers in the Cold War ordered their students to duck under desks during nuclear war drills. On a monthly basis, principals have pulled fire alarms in schools to practice and measure the faculty and student response. Earthquake drills forced workers and students alike under solid and substantial objects to avoid injuries. These acts were second nature to participants due to the cultural acceptance and regular practice.

As previously mentioned, the minimum training for this community risk reduction program should be a basic first aid and cardiopulmonary resuscitation (CPR) course. Red Cross First Aid, and automated external defibrillator (AED) training and certification meets the needs of workplace responders, professional rescuers, school staff, and healthcare providers, as well as the general public. These courses provide a certification and a non-certification offering. Generally these courses award a two year certification (Red Cross, 2013).

The American Heart Association also offers a similar first aid, CPR, and AED curriculum. There are online offerings for training in first aid, CPR and AED use. These offerings provide very basic understandings of how to treat simple injuries. While having a basic understanding of treating injuries is important, research shows active shooter inflicted injuries are anything but basic. A training program that encompasses a basic course in first aid, CPR, and AED is not adequate to meet the goal of reducing morbidity and mortality. These courses do provide a starting point for civilians to begin refining more specific life-saving skills that are necessary.

Training must be provided to civilians participating in this community risk reduction program in rapid patient assessment. The START Triage and JumpSTART Triage model was previously mentioned to fulfill this area of need. This training must focus on quick decision-making that centers on patient condition. Quick, simple lifesaving adjuncts can be deployed. If a civilian is in a situation where there are multiple victims, this method can rapidly assess and treat each person.

Training must also be provided in advanced wound care, tourniquet placement, shock management, and coping with death. Each of these categories is important for treating and caring for active shooter victims. Advanced wound care includes following the flowchart found in Figure 2 that moves from direct pressure to tourniquet placement. Controlling bleeding that can be seen is important in slowing cellular hypo-perfusion. Shock management is an ongoing form of patient care that will be accomplished through controlling bleeding, keeping the patient warm and calm until definitive patient care can be obtained. It is important to remember that a 2007 study published in *Prehospital and Disaster Medicine* noted that there is no widely accepted, specialized medical training for police officers, or any other civilians confronted with medical emergencies while under an active threat. The major causes of death to victims of active shooter events are uncontrolled hemorrhage resulting in cellular hypo-perfusion, tension pneumothorax, and airway problems. Each of these can be treated with minimal equipment and training. A customized course is needed to teach basic care under active threats. The course content can be customized based on environment and to meet the specific needs of students (Kastre & Kleinman, 2012).

The fifth research question asks, "What are the potential costs of this community risk reduction program?" This research question is specific to the particular program and how customized the initiative. Potential costs include personnel pay to attend training. This personnel pay could be overtime, which would create more of a financial burden. Other costs include training fees to courses and equipment associated with providing lifesaving maneuvers.

There could also be costs associated with the evaluation phase of the program. If the organization does not have evaluative capabilities, it may be to the best interest of the organization to hire a third party to evaluate their efforts. This type of community risk reduction program is a low frequency, high risk scenario. It is best to be aware of weaknesses before an event occurs. To know weaknesses, third party evaluation gives unbiased perspective and valuable feedback on areas to improve.

Procedures

The goal of these procedures is to gain perspective, collect data, and draw conclusions with the need for a community risk reduction program designed to decrease

morbidity and mortality in victims of active shooter events for the Salem Fire-EMS Department. Descriptive research methodologies are primarily used by the author in this set of procedures. This research focuses on the formative evaluation phase of community risk reduction program design.

The first step in these procedures is to gain perspective of the problem statement: "The problem is Salem Fire-EMS Department does not have a community risk reduction program in place to minimize morbidity and mortality in victims of an active shooter event." In order to shed light on the problem statement, an investigation of resources was conducted at the Learning Resource Center (LRC) at the National Fire Academy in Emmitsburg, Maryland during the two weeks on-campus for the Executive Analysis of Community Risk Reduction (EACRR) course in December of 2013. The investigation of resources at the LRC lead to many books, periodicals, previously conducted applied research projects, and internet sources tied to active shooter events and readiness that ultimately laid the foundation for this research.

The parameters of all search criteria during the investigation at the LRC included no sources older than five years to ensure accuracy in content and the most up-to-date data. A limitation to utilizing only sources no older than five years is the risk of missing a reputable source that exceeds the parameters set forth in these procedures. Even with the five year or earlier rule placed on these procedures regarding references, there was an abundance of material that added value to the content of the research, which presented a time limitation sorting through content. Search criteria included keywords such as "active shooter events," "civilian medical care," "tactical medicine," and "rapid triage and treatment" in order to maintain consistency and accuracy in searches from one platform to another. Further investigatory efforts were made by utilizing medical based textbooks from the author's personal collection. Textbook content varied from basic medical care, rapid triage and treatment, and participant behavior to better understand organizational effectiveness. These textbooks gave academic insight into potential rules and regulations, psychological and physiological impacts that could potentially influence a civilian based medical treatment program that is designed to reduce tragic outcomes in an active shooter event.

The last investigatory effort made to gain perspective of the problem statement of this research was reaching out to public and private organizations through personal contacts to acquire policies, procedures, guidelines, and cost analysis for their active shooter response and similar community risk reduction programs for review. These efforts yielded three separate policies and procedures out of nine formal inquiries of requesting information. This effort gave a 33% rate of return of information to better understand current practices of active shooter response protocols and impacts. All information obtained helps fulfill the purpose of this research, to identify the need for a community risk reduction program that trains civilians to provide rapid triage and treatment for victims in an active shooter event.

Research question one, "Who are the potential stakeholders for this community risk reduction program?" was explored using the criterion developed in 1997 by Ronald Mitchell, Bradley Agle, and Donna Wood. Their criterion was developed to identify who were legitimately stakeholders and who really counts based on terms more than just power and legitimacy. Historically, there were numerous definitions of who stakeholders were. Each definition was either broad and inclusive or narrow and pragmatic. Mitchell, Agle, and Wood's research focused stakeholder identification on three criterions to include power, legitimacy, and urgency (Mitchell et. al, 1997).

In terms of stakeholder identification, power can be defined as the extent to which a party has or can gain access to coercive (physical means), utilitarian (material means) or normative (prestige, esteem and social) means to impose their will (Etzioni, 1988). Urgency is defined as the degree to which stakeholder claims call for immediate attention. The degree depends not just on time sensitivity, but also on how critical the relationship is with the stakeholder or the importance of their claim. The more characteristics a stakeholder encompasses, the more power, legitimacy, and urgency is perceived. In other words the greatest priority will be given to stakeholders who have power, legitimacy, and urgency (Mitchell et. al, 1997).

A stakeholder analysis matrix was used to realize the interests and influence of those stakeholders that could potentially be involved with this community risk reduction program. The stakeholder analysis matrix was designed to display each person (or group's) interest in the community risk reduction program. The stakeholder analysis matrix was also created to show where interests converge, the level of influence, and who will benefit from this community risk reduction program. The benefit of the stakeholder analysis matrix shows the outset of new projects and when projects change directions. Because this community risk reduction will continually change based off of many extrinsic and intrinsic factors such as new threats, changes in frequency, location of active shooter events, and new interest groups, these matrices are easily adaptable.

Creating these simple matrices requires a pen and some paper, or a word processing program such as Microsoft Word. This exercise is best performed with team members. Inclusion of team members in stakeholder identification can build organizational buy-in to the community risk reduction program through active participation. The first step in building these matrices is to make a list of anyone whom has interest or influence over this community risk reduction program. Examples of stakeholders may be teachers, industry workers, vendors of medical equipment, trainers, law enforcement, etc. This stakeholder analysis matrix was designed using the high risk groups within the City of Salem found in Table 1. Once the community risk reduction program stakeholder analysis matrix is created, the formative team can then use this list to weigh the influence of each person based on Mitchell et al. (1997) research on power, legitimacy, and urgency criteria.

To create the matrices, draw a box divided into four equal quadrants. Take care to make this box large enough to fit in the various stakeholders when it is the appropriate time. Divide each quadrant into fourths again. The matrix should now have sixteen quadrants. Label down the left side starting at the top with "Significant Importance," "Some Importance," "Little Importance," "No Importance." Label across the top starting at the left with "Significant Influence," "Some Influence," "Little Influence," "No Influence." Begin to organize identified stakeholders according to importance and influence using the power, legitimacy and urgency guidelines. Appendix D is an example of the stakeholder analysis matrix that was used in the formative phase of program design for this community risk reduction initiative.

When this exercise is complete, the matrix will be a graphic display of who holds the most importance and influence (the group in the upper left-hand corner) and who holds the least amount of influence and importance (the group in the lower right-hand corner). Those in the high importance and influence category will be the first ones to

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receive the community risk reduction program training since they carry the most power, legitimacy, and urgency in the direction of the program.

Identifying stakeholders is not without its limitations. Depending on the scope and size of a community risk reduction program with the intent to reduce morbidity and mortality of active shooter events, the number of stakeholders can be quite large. Sifting through all possible stakeholders using the stakeholder analysis matrix can be time consuming and cumbersome. It is also important to realize that a significant limitation to identifying stakeholders will be the fact that members of the formative team that are tasked with analyzing the matrices will have different opinions on respective levels of power, influence, and urgency. As a formative team in the beginning stages of the program design and evaluation phase, reaching consensus on stakeholder's value will be difficult to achieve. This will add time and a need for individual team member cooperation to the process.

Research question two asks, "What are the potential stakeholders expected to do in this community risk reduction program?" This research question was answered by visiting a local elementary school during their faculty meeting one afternoon. This school set aside nearly an entire faculty meeting to discuss the research findings and allow this researcher to gain perspective from an identified high risk group on active shooter events.

The civilian response to injured victims of an active shooter concept was discussed with the faculty in detail. Careful attention was taken to highlight the data from past research that makes City of Salem schools a high hazard area for an active shooter event. Further detail was taken to explain the need for immediate medical 35

attention and care to victims of active shooter events. The golden hour and platinum ten minutes of trauma were defined and discussed.

The faculty was then engaged in forming specific, measurable, achievable, realistic and time-targeted (SMART) goals and objectives that will define a school-based response to victims of active shooter events. The visit to this elementary school was to create a think-tank environment that allowed for idea exchange between faculty and the program formative team member. The SMART goals and objectives were discussed in terms of what the faculty thought was good for this community risk reduction program to be successful. The faculty discussed what they were willing to do in terms of training, actual interventions, and ongoing evaluation efforts.

The criteria for all ideas in terms of what the stakeholder faculty were expected to do in this community risk reduction program had to be specific. Ideas that were passed forward had to have measurable objectives that forwarded a reasonable expectation for faculty to achieve. The ideas that the faculty gave had to be time-targeted that met the expectations in trauma management of patients in need of care.

Some limitations that were encountered with this method of fact gathering and idea sharing were the scope of several ideas. Several ideas that were shared from faculty to the formative team member were abstract and didn't fit into the scope of this community risk reduction program. On the contrary, some ideas that were shared in reverse fashion were not received well by the faculty. Some faculty members shared their concern that some of the interventions that are being suggested in the formative phases of this community risk reduction program are too advanced and require more training than a basic first aid course with modifications.
This limitation is consistent with a think-tank idea sharing session. There will be advocates for the community risk reduction program and there will be opponents of the program. The goals should be consistent. This was achieved by using the SMART objects and goals method.

Research question three asks, "What resources are needed to move the proposed program through the Community Risk Reduction Model?" This research question was answered by allowing three separate medical supply vendors to recommend the best products to meet the identified SMART goals and objectives of this community risk reduction program identified in the second research question.

These vendors were contacted by phone through their respective local sales representatives. Each company was given the background and significance for this community risk reduction program. The local sales representatives were then reminded that any product they discussed had to fit into one of the SMART objectives that was identified by the faculty from research question two. They were then given the opportunity to offer and discuss the products their company has that will enhance the following areas as it relates to this community risk reduction program.

Limitations to this mode of research are the abundance of equipment and ideas these sales representatives offered. Some of the equipment and training that was mentioned are for advanced medical providers, not civilian responders providing basic life supporting interventions. The sales representatives were reminded that the goal of this program is to provide care to victims of active shooter events by civilians. These civilian responders are trying to meet the criteria of the platinum ten minutes and golden hour of trauma care with little medical training and equipment. Another limitation to this research question was realized from training vendors. Most training programs that teach basic first aid will not deviate from their curriculum. The owner of the curriculum has designed the training around sound medical practices. The training has been authenticated by legal representatives to reduce liability. Deviation from this curriculum by instructors is strongly prohibited.

Research question four asks, "What training will be needed to effectively run this community risk reduction program to achieve its end goals?" A group-administered survey was utilized to accomplish respondent input.

A group-administered survey is completed by individual respondents assembled in a group. In this research environment, the faculty at the local elementary school referenced in research question two was surveyed to elicit responses regarding their training needs. The group's attention was captured in an afternoon faculty meeting. This technique allowed for 100%, or 26 out of 26, faculty members that were present to be surveyed. By conducting this research in the format described, it allowed for easy negotiating of a limitation to group-administered research, the lack of a captive audience. This format captured a quick glance from an identified high risk group in terms of their training needs to respond to victims of active shooter events.

Another limitation to group-administered surveys is the risk of creating bias during the instrument delivery. Simply saying or acting in a specific manner while administering a group survey can influence the respondents. To overcome this limitation a standard introductory statement was read to the group that expressed appreciation for their participation, described the steps of the survey, and emphasized that the survey is not the same as a test. Special attention was given to emphasize that the groupadministered survey was optional to each individual. By giving the respondents the option to take the survey reduced the chance of their feeling of coercion and therefore will increase the likelihood of more honest answers to the supplied survey instruments.

The group-administered survey was created with a word processing computer program, with multiple hardcopies being printed off for delivery to the respondents. The group-administered survey instrument can be found in Appendix E for further details and review.

Research question five asks, "What are the potential costs of this community risk reduction program?" This research question was answered by contacting medical supply vendors, training supply vendors, and utilizing cost analysis models to gain insight into potential pricing. This cost benefit analysis can be found in Appendix F for further review. It is important to remember that in the formative phase of the Program Planning and Evaluation Framework, found in Appendix A, all work is designed to predict the resources necessary to further implement the program. It is the formative team's responsibility to develop materials, training, and conduct pilot testing. Once these steps are complete, redefined goals, objectives, and interventions can be implemented and definitive resources can be budgeted.

A limitation to research question five is the realization that the program concept is in the infancy stages of the formative evaluation. The formative team has not been created. Therefore the team has not determined exact measurable objectives, and most importantly the team has not pilot tested the program to determine what refining needs to occur to make the effort successful. This notion leads to the limitation that narrowing down an exact cost is premature. What is measurable is an approximate cost that can be used to negotiate budgets and fulfill the intervention strategies of the Community Risk Reduction Model found in Appendix B.

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The cost analysis versus benefit is an important phase of the intervention strategies of the Community Risk Reduction Model. It is this point in the model that the formative team sees fiscal and risk reduction benefits merge or veer apart from each other. If the risk reduction and the fiscal benefits work, the cost analysis is going to be in favor of the program. If the cost outweighs the benefits, the risk reduction effort will likely fail. It is important for the formative team to predict a solid cost analysis to gain insight to negotiate the remaining steps of the Community Risk Reduction Model.

The cost analysis was performed by first identifying essential equipment that can be deployed in a single instance of this community risk reduction program. It is important that the cost analysis scale is consistent to achieve a fair and measureable outcome. All cost analysis was performed by computing the price of a single unit for each item of this program. The single unit model allows for participants to scale the initiative to their needs by simply multiplying the resources by how many units will be needed in their application of the program.

An example of scaling the program units can be found in a single elementary school application. In this hypothetical scenario a trauma supply kit that will be assembled and placed into a classroom will cost the school system \$100.00 for each kit. That single elementary school can then decide to what scale they can afford to install this community risk reduction program. If the elementary school system has complete buy-in to the program and finances were not a limiting factor, they can deploy the trauma kits to each classroom, public areas such as the gymnasium, foyer, office spaces, etc. That elementary school can then assign an exact number to the cost of the program. If the kits to only classrooms, or only common areas. The configurations of this program are endless and customizable based on budget.

The steps to conduct the cost benefit analysis are sequential in nature. The first step is to identify and quantify all costs associated with this community risk reduction program. Step two of the analysis is to make a list of all items that will cost money. Items should include everything that will be encumbered during the implementation strategies and throughout the duration of the community risk reduction program. These include needed medical equipment, certification fees, course delivery materials, payroll expenses, participant fees, training, and travel expenses among others.

Next, create a cost analysis list of all items that are non-monetary in nature. This list could contain impact to life, safety, security of citizens in terms of quality of life to name a few. This step requires thought and time. Assigning non-monetary values can best be completed within the formative team once it is established. The more insight into this portion of the cost benefit analysis, the less likely an item will go unclaimed. As previously mentioned, the non-monetary cost analysis poses a limitation to measuring costs. The community risk reduction initiative is early in the formative phase of program design. The scale, scope, and reach of the program have yet to be determined. Measuring non-monetary costs in terms of impact is essentially impossible at this point.

Next, assign dollar figures to the costs identified in the first two steps. It is important to ensure the cost benefit analysis utilizes a single standard of measure. For this to occur, the standard measure will be in terms of dollars. Dollars will be assigned to one unit of each needed item. This unit of measure will be the cost for implementation for that needed item. That is one first aid kit, one student, one instructor, etc. This unit of measure may not be applicable in all line items. If accurate cost values cannot be determined, use similar models to make educated and accurate decisions to get as close as reasonably possible. More accurate cost benefit analysis will be delineated in the ongoing evaluative process.

Lastly, to measure cost, add all anticipated expenditures together to get a total expense value of this community risk reduction program. This first expense value for costs is an estimate that will be used in the preliminary presentations to chiefs, first participants, and any other stakeholder in the program approval process. A more exact cost benefit analysis will be ongoing as the program yields more precise needs.

The next portion of the cost benefit analysis is to measure stakeholder benefits. This can be done by first identifying and making a list of all potential realized benefits of this community risk reduction program.

First, begin by making a list of all benefits that cost money that will be realized during the implementation and evaluation phases of the community risk reduction program. These benefits include any potential income from the program.

Next, make a list of all non-monetary benefits that stakeholders are going to realize by this community risk reduction program. These non-monetary benefits will most likely be a feeling of increased sense of safety and security among others. Assigning non-monetary values can best be completed within the formative team. The more insight into this portion of the cost benefit analysis, the less likely an item will go unclaimed. A limitation to this measurement is simply the notion that there are no similar non-monetary benefits because of the originality of this community risk reduction program. The non-monetary benefits have yet to be realized.

Next, assign dollar figures to the benefits identified in the first two steps. It is important to remember the cost benefit analysis utilizes a single standard of measure. For

this to occur, the standard measure will be in terms of dollars. Dollars will be assigned to one unit of each needed item. This unit of measure will be the cost for implementation for one unit. This unit of measure may not be applicable in all line items. If accurate cost values cannot be determined, use similar models to make educated and accurate decisions to get as close as reasonably possible. More accurate cost benefit analysis will be delineated in the ongoing evaluative process.

Lastly, to measure benefit, add all anticipated benefits together to get a total expense value of this community risk reduction program. This first expense value for benefits is an estimate that will be used in the preliminary presentations to chiefs, first participants, and any other stakeholder in the program approval process. A more exact cost benefit analysis will be ongoing.

The final step when creating a cost benefit analysis is to weigh the costs and benefits to determine if the community risk reduction program is worthwhile. The following steps are offered to complete the cost benefit analysis. First, it is necessary to compare the total costs and total benefits that were discovered in the first two portions of the analysis. The results can simply be interpreted in a comparison of cost versus benefit. When the total costs are much greater than the total benefits, the City of Salem can make an educated decision that the community risk reduction effort is not worthwhile in terms of time, resources, and effort.

On the contrary, when the total benefits are much greater than the total costs, the City of Salem can conclude that the proposed community risk reduction program is potentially a worthwhile investment and should be further evaluated as a realistic opportunity to reduce morbidity and mortality in victims of active shooter events.

Results

The purpose of this research is to identify the need for a community risk reduction program that trains civilians to provide rapid triage and treatment for victims in an active shooter event. This data will attempt to demonstrate a need for a community risk reduction program designed to reduce morbidity and mortality in victims of an active shooter event in the City of Salem. To achieve the identified purpose statement, five questions were the main focus of the research. Descriptive research methods were used in the form of surveys, question and answer sessions, and interviews of potential vendors.

The first research question, "Who are the potential stakeholders for this community risk reduction program?" was investigated by a stakeholder analysis matrix found in Appendix D. Mitchell, Agle, and Wood's model of stakeholder identification was used to focus on three criterions that focus on power to initiate this program, legitimacy in terms of need for this program, and urgency to implement this program (Mitchell et. al, 1997).

Early stakeholder identification prior to formation of the formative team included City of Salem Public Schools as the most urgent and legitimate starting point to initiate this community risk reduction program. The public school's power to initiate this community risk reduction program is quite significant. The school superintendent has to achieve buy-in and issue a mandate to all faculties. This level of influence makes initiation of the program less cumbersome. The City of Salem School System was identified to fall into the *significant influence, significant importance* category on the matrix.

Roanoke College has a significant need for a similar program. Their urgency is high based on previous statistical data and research. The power to implement this

community risk reduction program is similar to the public school system. The main difference is the level of funding that is required. Roanoke College is a for-profit, private liberal arts school. The college is money driven, thus making implementation more heavily dependent on cost. Roanoke College falls into the *some influence, significant importance* category on the matrix.

The next focus group of stakeholders was daycares. Daycares in the City of Salem have significant importance in terms of this community risk reduction program. Their potential to influence the goals of this community risk reduction program are minimal. The power to influence is strong. The daycare directors can initiate the program and implement easily. The urgency for daycares to initiate this community risk reduction program is at moderate levels based on past research and data. Past research has demonstrated that there have been few daycare active shooter events. Legitimacy shows that daycares are for-profit businesses that must watch their ledgers closely. Therefore, daycares fall into the *some influence, some importance* category of the stakeholder analysis matrix.

The next identified stakeholders are the factory and warehouse facilities within the City of Salem. These include Yokohama, General Electric, U.S. Food Service, Novozymes, Kroger, and Wal-Mart to name a few. These businesses share similar legitimacy to the program. They do show a need for the program based on past research and data. Their urgency is similar in terms of frequency of active shooter events from a historical perspective found in research and data. Their power to influence the goals of the program is minimal. Each of these corporations are profit driven and must maintain sound profit margins. Their budgets for training are finite and often set for up to a year at a time. Convincing their respective finance departments and corporation leaders to implement a pilot program is unlikely. This is especially true for programs that aren't mandated by governing bodies such as the Occupational Safety and Health Administration (OSHA). Therefore, manufacturing and factory environments in the City of Salem demonstrate *little influence, some importance* to the program.

The last stakeholder group that was identified in the matrix is the public venue settings. These settings are numerous in the City of Salem. The city has public venues that range from a professional baseball stadium, to a large civic center, to open air festivals. This factor alone makes the influence on this community risk reduction program minimal. The complexity to implement this program to key people in these environments is a challenge due to the inconsistency in personnel presence at each event. The power to incorporate this community risk reduction program is also minimal. These venues are traditionally city ran with set budgets. Installation of this program would take time and consideration in the budget cycle. These venues do show a moderate level of urgency based on previous research and data in terms of frequency of active shooter events. Therefore, public venues were found to have *little influence, little importance* on the matrix.

The second research question, "What are the potential stakeholders expected to do in this community risk reduction program?" was answered by visiting a local elementary school during their faculty meeting one afternoon. This school set aside nearly an entire faculty meeting to discuss the research findings and allow this researcher to gain perspective from an identified high risk group on active shooter events.

The faculty was then engaged in forming specific, measurable, achievable, realistic and time-targeted (SMART) goals and objectives that will define a school-based response to victims of active shooter events. The visit to this elementary school was to create a think-tank environment that allowed for idea exchange between faculty and the program formative team member. The SMART goals and objectives were discussed in terms of what the faculty thought was good for this community risk reduction program to be successful. The faculty discussed what they were willing to do in terms of training, actual interventions, and ongoing evaluation efforts.

The results of this research tool found SMART goals and objectives to include providing all school employees basic first aid and CPR training from a certifying entity. This can be measured by simply completing the program and obtaining a certification card. This SMART goal can then be maintained by recertification at the end of the certification period for an ongoing training program.

The next SMART goal and objective identified is the need to review the current school system's emergency response plan, in particular the response to active shooter events. This can be measured by implementing policy for mandatory review training sessions that covers the information on faculty response to active shooter events. This should be accomplished annually at the beginning of each school year.

A SMART goal was discussed that included the need for having first aid kits in key locations throughout the school. The goal was set to place first aid kits containing trauma dressings, occlusive dressings, tourniquets, and other wound care products in each classroom, large gathering areas, and the office of the school. This can be measured by achieving the placement of each first aid kit by the beginning of next school year.

The last SMART goal and objective was identified to create a policy on advance training for staff members of this school to respond and treat injured victims of an active shooter event. This policy should focus on training that includes tourniquet application, advance wound care, shock management, rapid victim assessment, and refined decisionmaking skills. This policy should be completed and budgeted before the next school year.

The third research question asks, "What resources are needed to move the proposed program through the Community Risk Reduction Model?" This research question was answered by allowing three separate medical supply vendors to recommend the best products to meet the identified SMART goals and objectives of this community risk reduction program identified in the second research question.

The results of this research instrument yielded three competitive pricing guidelines to assist in the cost analysis process for each participating stakeholder. In comparing similar products, these medical tools were identified by all three vendors as necessary for medical care of victims in an active shooter event. The first item identified by all three vendors is tourniquets. Vendors offered three choices for easy to apply tourniquets. Those tourniquets that were identified are the Mechanical Advantage Tourniquet (MAT), SOF Tactical Tourniquet, and the Military Emergency Tourniquet (MET).

The next item identified by vendors as a needed item for a first aid kit designed for response to an active shooter event was trauma dressings. Each vendor offered similar products that ranged from dressings in sizes 4" x 4", 5" x 9", and 12" x 30." These trauma dressings are made by multiple manufactures and can be ordered through each of the vendors interviewed.

Vendors suggested cloth tape is needed to hold dressings in place. In addition to cloth tape, roller gauze in two inch and three inch widths are a good idea for application in an active shooter event. Roller gauze is easily deployed and has multiple functions to include holding larger dressings in place. Occlusive dressings were discussed by each vendor. Several options for occlusive dressings were identified. Vaseline gauze was the consistent offering by all three vendors. The Vaseline gauze offers advantages such as ease of application, cost effective to purchase, and easily stored. These bandages are essential for wounds to the thoracic areas of victims.

Each vendor also suggested a functional bag to keep all of the equipment in one place and together. Each vendor offered different bags. The bags were all made of woven polyester fabric that has backpack style straps and is easily carried from one location to another.

The fourth research question asks, "What training will be needed to effectively run this community risk reduction program to achieve its end goals?" A groupadministered survey was utilized to accomplish respondent input. The groupadministered survey was completed by individual respondents assembled in a group. In this research environment, the faculty at a local elementary school was surveyed to elicit responses regarding their training needs. The group's attention was captured in an afternoon faculty meeting. The technique allowed for 100%, or 26 out of 26, faculty members that were present to be surveyed.

Survey instrument one of Appendix E was used to gain insight to the respondent's knowledge of their school emergency response plan to an active shooter event. Interestingly, 38.5%, or 10 of 26 of the respondents, stated that they did in fact know their school's emergency response plan to active shooter events. On the contrary, 61.5%, or 16 of 26 respondents, were unfamiliar with their school's emergency response plan to active shooter events. Finally, 0.0%, or 0 of 26 respondents, was unsure of their school's emergency response plan to active shooter events. Figure E1 in Appendix E illustrates survey instrument one results.

Survey instrument two of Appendix E addressed the schools past training to its faculty. The second survey instrument focused on previous first aid training. Survey instrument two of Appendix E revealed that 15.4%, or 4 of 26 respondents, on hand had received some form of first aid training from their school in the past. The rate of respondents that replied *no* was 84.6%, or 22 of 26 respondents. The *unsure* replies accounted for 0.0%, or 0 of 26 responses. Results of instrument two are illustrated by Figure E2 in Appendix E.

Survey instrument three of Appendix E addressed the schools past training to its faculty in terms of CPR. This survey instrument was intended to measure the baseline level of training by faculty to assist in a needs analysis. The third survey instrument in Appendix E showed 100%, or 26 out of 26 respondents had been trained in CPR. This finding was attributable to the new Virginia Department of Education standard that requires CPR training for all school faculties to obtain original licensure and re-licensure. These findings were not a surprise. Results of instrument three are illustrated by Figure E3 in Appendix E.

Survey instrument four of Appendix E was used to gain perspective regarding baseline training that this faculty has experienced. Survey instrument four asked about previous first aid training received outside of the respondent's school. Survey instrument four found that 69.2%, or 18 out of 26 respondents had received first aid training outside of their school. This survey instrument also showed that 15.4%, or 4 out of 26 respondents, have not received first aid training outside of their school offering. This left 15.4% or 4 out of 26 respondents unsure if they had received first aid training outside of

their school offerings. Results of instrument four are illustrated by Figure E4 in Appendix E.

Survey instruments five of Appendix E was used to gain perspective regarding baseline training that this faculty has experienced. Survey instrument five asked about previous CPR training received outside of the respondent's school. Survey instrument five found that 88.5%, or 23 out of 26 respondents had received CPR training outside of their school. This survey instrument also showed that 11.5%, or 3 out of 26 respondents, have not received CPR training outside of their school offering. This left 0.0%, or 0 out of 26 respondents unsure if they had received CPR training outside of their school offering. This left 0.0%, or 0 out of 26 respondents unsure if they had received CPR training outside of their school offering. Results of instrument five are illustrated by Figure E5 in Appendix E.

Survey instrument six of Appendix E asked the faculty of this elementary school if they had previously received training of any kind on rapid victim medical assessment. The results of this survey instrument were 0.0%, or 0 out of 26 respondents, had received this type of medical training. On the contrary, 92.3%, or 24 out of 26 respondents, answered this research instrument *no*, they have never received this type of training. Lastly, 7.7%, or 2 out of 26 respondents, were unsure if they had received training on rapid victim medical assessments. Results of instrument six are illustrated by Figure E6 in Appendix E.

Survey instrument seven of Appendix E asked the faculty of this elementary school if they are familiar with the Good Samaritan Law as it applies to rendering medical care to a sick or injured person other than themselves. The results of this survey instrument were 32.0%, or 9 out of 26 respondents, were familiar with the Good Samaritan Law and its implications. On the contrary, 42.3%, or 11 out of 26 respondents, answered this research instrument *no*, they have never heard of the Good Samaritan Law.

Lastly, 23.1%, or 6 out of 26 respondents, were unsure if they had heard of the Good Samaritan Law. Results of instrument seven are illustrated by Figure E7 in Appendix E.

Survey instrument eight of Appendix E asked the faculty of this elementary school if they had ever received training in applying a tourniquet to an injured and bleeding extremity. The results of this survey instrument were 15.4%, or 4 out of 26 respondents, had received prior training in tourniquet application. On the contrary, 65.4%, or 17 out of 26 respondents, answered this research instrument *no*, they have never heard received training on tourniquet application. Lastly, 19.2%, or 5 out of 26 respondents, were unsure if they had received training in tourniquet application. Results of instrument eight are illustrated by Figure E8 in Appendix E.

Survey instrument nine of Appendix E asked the faculty of this elementary school if they would be willing to render medical care to a victim of an active shooter event if they had proper training and equipment. The results of this survey instrument were 23.1%, or 6 out of 26 respondents, were willing to provide care to a victim of an active shooter event if properly trained and equipped. On the contrary, 23.1%, or 6 out of 26 respondents, answered this research instrument *no*, they would not help an injured victim of an active shooter event. Lastly, 53.8%, or 14 out of 26 respondents, were unsure if they would help a victim of an active shooter event if trained and equipped. Results of instrument nine are illustrated by Figure E9 in Appendix E.

Survey instrument ten of Appendix E asked those faculties of this elementary school that answered "*yes*" to survey instrument nine, what interventions would they be willing to perform on a victim of an active shooter event. The results of this survey instrument were 100%, or 6 out of 6 respondents, were willing to perform a rapid victim medical assessment. Next, 100%, or 6 out of 6 respondents, said they would be willing to

apply direct pressure to bleeding wounds. Tourniquet application to an injured and bleeding extremity received, 100%, or 6 out of 6 respondents, agreeing they would deploy this tool if needed in an active shooter event. Opening an airway of a victim received 100%, or 6 out of 6 respondents answering they would perform these techniques on a victim of an active shooter event. Finally, 100%, or 6 out of 6 respondents, said they would apply advance bandages to wounds if required. Results of instrument ten are illustrated by Figure E10 in Appendix E.

The fifth research question asks, "What are the potential costs of this community risk reduction program?" This research question was answered by contacting medical supply vendors, training supply vendors, and utilizing cost analysis models to gain insight into potential pricing. Using the medical supplies that were identified in research question three, a cost analysis was compiled. This cost analysis can be found in Appendix F.

The tourniquets suggested by the medical supply vendors were the MAT, SOF Tourniquet, and MET. The cheapest of the three vendors priced the MAT Tourniquet at \$36.29 each. The cheapest SOF Tourniquet was priced at \$38.49 each. The cheapest MET Tourniquet was priced at \$56.99 each.

The bandages suggested by the medical supply vendors were in sizes 4" x 4", 5" x 9", and 12" x 30." The cheapest price on 4" x 4" bandages found was \$13.29 for a box of 100. This price equates to \$0.13 each. The vendor recommended having a box of 100 4" x 4" bandages in each trauma kit. The 5" x 9" bandages were lowest priced at \$79.84 for a box of 40. This price equates to \$1.99 each. The vendor recommended having at minimum 10- 5" x 9" bandages in the trauma kit. The 12" x 30" trauma dressings were

lowest priced at \$55.50 for a box of 25. This price equates to \$2.21 each. The vendor recommended having at minimum 5- 12" x 30" trauma dressings in the trauma kit.

Other items suggested by the medical supply vendors included cloth tape, two inch, and three inch roller gauze. Cloth tape in two inch width was cheapest at \$205.92 for a box of 72 rolls. This price equates to \$2.86 a roll. The vendor recommended at minimum 3- two inch rolls of tape in the trauma kit. The two inch roller gauze was priced at \$9.79 for a box of 12. This equates to \$0.82 per roll. The three inch roller gauze was priced at \$11.99 for a box of 12. This equates to \$1.00 a roll. The vendor recommended 10- two inch roller gauze and 10- three inch roller gauze in the trauma kit.

The next items priced were occlusive dressings. Vaseline gauze was identified as the resource needed to have an occlusive dressing. The cheapest price obtained for an occlusive dressing was \$31.76 for a box of 25. This price equates to \$1.27 per bandage. The vendor recommended having at minimum five occlusive dressings in the trauma kit.

Bags to store all of this medical equipment ranged from fairly inexpensive to expensive. Each medical supply vendor offered different bags with different capabilities. The cheapest bag was \$37.89 for one. The most expensive bag was priced at \$134.27 for one.

In terms of training, vendors offered a basic first aid course for \$35.00 per person. This first aid course was a basic introduction to first aid only. The same vendor offered a combination basic first aid and CPR training for \$60.00 per person.

A complete pricing guide and cost analysis for these items can be found in Appendix F. All items were priced for one to simplify the cost analysis process. This also allows scaling of the program more easily by users.

Discussion/Implications

The first research question, "Who are the potential stakeholders for this community risk reduction program?" found that the results were consistent with prior research done by Blair et al. in 2013. The research question utilized a stakeholder analysis matrix to identify those at the highest risk for an active shooter event to occur. Mitchell, Agle, and Wood's model of stakeholder identification was used to focus on three criterions that included power to initiate this program, legitimacy in terms of need for this program, and urgency to implement this program (Mitchell et. al, 1997). Blair et al. (2013) found that schools had the highest frequency of active shooter events from 2000 to 2010. The highest risk group identified within the City of Salem was the public school system.

The public school system was found to have *significant influence* and *significant importance* as it relates to this community risk reduction program aimed at reducing morbidity and mortality of active shooter events. The school system has a tentative audience; they can easily implement the program into their annual in-service trainings. They currently have mandates in place for CPR training at the state level. The school system can achieve the greatest impact in the least amount of time and resources.

The Salem Fire-EMS Department should within the formative team create this community risk reduction program designed for the school system first. Special attention should be given to parameters set by the school system. These parameters should be integrated into the identified goals and objectives that the formative team will be tasked to set.

The second research question, "What are the potential stakeholders expected to do in this community risk reduction program?" This research question was answered by visiting a local elementary school during their faculty meeting one afternoon. This school set aside nearly an entire faculty meeting to discuss the research findings and allow this researcher to gain perspective from an identified high risk group on active shooter events.

The research method discovered consistency in that the school system does have an emergency response plan in place to respond in certain situations. The school system does not place emphasis on training on this emergency response plan routinely. This is consistent with Bill Lowe's research that found most schools are ill-prepared for an active shooter scenario. He further explains that the need for employing mechanisms to stop active shooters in schools is as essential as a school librarian. Employing key personnel that are essential for the safety of students and faculty are paramount and should not be the first budget items cut from ledgers each fiscal year (McKay, 2013).

The meeting with the faculty at this elementary school yielded SMART goals and objectives that will be valuable for the Salem Fire-EMS Department Formative Team as they advance past the formative phase of the Program Planning Framework. The team can use these SMART goals and objectives to frame the content and mold the program to the needs of the school system and other potential users.

The third research question asks, "What resources are needed to move the proposed program through the Community Risk Reduction Model?" This research question was answered by allowing three separate medical supply vendors to recommend the best products to meet the identified SMART goals and objectives of this community risk reduction program identified in the second research question.

This research question focused on monetary objects that can be purchased to set the community risk reduction program up for success. These items are mainly medical products that can be deployed in an easy to grab, easy to use trauma kit. The objective with these items is to reduce tragic outcomes in victims of active shooter events. It is important to remember the goal of the content of this community risk reduction effort will be to reduce morbidity and mortality in active shooter events by controlling factors that cause death such as hemorrhage and shock. The Prehospital Trauma Life Support (PHTLS) Manual recommends lifesaving maneuvers are performed on trauma victims within the first ten minutes of the traumatic insult. These interventions will greatly increase the victim's chances of surviving the event. This ten minute treatment goal is referred to as the platinum ten minutes of trauma care. If interventions can be implemented in the first ten minutes and more definitive care be delivered within the first hour from injury insult, the victim's survival rate increase exponentially (National Association of EMT, 2011).

The resources needed to move this community risk reduction program through the model are both tangible items and non-tangible items. Tangible items include training, equipment, and other physical objects that will assist civilians in treating and caring for victims. These items are easily obtainable through the budgetary process.

The implications that challenge Salem Fire-EMS Department are the more difficult resources that will be required to progress through the Community Risk Reduction Model are those that require organizational change, equity, and culture. One highly successful mechanism for facilitating organizational change in equity and culture involves rewarding people for behaving in the desired fashion that promotes adjustments to new standards, such as adapting to new responsibilities or responding to an active shooter event. Organizations that are implementing change can demonstrate a higher success rate and less resistance from personnel by positive reinforcement for desired behavior by utilizing a recognition system. For example, by awarding a service medal or ribbon for obtaining a specific benchmark in training is relatively inexpensive, but carries substantial influence on personnel. Awarding a small token such as a medal or ribbon is a tangible item that demonstrates the inherent desire for personnel to be accepted and wanted within the organization. Personnel that sense the feeling of being wanted are more likely to promote change and reinforce management decisions with positive outcomes (Greenberg, 2010, p. 416).

The fourth research question asks, "What training will be needed to effectively run this community risk reduction program to achieve its end goals?" A groupadministered survey was utilized to accomplish respondent input. The respondent input measured baseline levels of training that a particular elementary school had within their faculty. This data was used to gain a snapshot of where training is currently, and where training will need to go in the future. The implications of this data to Salem Fire-EMS Department are molding the content of this community risk reduction program around stakeholder needs.

It appears the faculty of this elementary school has varying levels of training as it pertains to basic first aid, CPR, rapid victim medical assessment, and effective decisionmaking in high stress environments. Understanding the baseline levels that exists reinforces the need to establish common training for all stakeholders. That is, all stakeholders should receive the same training regardless of their baseline level of knowledge. This will assist in a common message, and a common set of goals and objectives.

As previously mentioned, the minimum training for this community risk reduction program should be a basic first aid and cardiopulmonary resuscitation (CPR) course. Red Cross First Aid and automated external defibrillator (AED) training and certification meet the needs of workplace responders, school staffs, professional rescuers and healthcare providers, as well as the general public. These courses validate learning through a certification and a non-certification option. Generally these courses award a two year certification (Red Cross, 2013).

Training must be provided to civilians participating in this community risk reduction program in rapid patient assessment. The START Triage and JumpSTART Triage model was previously mentioned to fulfill this area of need. This training must focus on quick decision-making that centers on patient condition. Quick, simple lifesaving adjuncts can be deployed. If a civilian is in a situation where there are multiple victims, these learned skills can assist in rapidly assessing and treating each victim.

Training must also be provided in advance wound care, tourniquet placement, shock management, and coping with death. Each of these categories is important for treating and caring for active shooter victims. Advance wound care includes following the flowchart found in Figure 2 that moves from direct pressure to tourniquet placement. Controlling bleeding that can be seen is important in slowing cellular hypo-perfusion. Shock management is an ongoing form of patient care that will be the accomplished through controlling bleeding, keeping the patient warm and calm until definitive patient care can be obtained.

The fifth research question asks, "What are the potential costs of this community risk reduction program?" This research question was answered by contacting medical supply vendors, training supply vendors, and utilizing cost analysis models to gain insight into potential pricing. Using the medical supplies that were identified in research question three, a cost analysis was compiled. This research method is a preliminary view of the potential costs of this community risk reduction initiative. This cost benefit analysis is difficult to complete due to the early phase of program planning and design. It is difficult to put pricing on non-monetary costs and benefits when those benefits have yet to be identified by the Salem Fire-EMS Department Formative Team.

The implications of this research questions will cause the formative evaluation process that the team will undergo to constantly update the cost benefit analysis to give the stakeholders a realistic look at the cost versus benefits of participating in this community risk reduction program.

It is necessary in this community risk reduction program cost benefit analysis to evaluate the benefit of saving human lives. There is considerable antipathy in the general public to the idea of placing a dollar value on human life. Economists recognize that it is impossible to fund every project which promises to save a human life and that some rational basis is needed to select which projects are approved and which are turned down.

The controversy is defused when it is recognized that the benefit of such projects is in reducing the risk of death. There are many cases in which people voluntarily accept increased risks in return for higher pay. These choices can be used to estimate the personal cost people place on increased risk and thus the value to them of reduced risk. This computation is equivalent to placing an economic value on the expected number of lives saved. Again, this program is best left untested, thus making this computation more difficult to equate.

Recommendations

As Salem Fire-EMS Department seeks new and creative ways to keep the public safe, the department can employee a community risk reduction program to reduce tragic outcomes in active shooter events. The City of Salem has not been forced to deal with an active shooter event as of this date which would assist in building policy and procedures through experience. Therefore, the Salem Fire-EMS Department must use theory of best practices, current trends, and outside-of-the-box thinking to reduce morbidity and mortality by all means necessary.

The following four pronged recommendations are intended to guide Salem Fire-EMS Department and future readers of this research with efforts to reduce morbidity and mortality in victims of active shooters.

- Create a formative evaluation team within the department consisting of the rank and file to explore community risk reduction ideas designed to teach life-saving techniques to the public. This research paper can be utilized as the work group's first focus. The objectives for this team shall be to establish the mission, goals, scope, target audience, and pilot training for this community risk reduction program. They will also conduct a cost versus benefit analysis so a budget can be presented to stakeholders to assist them with their decision-making processes.
 Special attention should be placed on content delivery to the high risk groups that were identified in Table 1. This will allow for content delivery to the most at risk groups in the City of Salem, Virginia.
- Draft a community risk reduction program within the formative team to be presented to the chiefs for approval and further department budgeting. This is a necessary step to move into the process and impact stages of the Program Planning and Evaluation Framework. This plan should include the frequency, method, and type of content delivery that will be conducted along with its associated cost. Careful consideration should be given to the cost versus benefit analysis to both the stakeholders receiving the program and the department

delivering the program. Several proposals of content delivery should be created to give the chief's options. More than one option in terms of cost will yield a more viable program in terms of budgeting.

- Educate and create an environment within the Salem Fire-EMS Department that supports community risk reduction by emphasizing the organization's goals and values as they relate to the possibility of catastrophic loss due to being unprepared for active shooter events. These efforts should build the foundation for this community risk reduction program. Efforts should be made to emphasize the data, frequency, and high risk groups found in past research that exists in the City of Salem. Relating data about high risk groups within the City of Salem will provide relative examples to further prove the need for this community risk reduction program.
- Finally, after implementation of the community risk reduction program has been piloted by the formative team that will end the formative phase, an on-going evaluation should be conducted to measure efficacy. This on-going evaluation will be aimed at measureable outcomes that can be quantified into usable data to prove the value of the program and assist in making necessary ongoing changes. It is important to remember that as new data evolves, the risk groups and underlying messages of this community risk reduction program will need to evolve as well. This community risk reduction program is a dynamic process that should be reexamined at least annually to ensure the content is accurate and the messages are being received appropriately.

Further research into community risk reduction programs that aim at reducing morbidity and mortality associated with active shooter events should be conducted to narrow the focus of this initiative. Budgetary constraints will be an issue. Most equipment identified for organizations to purchase that will assist civilian response to victims of active shooters is expensive and must be purchased in bulk quantities to be effective. It is important to start small and work to a larger program as the on-going evaluation proves the program's success. Perhaps, most important, the program must be administered to the highest risk groups first, then as budget allows other stakeholders that are identified as benefiting from this community risk reduction program can receive the program content.

Setting measurable outcomes will be important for the ongoing evaluative process. It is a goal to never exercise this community risk reduction program in a real-time event. Rather, measurable outcomes need to be benchmarked and measured in continuous training exercises. It is these training exercises that will help craft and shape this community risk reduction program over time through an ongoing evaluative process.

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Appendix A

Program Planning and Evaluation Framework

Source:

Federal Emergency Management Agency [FEMA], United States Fire Administration.
 (2013). Executive analysis of community risk reduction: student manual (2nd Edition, 4th Printing). Emmitsburg, MD: National Fire Academy.

Appendix B





Source:

Federal Emergency Management Agency [FEMA], United States Fire Administration.
 (2013). Executive analysis of community risk reduction: student manual (2nd Edition, 4th Printing). Emmitsburg, MD: National Fire Academy.

Appendix C

Simple Triage and Rapid Transport (START) & JumpSTART Triage Systems





Source:

U.S. Department of Health and Human Services. (2013). *Start Adult Triage Algorithm*. Chemical Hazards Emergency Medical Treatment. Retrieved from http://chemm.nlm.nih.gov/startadult.htm.

Appendix D

Stakeholder Analysis Matrix



Appendix E

Group Administered Survey

Survey 1- Faculty Response to Victims of an Active Shooter

- 1. As faculty of this elementary school, do you know the school's emergency response plan to an active shooter event?
- A) Yes
- B) No
- C) Unsure
- 2. As faculty of this elementary school, have you received first aid training from the school system?
- A) Yes
- B) No
- C) Unsure
- 3. As faculty of this elementary school, have you received cardiopulmonary resuscitation (CPR) training from the school system?
- A) Yes
- B) No
- C) Unsure

4. Have you ever received first aid training in the past outside of this employer?

- A) Yes
- B) No
- C) Unsure
- 5. Have you ever received cardiopulmonary resuscitation (CPR) training in the past outside of this employer?
- A) Yes
- B) No
- C) Unsure
Survey 1- Faculty Response to Victims of an Active Shooter 6. Have you ever received training in rapid victim medical assessment? A) Yes B) No C) Unsure 7. Are you familiar with the Good Samaritan Law as it applies to rendering medical care to a sick or injured person other than yourself? A) Yes B) No C) Unsure 8. Have you ever been trained in tourniquet application for a bleeding extremity? A) Yes B) No C) Unsure 9. Would you be willing to provide medical care to a victim of an active shooter if you had proper training and equipment? A) Yes B) No C) Unsure 10. If you answered "Yes" to question 9, what would you be willing to do to treat the victim of an active shooter event? If you answered "No", or "Unsure" to question 9, choose "N/A." Choose all that apply from the below list A) Rapid victim assessment B) Open an airway C) Applying direct pressure D) Applying a tourniquet E) Applying advanced dressings to wounds to control bleeding

F) N/A





Figure E1. The first survey instrument from the questionnaire found in Appendix E asks, "As faculty of this elementary school, do you know the school's emergency response plan to an active shooter event?"

Figure E2. Appendix E: Instrument 2 Results



Figure E2. The second survey instrument from the questionnaire found in Appendix E asks, "As faculty of this elementary school, have you received first aid training from the school system?"

Figure E3. Appendix E: Instrument 3 Results



Figure E3. The third survey instrument from the questionnaire found in Appendix E asks, "As faculty of this elementary school, have you received cardiopulmonary resuscitation (CPR) training from the school system?"

Figure E4. Appendix E: Instrument 4 Results



Figure E4. The fourth survey instrument from the questionnaire found in Appendix E asks, "Have you ever received first aid training in the past outside of this employer?"

Figure E5. Appendix E: Instrument 5 Results



Figure E5. The fifth survey instrument from the questionnaire found in Appendix E asks, "Have you ever received cardiopulmonary resuscitation (CPR) training in the past outside of this employer?"

Figure E6. Appendix E: Instrument 6 Results



Figure E6. The sixth survey instrument from the questionnaire found in Appendix E asks, "Have you ever received training in rapid victim medical assessment?"





Figure E7. The seventh survey instrument from the questionnaire found in Appendix E asks, "Are you familiar with the Good Samaritan Law as it applies to rendering medical care to a sick or injured person other than yourself?"

Figure E8. Appendix E: Instrument 8 Results



Figure E8. The eighth survey instrument from the questionnaire found in Appendix E asks, "Have you ever been trained in tourniquet application for a bleeding extremity?"

Figure E9. Appendix E: Instrument 9 Results



Figure E9. The ninth survey instrument from the questionnaire found in Appendix E asks, "Would you be willing to provide medical care to a victim of an active shooter if you had proper training and equipment?

Figure E10. Appendix E: Instrument 10 Results



Figure E10. The tenth survey instrument from the questionnaire found in Appendix E asks, "What would you be willing to do to treat the victim of an active shooter event?"

Appendix F

Cost Benefit Analysis Template

Monetary Cost/Unit Analysis	Value (\$)
Tourniquet (1 count)- Contents for one trauma kit	\$36.29
4" x 4" Bandage (1 box)- Contents for one trauma kit	\$13.29
5" x 9" Bandage (10 count)- Contents for one trauma kit	\$19.90
12" x 30" Trauma Dressing (5 count)- Contents for one trauma kit	\$11.05
2" Cloth Tape (3 count)- Contents for one trauma kit	\$8.58
2" Roller Gauze (10 count)- Contents for one trauma kit	\$8.20
3" Roller Gauze (10 count)- Contents for one trauma kit	\$10.00
Vaseline Gauze (5 count)- Contents for one trauma kit	\$6.35
Trauma Bag (1 count)- Contents for one trauma kit	\$37.89
Basic First Aid/CPR Combination Course (Per Person)	\$60.00
Total Cost/Unit:	\$211.55

Non-Monetary Cost/Unit Analysis	Value (\$)
TO BE DETERMINED BY FORMATIVE TEAM	\$
Total Cost/Unit:	\$

Monetary Benefit/Unit Analysis	Value (\$)
TO BE DETERMINED BY FORMATIVE TEAM	\$
Total Cost/Unit:	\$

Non-Monetary Benefit/Unit Analysis	Value (\$)
TO BE DETERMINED BY FORMATIVE TEAM	\$
Total Cost/Unit:	\$

*If total cost (Monetary Cost + Non-Monetary Cost) is greater than (>) the total benefit (Monetary Benefit + Non-Monetary Benefit), the program is not beneficial.

**If total cost (Monetary Cost + Non-Monetary Cost) is less than (<) the total benefit (Monetary Benefit + Non-Monetary Benefit), the program is beneficial.