RISK IN COLLETON COUNTY

Risk in Colleton County, South Carolina

STRATEGIES FOR COMMUNITY RISK REDUCTION

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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.

Signed: _____

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Abstract

The problem was that Colleton County (S.C.) Fire-Rescue risk reduction programs addressed only child fire safety education and no other risks or audiences. The research purpose was to identify other risks and audiences that should be addressed.

Through descriptive research, questions about primary risks for the community, audiences that should be addressed, and community stakeholders' perceptions of community risks were answered. The procedures included statistic compilation, surveying of community stakeholders, and literature review.

The results identified the risks to the community, other local audiences that should be targeted, and the stakeholders' perceptions of the community risks. The recommendations were to inform the stakeholders and community the local risk and target audiences and develop interventions to address the risks and audiences.

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Risk in Colleton County, South Carolina

Introduction

The problem is that Colleton County Fire-Rescue's (CCFR) risk reduction program only addresses child fire safety education and no other risks or audiences, therefore Colleton County citizens may not be receiving needed CCFR services. Risk reduction is a necessary part of any progressive proactive fire-rescue department. The lack of a comprehensive risk reduction program in any community will lead to an increase in the vulnerability for harm or damage to life, property, or community vitality. Injuries, the leading cause of death for Americans under the age of 44 years, continue to be a major public health problem. Some estimates indicate that injuries cost the United States hundreds of billions of dollars annually.

The research purpose was to identify other risks and target audiences that should be addressed by CCFR. Using a descriptive research method, existing literature was reviewed to identify other risks to the community, and other local target audiences. In addition, other community risk reduction stakeholders were surveyed to establish what their understanding of community risk and target audiences was in Colleton County. After organizing, analyzing, and documenting the collected data in detail, the research answered the following questions: (a) what are the risks that exist for the Colleton County Fire-Rescue community, (b) what other audiences should be addressed in community risk reduction, (c) what do the stakeholders understand the community risk and target audiences are in Colleton County?

Risk reduction can be defined as anticipating potential hazards within a community and facilitating interventions to diminish adverse outcomes. In the absence

of risk reduction, communities must rely on their fire, police and emergency services to manage their problems when they occur. An adequate risk reduction program will prevent the community's problems from occurring and diminish loss of life, property and community vitality.

Background and Significance

Prior to 1989, Colleton County Fire-Rescue (CCFR) was an all-volunteer fire department that had no risk reduction program in place. Today, CCFR is a full-service, all-hazards fire department operating out of 30 stations, covering an area of 1,697 kilometers, and serving a population of approximately 40,000 people. CCFR operates six advanced life support ambulances, and a tactical response team responsible for water rescue, technician level hazardous materials mitigation and confined space and high angle rescue. However, the risk reduction program in place today is not a comprehensive program. Although the capabilities of CCFR to mitigate incidents have improved significantly over the years, the risk reduction program currently operated by CCFR has not kept pace.

Risk reduction for CCFR began in the early 1990's with a single fire prevention class that was held for children at a school's request. Today, the program has expanded to address children in kindergarten, first, second and third grades independently, each with a specially tailored fire prevention program. Although fire prevention and cardiopulmonary resuscitation classes are taught to the older children and adult community, the frequency of the classes is very low and often only by request. CCFR is routinely addressing only young audiences (ages 5 through 8 years) and only in the area of fire hazard prevention. No other risks or audiences are routinely addressed. The

probable future without improvements will allow for an ever more increasing number of risks and people being excluded from CCFR risk reduction efforts.

This is an emerging issue, which needs addressing immediately. Moreover, the lack of risk reduction addressing older children and the elderly means that two of the target populations identified by the United States Fire Administration are not being addressed. As a result, this research study addressed all of the United States Fire Administration (USFA) operational objectives. USFA operational objective one is to reduce the loss of life from fire in the age group 14 years old and below. USFA operational objective two is to reduce the loss of life from fire in the age group of 65 years old and above. USFA operational objective four is to promote within communities a comprehensive, multi-hazard risk-reduction plan led by the fire service organization. USFA operational objective five is to respond appropriately in a timely manner to emerging issues. A community risk reduction program will also decrease the number of incidents wherein firefighters are required to mitigate incidents with a potential loss of life or property. Therefore, this research can also be tied to the third and final USFA operational objective, to reduce the loss of life from fire to firefighters. This research also addressed Chapter 1 of the Strategies for Community Risk Reduction student manual regarding understanding, interpreting, and analyzing community risk.

For the author, the importance of this issue can be easily demonstrated. It is always preferred that in lieu of an organization having to manage an event which causes a loss of life, property or community vitality, an organization should strive to prevent it through risk reduction efforts.

Literature Review

Risk can be defined as vulnerability for damage or harm to life, property and community vitality. Whether derived from natural or human sources, risk surrounds us everyday. Although a community will commonly refer to an occurrence as an accident, most of these occurrences are preventable. Prevention begins with understanding what the risks are to the community and committing to the proposition that occurrences are most likely preventable and are not accidents.

Although natural sources of risk such as a hurricane or earthquake are difficult to predict, the lives, property and community vitality can be affected prior to the occurrence in order to minimize the damage or harm during and after the event.

Similarly, while other disciplines may merely assume that "risk happens," sociologists know better than that. Earthquakes are acts of nature, but earthquake disasters – the deaths, injuries, economic losses, and social disruption that result when the earth trembles – are social in origin (Tierney, 1999, p. 236).

Examples of this can be easily seen when you examine homes built below sea level in a hurricane prone area or on the side of a mountain in a highly wooded area, and large populations built upon tectonic plate fault lines. "Disaster prevention, therefore, is seen as largely a matter of improving scientific prediction, engineering preparedness and the administrative management of the hazard" (Bankoff, 2002, p. 5).

Jaeger, Renn, Rosa, Webler (2001) agree with their citation of the following:

In common usage, risk has a wide range of connotations: fear of specific hazards, concern for the interdependency of humans and technological systems, uncertainty regarding financial gain or loss, fear of the malevolent forces of nature, or the thrill of

adventure, or worry about the competence and trustworthiness of those who manage risks (p. 16).

As the previous citations illustrate, even with natural sources of risk, there are ultimately social or human factors that must be considered. These factors must also be considered when examining human sources of risk. Interventions must then be identified in order to reduce that risk. The Strategies for Community Risk Reduction student manual states that effective forms of interventions are: education, enforcement, engineering, economic incentive, and emergency response.

Education is designed to invoke a behavioral change within the intended audience. Although the educational intervention is the most widely used, many texts agree that education is not successful when used independently from other interventions. Education must also be specially designed to meet the needs of the intended audience. However, the most important aspect of an educational intervention is that its audience accepts it. "Educational approaches and action plans, no matter how well intentioned, should not be imposed on people. People and their communities must be engaged in education on an equal footing" (Rodriguez & Aguirre, 2005, p. 1). The benefits of learning the new behavior must be clearly demonstrated to the community in order for the community to buy in to this type of intervention. "Adults are relevance-oriented. They must see a reason for learning something" (Mieure, 2003, p. 18). For example, the Elk River Fire Department puts on a mock crash during which approximately 800 junior and senior high school students observe all aspects involved with an alcohol related motor vehicle collision. "During this time, everyone saw how different agencies respond to an emergency, from the 911 phone call, arrival of local law enforcement, treatment of

injured and the care shown when working with the dead" (Lees, 2007, p. 26). In this case, it is clearly demonstrated to students that driving after consuming alcohol is a risky behavior and has dire consequences.

Austin emergency medical service takes this education a step further by addressing actual calls with a smaller audience. "The program includes tapes from 9-1-1 emergency dispatches, slides and videos of actual alcohol-related accidents, profiles, and pictures of real victims and, of course, personal experiences and life lessons from EMT's and paramedics" (Williams, 1995, p. 89). The small group classes used by Austin emergency medical service makes it easier for the audience to ask questions and learn; however, it is harder to reach a large population. Fresno Fire Department has a broader plan. "The department's goal is to educate the community as a whole via public service announcements, innovative signage and local media" (Bruegman, 2007, p. 18). This program stands to reach a broader audience but also does not allow for any interaction or questions surrounding the educational message. Both of these examples use negative reinforcement to show adverse effects of risky behaviors. "As the name implies, positive reinforcement is 'good' and reinforces 'good' (or positive) behavior. Negative reinforcement is useful in trying to change modes of behavior" (Mieure, 2003, p. 20).

An additional step in the educational process is to allow participation in actual risk reducing activities. Such is the case in Copperas Cove (Texas) Fire Department, wherein students participate in field prevention activities. "The hands-on activities expose students to important life skills as well as career information" (Haas, 2007, p. 16). The hands-on activities will reinforce the intended behavioral change. There are also curricula that address a wide range of risks associated with children. One of the most

popular is Risk Watch, which is produced by the National Fire Protection Agency (NFPA). "The Risk Watch program is intended to help educators provide positive messaging on injury prevention and natural disaster preparation for children" (Araujo, 2006, p. 48). The National Fire Protection Agency's goal is to establish risk watch safe communities. These are communities that are not free of risk, but are better prepared. "Risk Watch Safe Communities brings teachers, safety experts, and parents together to better prepare them to keep kids safe from unintentional injuries" (Araujo, 2006, p. 48).

Another consideration in education is the population composition as it relates to cultural differences, particularly language barriers. The information presented has to be in a language that can be understood. Throughout the United States, the influx of immigrants makes communication during an emergency difficult in some cases. It will be that much more difficult to convey the intended message without a common language.

Statistics show that there is an increase in immigrants in the United States each year. "According to the Center for Immigration Studies, the immigrant share of the U.S. population is increasing dramatically, from 7.9% of the overall population in 1990 to 11.1% just 10 years later" (McCallion, 2007, p. 70). Risk reduction programs involving educational interventions must include non-English speaking residents. "We feel strongly that fire service and law enforcement agencies must reach out to these new residents and include them in our educational programming" (Kline, 2007, p. 23). This presents a new obstacle in the educational intervention. Not only must the intended training reach a new audience made up of people with a variety of backgrounds, but also each person may have a slightly different background and language. "Just like English, Spanish has its own cultural dialects" (McCallion, 2007, p. 71). It is not uncommon for

risk reduction programs to specifically target Hispanic populations. However, when teaching educational programs to a Hispanic workplace, such as a fire extinguisher class, it is important to remember that people referred to as Hispanics are often not the same. “An employee from Argentina is different from one from Mexico, Venezuela, etc. All have different attitudes, values, beliefs, behaviors and even vocabulary” (Gonzalez & Topf, 2007, p. 47). Therefore, addressing each individual using an educational intervention may be difficult. Some fire departments have implemented a translation guide to assist in serving these types of populations both in times of emergencies and during risk reduction programs. Other fire departments stress the importance of educating the children and allowing them to educate the adults in their families. “The children almost always know more English than the parents. They learn it at school and from peers” (O’Connor, 2006, p. 109). Recognizing the cultural differences between the represented populations is essential when implementing an educational intervention as part of a risk reduction program. As previously established, many texts stress the importance of utilizing educational interventions with other interventions in order to increase the chances of success.

The second intervention is enforcement. Enforcement, like education, is an ineffective independent intervention. Enforcement must be based on an existing law, rule or regulation. These regulations not only take members of the community dedicated to their enforcement but also must not conflict with other existing laws. One text addressed handgun legislation.

Despite an extraordinary annual national toll from handgun-related violence and the assassination or attempted assassination of the nation’s political leaders, control

efforts, such as the Brady bill, have failed to overcome the credo that the right to bear arms is one of the most inalienable of American rights (R.E. Kasperson & J.X. Kasperson, 1996, p. 103).

Moreover, there are many unintentional incidents involving handguns that occur each year and cause injuries and deaths. Enforcement of existing handgun legislation may reduce the number of intentional incidents by stopping those individuals who may use handguns in a manner to purposely inflict injury or death. However, enforcement is ineffective against unintentional injuries and deaths as the law allows for citizens to possess handguns.

Outdoor burning is an area where enforcement can be more helpful. Outdoor burning is an activity that is widely used in rural areas, such as Colleton County, to help control the growth of wild lands and prevent conflagrations from the accumulation of brush and trees over time. "Periodic burning is now recognized as an important tool in managing prairies in the absence of the grazing and wildfires that helped shape them" (Winter, 1988, p. 54). Many communities where outdoor burning is legal have requirements that the attendant obtain a permit, remain with the fire, and have a means to control and/or extinguish the fire should it get out of control. These requirements are futile without enforcement. Enforcement in this area can be compared to the traffic police insuring that no one drives while under the influence of alcohol. Enforcement insures that those members of the community follow the local requirements governing outdoor burning. In the absence of laws and specifically enforcement of those laws, injuries and deaths will occur. "Thermal-related injuries are the sixth leading cause of unintentional injuries in the United States" (Wibbenmeyer, Amelon, Loret de Mola,

Lewis, & Kealey, 2003, p. 85). In their study of 899 burn patients, Wibbenmeyer et al. found that "of those patients, 194 (20.1%) were injured by burning brush or trash . . . . Sixteen percent (n=30) of these injuries occurred in individuals less than 15 and 19% (n=36) occurred in individuals greater than 65 years of age" (2003, p. 86). The elderly in this type of risk event are extremely disadvantaged after this type of injury occurs. "The injured elderly fared the worst, with age being significantly correlated with death and placement needs after discharge" (Wibbenmeyer et al., 2003, p. 88). Enforcement of regulations governing outdoor burning could certainly reduce the risk to the overall community and could also reduce the likelihood of injury and death to target populations such as those greater than 65 years of age.

Enforcement may also be effective in reducing the number of injuries and deaths from motor vehicle collisions, and the associated risks. "Motor vehicle crashes (MVCs) are the leading cause of death for persons aged 5 to 29 years" (McCammon, 2001, p. 415). In many motor vehicle collisions with severe injuries or fatalities, alcohol is a contributing factor. Enforcement of existing traffic laws surrounding this type of risk is often difficult due to existing laws regarding patient privacy. Many texts offer solutions to better enforcement.

Advocates of mandatory health care reporting of impaired drivers argue that the physician-patient confidentiality is waived because state laws already (1) allow police access to hospital BAC results, (2) require reporting of certain communicable diseases, child abuse, stab and gunshot wounds, (3) require reporting of any injury sustained in committing or as a victim of a crime, and (4) consider a license to drive as implied consent to breath or blood testing (McCammon, 2001, p. 416).

This mandatory reporting of impaired drivers could assist with enforcement of the laws designed to protect the community. Additionally, this reporting could help to enforce other mandatory programs as designated by law.

Whereas injury alone may not alter impaired driving practices, structured interventions have been shown to be effective. . . . More specifically, the emergency department is the critical setting that provides both the opportunity to screen high numbers of at-risk patients and to intervene in a timely manner (McCammon, 2001, p. 417).

The enforcement of reporting requirements and existing traffic laws can easily be tied to educational interventions. By using enforcement and education interventions jointly, all texts agree that success in reducing the risk to the community is much more likely than if either were used alone.

Engineering is another intervention, which revolves around changing the physical environment in order to decrease risk. Safety products are designed, developed and manufactured so that even in the absence of education and enforcement, an intervention is still present. Examples of engineering interventions already in place are airbags in vehicles, sprinkler systems and smoke alarms in buildings.

An example of new-engineered technology to reduce risk is safer stoves.

Why? Because cooking is the leading cause of home fires, according to the nonprofit National Fire Protection Association (NFPA). The latest statistics from NFPA say that one out of every three home fires started in the kitchen and more than 100,000 fires a year were related to cooking (Stark, 2006, p. 32).

The statistics illustrate that the risk is prevalent and the need for intervention is paramount.

Forty-one percent of people killed in U.S. home cooking fires during 1999 to 2003 were sleeping when fatally injured. . . . In 2004, more than 28,300 people were seen in hospital emergency rooms for cooking related thermal burns, often contact burns, and scalds associated with cooking equipment, cookware, or table ware. Children under five were particularly at risk of non-fire related thermal burns and scalds (Nicholson, 2006, p. 70).

This risk is particularly deadly and also illustrates an audience that should be addressed, perhaps with an associated educational intervention. "Older adults and children under five account for a disproportionate share of cooking fire deaths" (Nicholson, 2006, p. 71). Engineering interventions seek to remove the hazards of the physical environment. Developers have designed stoves that require an attendant to be present or power is turned off. In the absence of education of persons in proximity to the stove and enforcement of the attendant to prevent anyone from contacting the stove, engineering removes the physical hazard from the environment thereby reducing risk. Once these engineering systems are in place they are an immediate and permanent intervention. However, virtually all of them require some sort of involvement by the member of the community. For example, seat belts were engineered to reduce injuries and make traveling in a motor vehicle safer. However, seat belts are ineffective without the user being educated in its proper use. In some cases an individual that enforces its use either by values or by existing laws is necessary. This makes engineering somewhat dependent on other interventions.

An economic incentive intervention, the fourth intervention, is one that influences behavior either positively or negatively through monetary means. Examples of positive economic incentives are insurance premium reductions for participating in an educational intervention such as a safe driving course or building a home that is protected by an engineering intervention such as a sprinkler system. Examples of negative economic incentives are insurance premium increases for contributing to a collision or being issued a ticket, fine or citation by an enforcement intervention for choosing unsafe behaviors. It is not difficult to see how easily economic incentive interventions can be tied to education, enforcement or engineering interventions. Although economic incentive interventions are designed to influence behaviors, they are frequently closely associated with another type of intervention.

Emergency response intervention is the last intervention. These interventions include the tools and capabilities of the emergency responders. The emergency response intervention is only used during an event and deals more with mitigation of the risk and less with prevention of the risk.

An example is a motor vehicle collision. A fire department with a one-engine response capability will be able to respond and extinguish any fires present. A fire department with a one-engine and heavy rescue response capability will be able to respond, extinguish any fires present and extricate any patients that are trapped in the vehicle. A fire department with a one-engine, heavy rescue, and advanced life support ambulance response capability will be able to respond, extinguish any fires present, extricate any patients that are trapped in the vehicle, and provide any patients on scene

with advanced life support procedures. As this example illustrates, the capabilities of the fire department drive the emergency response intervention.

The emergency response intervention is also dependent upon people. These professionals, who serve as members of fire, law enforcement, or emergency medical services, are often required to mitigate risk with limited available resources. "Professionals are required to make risk assessments in relation to dangers . . ." (Denney, 2005, p. 74). Furthermore, the community will quickly find these professionals at fault for failing to mitigate the risk, regardless of their organizations' capabilities. Emergency responses will not only be evaluated by the equipment capabilities of the responding agency but by the training and capabilities of the personnel from that agency, in particular the leaders of that agency.

The impact of the notion of risk society places professionals in a double jeopardy. First, the general public and the media blame professionals when a calculated risk results in damage to a vulnerable person. . . . Second, professionals are blamed by management for failing to carry out procedures which are thought to be virtually infallible if applied with enough precision and enthusiasm (Denney, 2005, p. 80).

An increase in nationwide call volumes is occurring without an equivalent increase in equipment and available personnel. As a result, risk mitigation professionals are often required to do more with less when faced with the emergency response intervention. Many fire departments have established alternatives to traditional responses, especially for those times when the department may be overwhelmed by service demands. Many fire departments have established community emergency response teams. As the Strategies for Community Risk Reduction student manual

outlines, community emergency response teams (CERTs) assist in two ways. They prepare for disasters by removing hazards in their homes and workplace. They also respond to emergencies and assist with task level operations. "According to Dennis Walter of the Minnesota Division of Homeland Security and Emergency Management, it is the hope of the state and federal government that CERTs are formed throughout the country" (Farmer, 2005, p. 23). If these community emergency response teams are formed throughout the country, they stand to supplement and significantly improve the capabilities of many fire departments and thereby increase the effectiveness of the emergency response intervention.

The obvious disadvantage of the emergency response intervention is its reactivity. When discussing education, enforcement, engineering and economic incentives, it is hoped to prevent the risk event from occurring. The emergency response intervention is not dependent on the other interventions; however, if the emergency response intervention is needed, it can be assumed that the other interventions failed to reduce the risk and an event occurred. Despite its reactivity, all the reviewed texts agree that no matter what amount of time and money is spent on the other interventions, events will still occur and therefore require an established and continually improved emergency response intervention.

"Scarce time and resources prevent individuals and societies from doing everything that they might to reduce risks to health, safety, and the environment" (Long & Fischhoff, 2000, p. 339). Ross (1999) further illustrates that trade offs are often necessary in risk reduction in his citation of the following:

An essential, and perhaps the most critical, foundation of the modern language of risk is that whenever an action is taken to reduce a risk in one area, a risk or risks in another area will be heightened. . . . Putting up bars on windows to protect against thieves makes it more difficult to leave the house in case of fire. Washing the hands with soap, which may lessen a person's chance of contracting a cold or flu, can also put the individual in contact with cosmetic additives that might be carcinogenic (p. 148).

With that in mind, it is essential for a community to identify all of its risks. "One common strategy for coping with such overload is to rank risks in terms of their magnitude" (Long & Fischhoff, 2000, p. 339).

In what manner the risk reduction program will address the audiences, is important also. This manner is often referred to as prevention levels. Primary or universal prevention addresses everyone. This type of prevention can be accomplished through public service announcements or comprehensive community based educational programs. Secondary or selective prevention addresses a target audience. After understanding how the risk reduction program will address the audience, the risk reduction is limited in concentration to that intended group. An example of secondary prevention is educational programs for elderly groups regarding fire prevention in the home. This type of prevention is limited in scope by both the topic and audience addressed and is used to mitigate specific hazards. Tertiary prevention addresses a risk or audience after an event has already occurred and is designed to reduce future negative impacts of the event. An example of tertiary prevention is rehabilitation of a burn patient in order to help the patient become a productive member of society.

The literature review reveals the importance of following a step-by-step risk reduction process. First, identification of the risks to the community must be identified. Next, the risks must be ranked according to magnitude and/or frequency. Then, the risks that are acceptable to the community must be identified. Finally, those risks that are not acceptable to the community must be selected and the aforementioned interventions applied in a risk reduction effort. As the research has clearly illustrated, the more interventions that are used in the risk reduction effort, the greater the chance of success in reaching your intended audience or target population. The literature review reveals that one must fully understand these interventions in order to appropriately address the intended audience. For example, enforcement of traffic laws and education regarding the risks associated with driving while intoxicated will not fully address child deaths due to motor vehicle collisions; however, engineering a better child safety seat will properly address that audience. Likewise, a fire-rescue department that is not authorized to enforce laws governing outdoor burning, may be limited to the emergency response intervention when that hazard occurs. This example illustrates what the literature review stresses. How a risk reduction program will address the intended audience, using the appropriate interventions, must be established in order to identify what other audiences can be addressed.

Procedures

The procedures the author used for this descriptive research project began with a review of the existing literature. This literature review commenced in the Learning Resource Center at the National Fire Academy in December of 2007. It was the author's intention to answer the following questions using the literature review: What are the

primary risks that exist for the Colleton County Fire-Rescue community, and what other audiences should be addressed in community risk reduction? The literature review was focused on overall risk to society, the relationship between risk reduction and the use of education, enforcement, engineering, economic incentives and emergency response as interventions. Moreover, the literature review guided the author to further identify local risks and rank those risks according to frequency and/or severity.

Building on the Strategies for Community Risk Reduction pre-course assignment, the author, utilizing statistics from the Center for Disease Control, the United States Census Bureau, and Colleton County statistics, identified the risks to the citizens of Colleton County, South Carolina. Additionally, the collected data was used to identify (a) hazards that were age-specific, (b) national statistics on the same risks and hazards for comparison to Colleton County and (c) the composition of the Colleton County population. The data collected associated with the literature review answers the first and second research questions, what are the primary risks that exist for Colleton County Fire-Rescue community, and what other audiences should be addressed in community risk reduction?

A survey (Appendix B) was also developed with the purpose of answering the third research question, what do the stakeholders understand the community risk and target audiences are in Colleton County? By using primarily a closed ended questioning method, respondents were asked to rank a list of hazards from most to least risk to the citizens of Colleton County. Then for each of the same hazards, respondents were asked to identify if Colleton County citizens had a higher, equal or lower risk when compared to the rest of the United States. Each respondent was then asked to identify age groups

that are most at risk for the same hazards. Each respondent then answered three questions regarding contributing factors that increase risk of three hazards to the citizens of Colleton County. A question was then posed to identify whether the respondent perceives that risk reduction programs in Colleton County properly addressed the aforementioned hazards, or if improvement was needed. Finally, an open-ended question was provided to determine what the perception of the respondent was to the highest risk to the most number of citizens across all age groups and what more could be done to reduce that risk.

The survey was distributed to 13 stakeholders in the community. The population was determined by identifying organizations that serve as stakeholders in community risk reduction. These stakeholders were identified as members of other emergency service organizations, industries, and businesses that held positions of safety officers, public education officers, or otherwise had a vested interest in community risk reduction. The sample size was selected with one respondent from each organization, industry or business and the survey was distributed to all intended respondents in late January 2008. The requested respondents included the director of the local Safekids coalition, the chief of Colleton County Fire-Rescue, the nursing manager at Colleton Medical Center, the chief deputy of Colleton County Sheriff's Office, the major of the Walterboro Police Department, the captain in charge of risk reduction from the Walterboro Fire Department, the crime and accident reporter from the local newspaper, the director of the local chamber of commerce, the superintendent of the local school district, and four safety managers from local industries. The design allowed respondents to complete the survey online and a memorandum (Appendix A) via email was sent to each of the requested

respondents. This memorandum included the author's name, title and organization, the purpose of the survey, instructions for completing and returning the survey, a reasonable and specific return date, a statement of the author's willingness to share the results of the survey if the respondent desired, and an assurance of confidentiality and anonymity.

There were several limitations to the research, the first of which is directly related to the survey population. Given the rural composition of Colleton County, there were not a large number of industries, businesses and other public organizations from which respondents could be selected. In a more urban area, members of mass media, more business and industry as well as several members from each emergency service would be familiar with and possess a perception of risk reduction in their community. This would allow for more respondents to be used during surveying.

Another limitation is that each individual may have a pre-conceived perception of risk reduction that is directly tied to his or her organization's mission. For example, law enforcement will likely perceive that risks associated with traffic collisions is of most importance, while Safekids and other child safety organizations will likely perceive that risks associated with child injuries are of most importance. Using more respondents could reduce the limitation; however, as the author has previously established, this may be difficult in rural areas.

If each organization performed a detailed analysis of injuries and deaths by hazard or risk and the data was compiled, this would provide the most accurate perception of risk to the citizens of Colleton County. However, this would require a large commitment from each organization and would likely take longer than the applied research project time constraints allow. The time frame alone is another limitation of the research.

Another limitation is the data collected during the research. Much of this data is not current. For example, the United States census bureau data obtained was from the year 2000 as there are not more current data sets available. Moreover, the web-based injury statistics query and reporting system (WISQARS) provided injury and mortality reports from 1989-1998 and does not provide comparative statistics for more recent years. For the most accurate research results, data from more recent years should be examined. Furthermore, local data on malignant neoplasms was unavailable and therefore excluded from the research. The lack of these more recent and comprehensive data sets being available is another limitation to the research.

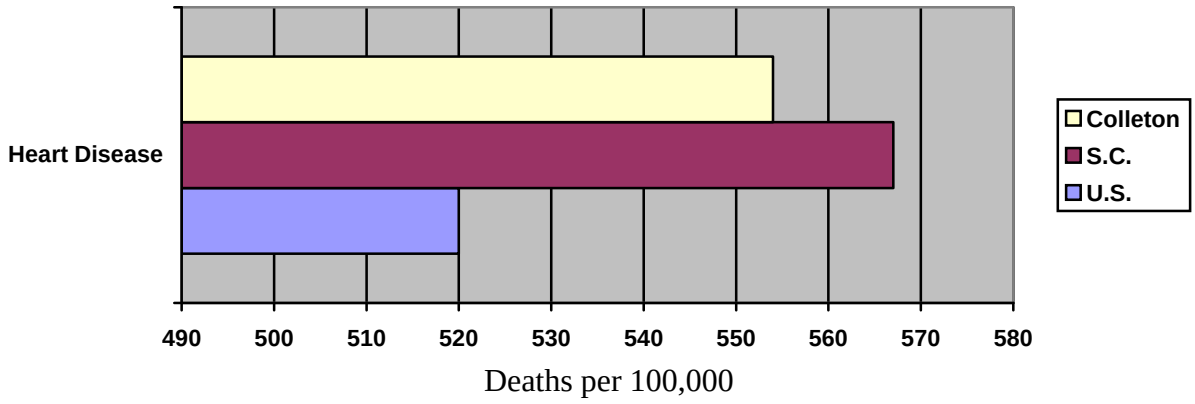
The majority of the terms used in this research are unambiguous. However, it is important to clearly define a few. The data compiled represents only unintentional hazards. For instance, firearm related deaths include only unintentional acts wherein a firearm was discharged resulting in a death. Therefore, this research does not include intentional violent acts by individuals using firearms. Malignant neoplasms are listed by the national data sets and are defined by its more widely accepted term of the disease, cancer.

Results

According to the Center for Disease Control statistics from 1989-1998, the leading causes of death from unintentional causes nationally are the same for South Carolina. The leading cause of death nationally is heart disease, followed by malignant neoplasms, then unintentional injuries. Heart disease in Colleton County is slightly higher than the national statistic but slightly lower than the South Carolina state statistic. As aforementioned, local statistics on malignant neoplasms were unavailable; therefore,

they were excluded from the research and comparisons. In Colleton County the unintentional injuries or causes that result in death mimic the national statistics. However, the percentages are different nationally, for South Carolina and for Colleton County specifically. South Carolina and Colleton County are higher than national statistics in instances of accidental death from motor vehicle collisions, fire/burns, firearm related injuries, drowning, and suffocation. Additionally, Colleton County is higher than South Carolina statistics in death from motor vehicle collisions, fire/burns, firearm related injuries, and drowning. In the following graphs, Figure 1 illustrates the deaths per 100,000 in Colleton County by heart disease and Figure 2 illustrates other unintentional deaths as compared to South Carolina and national statistics:

Figure 1 – Death by heart disease



The statistics on deaths per 100,000 people, as shown in table 1, clearly demonstrate the risks to the citizens of Colleton County. Table 1 clearly illustrates the comparison of Colleton County statistics, listed under the heading Colleton, versus the State of South Carolina, listed under the heading S.C., and the United States, listed under the heading U.S. The eight unintentional causes of death examined in the research are listed by order

of magnitude from greatest number of deaths to least number of deaths in Colleton County.

Figure 2 – Death by other unintentional causes

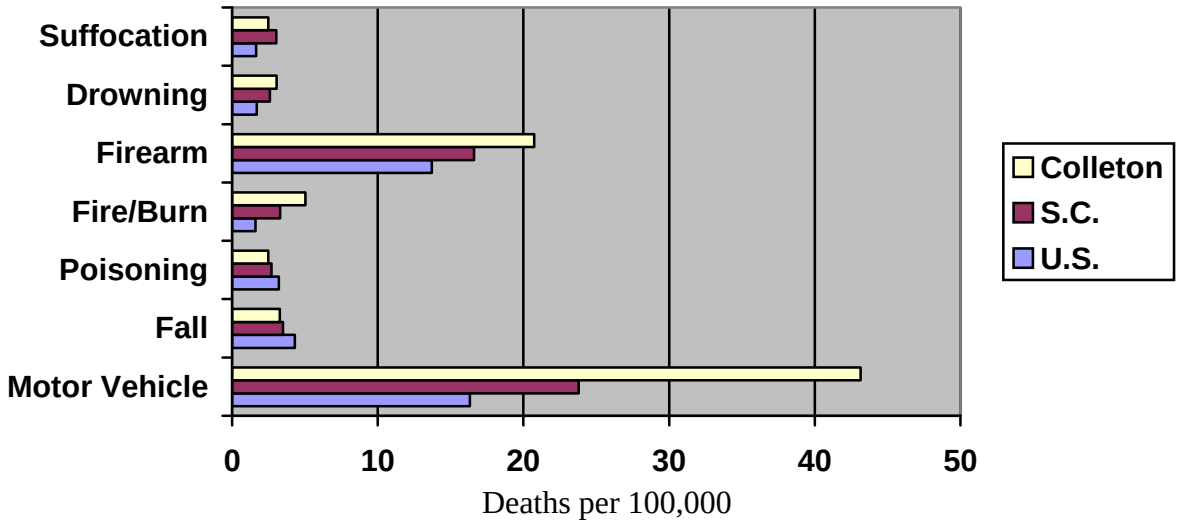


Table 1 –Deaths per 100,000 ranked by cause of death

Cause of Death	Colleton	S.C.	U.S.
Heart Disease	554.00	567.00	520.00
Motor Vehicle Collision	43.15	23.80	16.33
Firearm (Unintentional)	20.73	16.60	13.70
Fire/Burns	5.03	3.30	1.60
Fall	3.28	3.50	4.30
Drowning	3.05	2.60	1.70
Poisoning	2.48	2.70	3.20
Suffocation	2.46	3.06	1.64

Deaths per 100,000

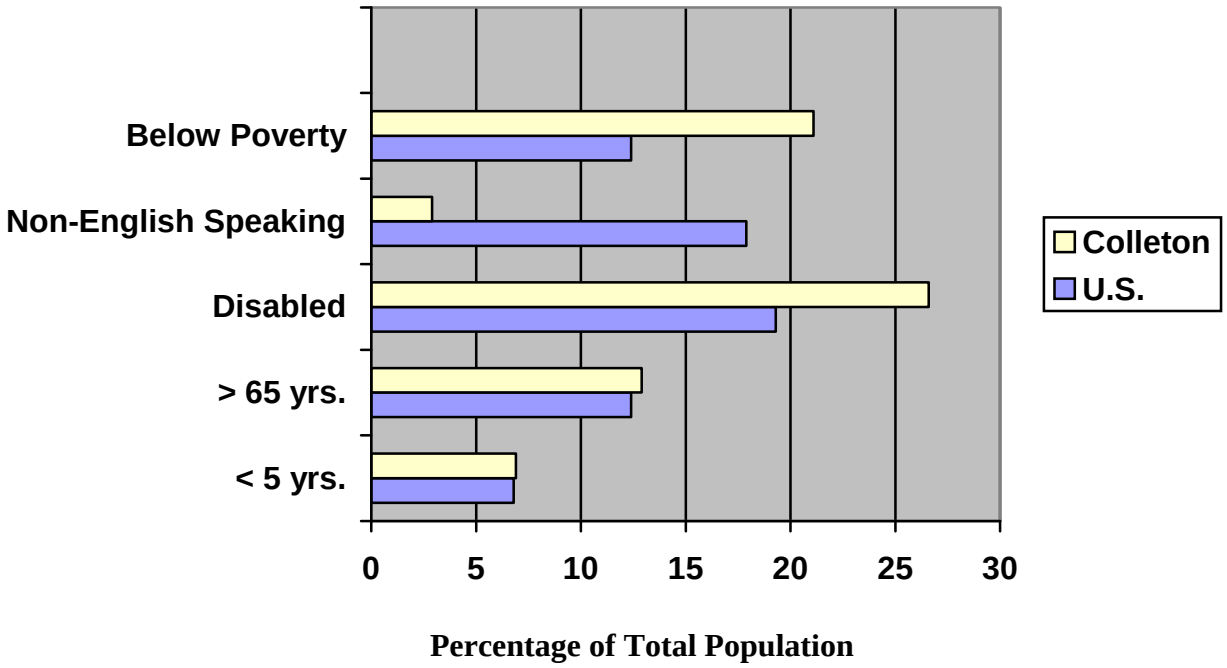
It is essential to re-emphasize that local statistics on malignant neoplasms were not available and therefore excluded from the research results.

As the data clearly illustrates, heart disease and motor vehicle collisions represent the highest risk to the citizens of Colleton County. The data also shows that although Colleton County is slightly higher than the national average for deaths by heart disease, the citizens of Colleton County face a much higher risk of death by motor vehicle collision than the national average. Colleton County is at or above the 90th national percentile for death by motor vehicle collision. This data clearly answered research question number one, which was what are the risks that exist for the Colleton County Fire-Rescue community. Aside from heart disease and malignant neoplasms, motor vehicle collisions contribute to the most deaths in Colleton County. Moreover, fire/burn related deaths; unintentional firearm related deaths, death from drowning and death from suffocation in Colleton County are all higher than the national average. These are the risks that exist for the Colleton County Fire-Rescue community.

Colleton County, according to the U.S. Census Bureau 2000 statistics, has a population of 38,264 people. Of those, 6.9% are under the age of five years and 12.9% are over the age of 65 years. These percentages closely match the U.S. statistics with 6.8% under age five and 12.4% over age 65 nationally. Statistics also revealed that 26.6% or 9,389 people over age five indicated they were disabled which is much higher than the nationally reported 19.3% U.S. disability status. Statistics indicated that 2.9% speak a language other than English in the home, which is much less than the nationally reported 17.9%. Statistics also show that 21.1% of individuals or 8,014 people indicate that they are living below the poverty level, which is much higher than the nationally

reported 12.4%. These statistics can be more clearly seen and compared in the following graph (Figure 3), which details the percentages.

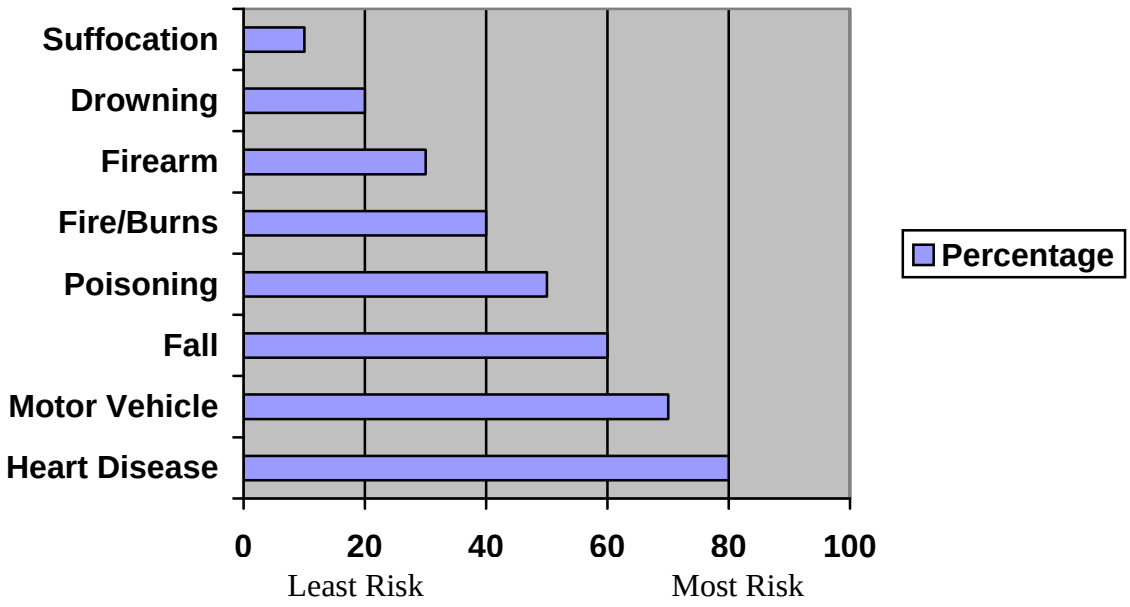
Figure 3 – Percentage of Total Populations



The distribution of target populations in Colleton County such as the elderly 65 years or older and children 5 years and younger seem to mimic national statistics. Colleton County also has a much lower percentage of non-English speakers than the national statistics. However, Colleton County has a much higher percentage of those living below the poverty level and those with a disability. Therefore, along with continuing risk reduction programs that address the aforementioned target populations of the elderly and children, Colleton County Fire-Rescue should address the disabled population and those living below the poverty level. This data answered research question number two, which was what other audiences should be addressed in community risk reduction.

Of the 13 surveys that were requested, eight respondents previously identified as stakeholders completed surveys. The stakeholders indicated that heart disease was the leading risk to the Colleton County community, followed by deaths from motor vehicle collisions, then falls, then poisonings, then fire/burns, then firearms, then drowning, then suffocation. The following graph (figure 4) indicates the perception of risk by the stakeholders:

Figure 4 – Survey Respondents Perception of Risk in Colleton County



The stakeholders also indicated that those above age 44 have the highest risk of death by heart disease and age 15-24 is at most risk of death by the leading cause of unintentional injury in Colleton County, motor vehicle collisions. The majority of the stakeholders indicated that alcohol and unsafe/careless/reckless driving are the largest contributing factors to death by motor vehicle collision in Colleton County. Additionally, the majority of the stakeholders indicated that failure to use safety equipment such as smoke detectors and improperly using heating sources is the biggest contributing factor to

fire/burn related deaths in Colleton County. The stakeholders surveyed also indicated that failure to use safety equipment such as life vests; fences surrounding swimming pools, and splash detectors are the largest contributing factors to death by drowning in Colleton County. The surveys also revealed that stakeholders think that Colleton County organizations, including emergency services, need some or major improvement in their risk reduction efforts for heart disease, motor vehicle collisions, and drowning.

Although the stakeholders did not correctly rank all of the risks when compared to Center for Disease Control statistics, it is important to note that they did correctly rank three. Many of the stakeholders deal with unintentional deaths on a routine basis and their perceptions of the risks in Colleton County are important to include in this research. The data obtained from the survey clearly answered research question number three, which was what do the stakeholders understand the risk and target audiences are in Colleton County. Although the aforementioned limitations prevent survey information from solely driving risk reduction efforts, it is essential to take note of the stakeholders' responses, as they will most assuredly be involved in any future risk reduction efforts.

Discussion

The results clearly illustrate that citizens of Colleton County are vulnerable to many risks. The risk of Colleton County citizens dying from heart disease, motor vehicle collisions, drowning, firearm related incidents, and fire/burn related injuries is much higher than the rest of the United States. As Tierney stated, the concept of risk happening is unacceptable to sociologists. Jaeger, et al. defines the risk as a hazard specific fear. The average citizen is not fearful of a risk that has not occurred to them or about which they otherwise have no knowledge. Therefore, as Rodriguez and Aguire noted, the

educational interventions have to be accepted by and not forced upon the intended audience. In addition, Mieure stated that the intended audience must see the relevance of the educational intervention in order to accept it. This means that educational interventions, in many cases, may have to begin with a clear presentation of the risk problem. Educating the intended audience of the risk present and its relevance is paramount prior to an educational intervention being used to reduce that risk. For example, according to the research 34 more people per 100,000 will die from heart disease in Colleton County than if they lived in another state. This information, uncovered during the research, must be clearly presented so that the citizens of Colleton County understand the risk, its relevance, and choose to participate in risk reduction efforts. Many citizens may think that dying from a motor vehicle collision is a risk while driving, and statistically the citizens of Colleton County are almost three times more likely to die while driving than national statistics. However, there are other risks that are occurring that must be made known to the citizens. Risk reduction efforts must begin with clearly showing that 543 more citizens per 100,000 in Colleton County are at risk of dying from heart disease. Without this information being communicated to the citizens, any risk reduction efforts are futile. "Adults are relevance-oriented. They must see a reason for learning something" (Mieure, 2003, p. 18). Without understanding the relevance of the risk, adults will not be likely to submit to efforts to reduce the risk.

Another consideration in clearly communicating the risk reduction message is to insure that the message is in an understandable language. The influx of immigrant population, as Kline and McCallion indicated, dictates that the message reach non-English speaking residents. "An employee from Argentina is different from one from

Mexico, Venezuela, etc. All have different attitudes, values, beliefs, behaviors and even vocabulary" (Gonzalez & Topf, 2007, p. 47). Although the point of publishing risk reduction messages in non-English vocabularies is critical, this may not be as important in Colleton County. According to Census statistics, only 2.9% of people in Colleton County speak a language other than English as opposed to the 17.9% reported nationally. Colleton County has sought to address the non-English speaking communities in the past, and this may be essential in other communities. However, given the small percentage of non-English speakers in Colleton County, it may not be a top priority.

The risk of death by firearm related injuries to Colleton County citizens is much higher than national statistics. As R.E. Kasperson and J.X. Kasperson have identified, one of the most inalienable American rights is the right to bear arms. Although enforcement interventions may affect the intentional use of firearms, educational interventions may be needed to reduce the risk of death by unintentional firearm injuries. As previously stated, the citizens of Colleton County must first be made aware that the risk of death by unintentional firearm related injuries is higher than national statistics before educational interventions can offer reduction solutions. This same promotion must be used for risk of death by drowning and suffocation in Colleton County, which are almost double the national statistic.

The risk of death by fire/burn related injuries is more than three times greater for the citizens of Colleton County than the national statistic. Wibbenmeyer, et al. (2003) indicate that, "thermal-related injuries are the sixth leading cause of unintentional injuries in the United States" (p. 85). However, it is the fourth leading cause of death by unintentional injury in Colleton County. Open burning was identified as a leading cause

of death and given the rural composition of Colleton County, this risk should be addressed by educational interventions and by enforcement interventions regulating open burning. Moreover, Stark identified cooking fires as causing more than 100,000 fires a year. This could be addressed by both educational interventions, which would make the risk known and risk reduction steps and engineering interventions like safer stoves or residential sprinkler systems, which are permanent interventions. An economic incentive intervention could also be used to entice citizens of Colleton County who install these engineering interventions by reducing their insurance premiums or punishing those who repeatedly have cooking fires through fines, tickets or another enforcement intervention.

Ross stated that reducing risk in one area increases the risk in another area. During primary and secondary prevention, the professionals involved should insure that reduction efforts do not increase other risks. For example, if Colleton County chose to spend all of its operating capital on primary and secondary fire prevention, once a fire occurred, it would be ill-equipped, untrained, and ill-prepared to mitigate it.

The research revealed that risk reduction efforts would never completely eliminate the hazard. Therefore, emergency response must always be addressed during risk reduction. As Denney identified, when a calculated risk results in damage, the media and general public will likely blame the professionals responsible for mitigating that risk. The professionals should be properly equipped and trained to mitigate the hazard and implement tertiary prevention; however, these same professionals should be involved in primary and secondary prevention efforts as well. The survey respondents, as professionals in their fields, recognize the risks. Although not all of the respondents agreed on the severity of the risks, they, as stakeholders in community risk reduction,

must be involved in the reduction efforts. The first educational intervention could be a document similar to the author's research, the documented risks to Colleton County, a collection and compilation of the local risk statistics, and the theory behind reduction interventions.

In order to understand all of the inherent risks to a community, Long and Fischhoff recommend ranking the risks according to magnitude. For Colleton County, the risks are heart disease, motor vehicle collision, firearm related injuries, fire/burn related injuries, drowning, and suffocation. All of these hazards represent higher levels of risk than the national statistics. Therefore, the citizens of Colleton County should be informed of their presence and interventions should be developed by the stakeholders and utilized in risk reduction efforts.

Recommendations

Based on the research results, Colleton County Fire-Rescue should begin by publishing the present risks to the citizens of Colleton County. It is also necessary to make the research results known to the stakeholders who will be involved in designing, creating and implementing risk reduction programs. The research may surprise both the stakeholders and the citizens of Colleton County; however, as this research has repeatedly identified, it is paramount to identify the risks and intended audience in order to establish the relevance for any risk reduction programs that are implemented. Risk reduction programs should include as many stakeholders as possible in their design and implementation to insure that the target risks and audiences are properly addressed.

Risk reduction efforts by Colleton County Fire-Rescue should not be a static process as it has been in the past, which is the current problem. Great strides have been

made to improve existing programs but still address only a few hazards. Changes should be made to continually evaluate the risks to the citizens of Colleton County and to create new, and refine existing risk reduction programs in order to properly address those risks. The research revealed that many of the risks nationwide are not the same priority locally. This dynamic continual re-evaluation process, as the purpose of this research, will adjust to the target risks and target audiences as they change in the future.

Organizationally, Colleton County Fire-Rescue risk reduction efforts in the future could potentially save lives, property and community vitality. At a minimum, it will serve as a reminder that prevention of a hazard is always preferred over management of the hazard.

Future researchers should strive to compile risk data that is specific to their jurisdiction and insure that the data is as current as possible. Moreover, the audiences to be addressed must be identified using current population statistics. It is paramount for future researchers to understand that risk assessment and reduction is a dynamic process that must continually be researched and perfected. In today's fire-rescue service, we constantly update operational policies, purchase new equipment to provide for safer incident scenes, and spend time pre-planning occupancies, water supplies, and training. Although these operational issues are important, the future fire-service should take hold of risk reduction as being equally as important in order to prevent hazards from affecting the citizens we protect. Future researchers should endeavor to merge risk reduction assessment and mitigation into a mutual plan for the management of risk in their local communities.

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Appendix A – Memorandum for Risk Survey

Hello all,

My name is David Greene and I am the Assistant Chief with Colleton County Fire-Rescue. As part of a research project for the Executive Fire Officer Program at the National Fire Academy, I am distributing a survey to a wide cross section of people, including emergency services, law enforcement, fire departments, industry, schools, and health care workers in Colleton County. The purpose of the survey is to determine what the risks are to the citizens of Colleton County. As stakeholders in this community, your opinions are very important to this research. It is my sincere hope, that with your help, the survey results, as part of the comprehensive research project, can assist Colleton County Fire-Rescue in risk reduction efforts in the future.

The survey can be completed online and in a relatively short period of time. Instructions are included for each question and once completed will be automatically saved. You can change your answers throughout the survey; however, you cannot change your answers once you have completed the survey. Surveys can be completed anytime prior to Monday, February 11, 2008 at 12:00 PM, at which time, the survey will be no longer available and the results will be compiled and analyzed.

Once you have completed the survey, if you are interested in obtaining a copy of the survey results, please email me and I will be more than willing to send you a copy of the results.

Let me also assure you of your anonymity as you complete the survey. Each respondent's answer to each question will be kept strictly confidential.

The survey can be reached at the following link:

http://www.surveymonkey.com/s.aspx?sm=2uCBP0HhTGtNR0083RzORQ_3d_3d

Thank you for the jobs you do everyday and thank you for taking time to assist me with this research. If you have any questions, please feel free to call me.

Sincerely,

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Appendix B – Stakeholder Risk Assessment Survey

1. This survey is being used to analyze your perception of risk to the Colleton County citizens by unintentional hazards (commonly referred to as "accidental causes"). You have been chosen as a stakeholder to determine the perceived risk in Colleton County. It is essential that you complete this survey based on your own experience, knowledge, and data from within your organization or agency and without utilizing research materials outside of your organization or agency (i.e. CDC, NHTSA, SCDHEC statistics). This information is being completed as part of an applied research project for the National Fire Academy's Executive Fire Officer Program and the results will be used to improve Colleton County Fire-Rescue's risk reduction programs. Thank you for your time in completing this survey.

Please rank (from "most risk" to "least risk") the following hazards (the "Most Risk" choice should be assigned to the hazard which poses the biggest risk to Colleton County citizens, the "Least Risk" choice should be assigned to the hazard which poses the least risk to Colleton County Citizens). Please select one circle per hazard:

Most Risk Least Risk

Drowning
Fall
Firearm (Unintentional)
Fire/Burns
Heart Disease
Motor Vehicle Collision
Poisoning
Suffocation

2.How do you think the risks of death by the following hazards in Colleton County (CC) compare to the National risk of death by the same causes?

CC has higher risk/CC has roughly equal risk/CC has lower risk

Drowning
Fall
Firearm (Unintentional)
Fire/Burns
Heart Disease
Motor Vehicle Collision
Poisoning
Suffocation

3.Which of the following age groups in Colleton County are most at risk of death from the following hazards?

Ages 1-4/Ages 5-9/Ages 10-14/Ages 15-24/Ages 25-34/Ages 45-44/Ages above 44

Drowning
Fall
Firearm (Unintentional)
Fire/Burns
Heart Disease
Motor Vehicle Collision
Poisoning
Suffocation

4.What factor(s) do you think most contribute(s) to the risk of death to the citizens of Colleton County by motor vehicle collision?

Alcohol and/or drugs
Failure to use safety equipment (seat belts, child seats)
Road Conditions
Unsafe/Careless/Reckless Driving

5.What factor(s) do you think most contribute(s) to the risk of death to the citizens of Colleton County by Fire/burns?

Alcohol and/or drugs
Cooking
Failure to use safety equipment (smoke detectors, etc.)
Improper use of heating sources (heater too close to combustible, etc.)
Outdoor Burning
Smoking (cigarettes, cigars, pipes)

6.What factor(s) do you think most contribute(s) to the risk of death to the citizens of Colleton County by Drowning?

Alcohol and/or drugs
Failure to use safety equipment (fences surrounding swimming pools, splash detectors, life vests, etc.)
Lack of education or training (swimming lessons, CPR, etc.)
Unsupervised and/or inadequately supervised persons

7.How well are the following risks addressed collectively by Colleton County organizations (Fire-Rescue, Hospital, Law Enforcement, Safekids, etc.) in a reduction effort?

Needs Major Improvement/Needs Some Improvement/Properly Addresses Risk

Drowning
Fall
Firearm (Unintentional)
Fire/Burns
Heart Disease
Motor Vehicle Collision
Poisoning
Suffocation

8. In your opinion, what is the highest risk to the most number of citizens (across all age groups) and what else could be done to reduce that risk.