Impacts of Risk Perception on Elderly Vulnerability: An Exploration of Effects on Disaster Preparedness in Assisted Living Facilities

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Impacts of Risk Perception on Elderly Vulnerability: 
An Exploration of Effects on Disaster Preparedness in Assisted Living Facilities

A Dissertation

Submitted to the Graduate Faculty of the 
University of New Orleans 
in partial fulfillment of the 
requirements for the degree of

Doctor of Philosophy 
in 
Urban Studies

by

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May, 2022
ACKNOWLEDGEMENTS

I would like to thank Dr. Monica Farris, Dr. John Kiefer, and Dr. Bethany Stich for their support and guidance with this research.

I would like to thank the assisted living residents and the subject matter experts who graciously agreed to take part in this research.
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ABSTRACT

Disasters are increasing in intensity and frequency. With this expectation, it is important for communities to be proactive in disaster preparedness to ensure the safety of their citizens. Vulnerable populations need special consideration in disaster planning. The elderly are one of these vulnerable groups. By 2025 one-quarter of the U.S. population will fall into the 65 or older age category. Age itself does not make a person vulnerable. It is physical and cognitive change that often accompany aging which can make a person vulnerable. The importance of elderly vulnerability and risk perception cannot be overlooked. The casualty data alone can demonstrate the severity of the issue, and with an increasing elderly population, the issue will only grow. Perception plays a key role in how a person prepares for risk and thus affects level of vulnerability. Understanding perception of risk is a crucial part of disaster planning. Many factors contribute to perception especially in vulnerable populations. Understanding the factors allows emergency management professionals to address the issues they can and better accommodate those they cannot correct. The purpose of this study is to explore risk perception in the elderly and how it might affect their disaster preparedness. Focus groups were conducted at an assisted living facility. While this study was in progress Hurricane Ida made landfall in Louisiana in August 2021. This provided a unique opportunity to conduct before and after research to examine the difference in risk and disaster perceptions in the elderly. Focus groups were reconvened at the same assisted living facility for comparison. In addition, elder care and disaster management experts were interviewed regarding existing elder-focused disaster preparedness plans and the challenges of keeping the elderly safe. Results indicate changes in risk perception pre- and post-storm, as well as differences in perceptions between the elderly and elder care and disaster management experts. Additionally, Hurricane Ida highlighted some failings in communications and senior housing regulations. These findings indicate that risk perception play a role in vulnerability, and, as such, a greater consideration needs to be given to the elderly’s perception of risk in disaster preparedness.
CHAPTER 1: INTRODUCTION

Disasters are events that disrupt normal life and cause destruction and suffering at levels that exceed the community’s capacity to adapt (Lindell and Prater 2003). As much as we hope to avoid them, disasters are increasing in frequency and intensity (Banholzer, Kossin and Donner 2014, Bergholt and Lujala 2012, Coleman 2006). Climate change is playing a key role in this increase in extreme events (Banholzer, Kossin and Donner 2014). However, this increase is not limited to natural events. Man-made disasters are increasing and intensifying as modern technology has made risk an integral part of modern life (Coleman 2006). Banholzer, Kossin and Donner (2014) note that with the expectation that disasters will continue to increase in number and intensity, it is important to include knowledge of vulnerability and exposure in disaster planning to better protect communities.

Vulnerable populations present a challenge to emergency management professionals. Not only must the special needs of each vulnerable group be taken into consideration but also their ability to respond to risk and participate in assisted disaster preparedness programs. The elderly are one of these vulnerable groups. As baby boomers age, the elderly population is growing quickly. By 2025 over 85 million people in the U.S. will be over the age of 65 (Mayhorn 2005). The U.S. Census Bureau estimates that by that time the U.S. population will be 335 million (Campbell 1996). That means that one-quarter of the population will fall into the 65+ age category. Berube et al (2010) project the national elderly population will increase at rates topping 30% through 2030. In the New Orleans metropolitan area, the elderly population is at 16% (U.S. Census Bureau 2019). Plyer et al (2011) predicted the elderly population in the New Orleans
metropolitan area to follow the national trend. As the elderly population grows, it presents a unique challenge to emergency management professionals. Age in of itself does not make a person vulnerable; however, physical and cognitive changes associated with the normal aging process can impact risk perception in ways not generally experienced by other segments of the population (Bodstein, Vanda Azevedo de Lima and Abreu de Barros 2014, Cooper and Perez Hooks 2016, Mayhorn 2005, Mayo Clinic 2019, McLelland et al 2017, Murman 2015, Pekovic, Seff and Rothman 2007).

Disaster preparedness contributes to overall survivorship and resilience of any population. However, a 2014 survey indicated that two-thirds of adults over the age of 50 have no emergency plan, never participated in a disaster preparedness education program, and were not aware of relevant resources (Shih et al 2018). Zedlewski (2006) notes that prior to 2005 the city of New Orleans had no special emergency plans to aid those with disabilities, and with 56% of the elderly population reporting a disability, this was a recipe for disaster. In response to recommendations from the U.S. Department of Transportation and the U.S. Department of Homeland Security, the New Orleans Office of Homeland Security and Emergency Preparedness developed the City Assisted Evacuation Plan to assist those citizens who lacked the capability to self-evacuate (Fogarty et al 2011). As governments learn from experience, disaster preparedness education programs and assisted evacuation programs are being created to assist the elderly in becoming more resilient. But how much of the elderly population are aware of these resources? How much of the elderly population actually uses these resources? Increasing participation in life-saving programs is always a priority, but it becomes especially important when dealing with a vulnerable population. A city can have a well-developed disaster preparedness plan in place,
but, if the target vulnerable population is unfamiliar with the plan, good results may be difficult to achieve.

Perception of risk is a crucial part of disaster planning in any community. Understanding the special physical and cognitive needs of the elderly is an important part of being able to assist in their safety and resilience. However, we must also understand their perception of risk. How a population views risk determines response to risk warnings and thus level of preparation and how well it fares after encountering a given hazard. Response to risk perception cannot be limited to a one-size-fits-all strategy though. The purpose of this research is to examine how elderly perceive risk and how their perception can impact their vulnerability.

The importance of elderly vulnerability and risk perception cannot be overlooked. The casualty data alone demonstrate the severity of the issue, and with an increasing elderly population, the issue will only grow. Hurricane Katrina highlighted these vulnerabilities in 2005 with 75% of fatalities being over the age of 65 (Bowser 2013). Hurricane Ida in 2021 again brought elderly vulnerabilities to the forefront with 58% of fatalities in Louisiana being over the age of 65 (Louisiana Department of Health 2021). The way to address vulnerability is to understand the factors that contribute to it. Understanding the factors allows emergency management professionals and other stakeholders to address identified issues in the most effective way.

Studies have been conducted that examine the various physical and cognitive factors contributing to elderly vulnerability, e.g., declination of motor skills, vision, comprehension, etc. (Jenkins, Laska and Williamson 2007, Mayhorn 2005, McLelland et al 2017). However, these studies
focus on how those changes impact vulnerability rather than how they influence perception of risk. For example, does someone’s decreased mobility make them fearful to stay and prompt evacuation preparations at the first warning? Or does it make the individual fearful to leave the house? How is this factor influencing vulnerability? Several studies also focused on the elderly’s evacuation behavior (Bowser 2013, Gray-Graves, Turner and Swan 2011, and Wang 2016). These studies used senior centers to collect interview data. While this method gives easy access to the elderly with perhaps a higher rate of participation, it leaves out those individuals who, due to physical or cognitive decline, are more socially isolated. People who are active physically and mentally are better able to respond to risk. Thus, the most vulnerable portion of the elderly population is left out of the data set. Studies have been conducted that look at elderly resilience (e.g., Henderson, Roberto and Kamo 2010, Kilijanek and Drabek 1979, Ngo 2001). However, these studies do not account for pre-disaster perception of risk. Overall, there is a gap in the literature that specifically examines whether perception of risk contributes to elderly vulnerability. This is unfortunate because understanding perception of risk could assist emergency management professionals in mitigating vulnerability through planning and resources. Within this gap in the literature there are several questions that are of interest in this research.

- How does risk perception contribute to elderly vulnerability?
- Are there any predominant perceptions and what are the possible implications?
- What perceptions are of particular concern for emergency management professionals?
- How does the aging process contribute to the challenges of disaster preparedness?
- How can the issue of risk perception be addressed?
Research design and methods

The purpose of this research is to examine questions for which there is little to no information and to help map direction for future studies, which Babbie (2014) notes is one of the main purposes of exploratory research. Swedberg (2020) explains that research conducted on such little known topics become exploratory by default. Therefore, this research is based on an exploratory design. The target population of this research is the portion of the elderly population that are “more vulnerable”, i.e., those who are experiencing noticeable physical and/or cognitive decline. Levels of vulnerability will be discussed later in this research. To this end, assisted living facilities within the New Orleans metropolitan area have been selected as the focus of the data collection.

Hurricane Ida presented a unique opportunity to this research. The hurricane made landfall in southeast Louisiana as a category 4 storm on August 29, 2021. At the time of landfall, data collection had already begun as data were collected from four focus groups. After Hurricane Ida, the researcher was able to reconvene the focus groups with the same participants from pre-storm groups. This provided a rare look at pre- and immediate post-storm perceptions and the opportunity to explore how recent events may change perceptions.

Summary

Overall, this research attempts to understand risk perception from the viewpoint of the elderly in assisted living facilities in the New Orleans region. This may help to better understand their vulnerability and highlight ways to support and improve resilience through planning, communication, and preparedness. Hoare (2015) notes that research on community and
individual resiliency has increased in recent years but has not really focused on the elderly. Key impediments to engaging vulnerable populations in planning are information access and social and cultural barriers (Horney, Strickland and Dwyer 2020). Communications must be customized for target vulnerable populations to transmit risk information more effectively (Janoske, Liu and Sheppard 2012). Horney, Strickland and Dwyer (2020) note the importance of engaging vulnerable populations now in disaster and mitigation planning because the longer it is delayed, the harder it will be to minimize the representation gaps between the general public and vulnerable populations. It may also help emergency management professionals better understand levels of participation in assisted evacuation programs.

The following chapters explore the impacts of risk perception on the elderly’s disaster preparedness in the New Orleans region. Chapter Two summarizes existing literature on risk and risk perception, preparedness, elderly vulnerability, the aging process, the elderly and disaster assistance, risk communication, and existing strategies for addressing vulnerability. This summary provides background information and identifies gaps in the current literature that provide context for how this research contributes to a better understanding of risk perception and the elderly. Chapter Three outlines the research design and methods utilized. Chapter Four presents the results of the research. Chapter Five summarizes the research findings and discusses the possible implications, and Chapter Six summarizes the purpose of the study, the contribution of the findings to the existing knowledge base, and possibilities for future research.
CHAPTER 2: LITERATURE REVIEW

The concept of risk is subjective and is influenced by many different factors. The aging process presents its own unique influences on perception of risk and can contribute to the increasing vulnerability of the elderly. Emergency management professionals face a unique challenge when addressing the perceptions and vulnerabilities of the elderly. This literature review explores the role of perception in the dynamic definition of risk. It also explores how the aging process can affect perception and vulnerability. Additionally, it examines how vulnerability can be addressed while taking risk perception and the aging process into account. This literature review provides the background on which this research concept is based and contributes to the research design and methods.

Risk and perception of risk

The word “risk” suggests bad behavior or destructive events, but what exactly is risk? Slovic and Weber (2002) note that the inherent subjectivity of risk makes it difficult to specifically define. A basic definition of risk is the probability of a negative event occurring in the future (Bourque et al 2015). Risk perception is an individual’s personal judgement of the likelihood, severity, and implications of a negative event (Brown 2014, Paek and Hove 2017). Šotić and Rajić (2015) explain that risk means different things to different people. Some people have a higher tolerance for risk than others. Others have different personal experiences with a given risk. Still others may not have the knowledge to understand the risk at hand. The public tends to involve more factors in their definitions of risk than the technical experts who seek to reduce the definition to a manageable concept (Morrow 2012). No matter what the variations in definition
are, all have a common element and that is the distinction between the reality of the individual and future possibilities (Renn 1998).

Bonem, Ellsworth and Gonzales (2015) explain that understanding risk motivations is critical to preventing risk taking. How individuals view a particular risk will impact how they prepare for and respond to that risk. One person may avoid flying because the lack of personal control over the aircraft is deemed a risk. Another may fly but avoid interstate driving because more people die from auto accidents than plane crashes. Still another may distrust mechanics and use a bicycle. All three examples are three different perceptions and thus three different definitions of risk.

Inouye (2014) categorizes factors affecting risk perception into three levels: macro, meso and micro. Macro level factors include the culture of safety and leadership in a community and the enforcement of safety measures. These factors come into play with governmental policies regarding community safety and governmental officials advocating for and enforcing these policies (or not). A declaration of a mandatory evacuation for certain levels of risk would be an example of a macro level factor. The declaration would help impress upon the community the severity of the risk at hand. Meso level factors include community and peer pressure. The influence of opinions and regard of family and friends have a strong influence on our lives. The social action theory suggests that our measure of risk is influenced by peer pressure (Inouye 2014). Someone hearing parents or grandparents dismissing the severity of a risk because they survived a similar event in the past may prompt the individual to dismiss the risk as well. Micro level factors include individual knowledge of a given risk and optimism bias. The extent of our
knowledge impacts how we respond to anything. The less knowledge we have, the less chance we have of making the right or safest decision. Our level of optimism will impact our measure of risk severity (Harris 2012). Within these levels described by Inouye (2014) there are risk-influencing factors that are unique to particular groups of people. A closer look at these unique factors is necessary to better understand risk perception in the elderly population.

There are various methods for analyzing risk perception. Slovic and Weber (2002) mention three paradigms that are used in examining risk perception: axiomatic measurement paradigm, socio-cultural paradigm, and psychometric paradigm. The axiomatic measurement paradigm describes risk as the probability distributions of possible outcomes of risky choices (Weber 2001). This paradigm seeks to quantify and estimate risk (Zheng et al 2015). Perception of risk becomes a product of numbers, i.e., estimating the chances of loss for a given action or non-action. However, this paradigm only looks at the quantitative side and does not take into consideration the social, cultural, and psychological factors of perception (Zheng et al 2015). The socio-cultural paradigm describes risk as the result of group and cultural variables (Slovic and Weber 2002). In this paradigm risk becomes a product of societal values, and individual views are dependent on societal representation (Zheng et al 2015). However, this paradigm reduces the importance of the individual on risk perception. The psychometric paradigm focuses on risk as a product of psychological reactions to risk that affect a person’s judgement of the risk (Sjöberg, Moen and Rundmo 2004). It seeks to address the “why” behind individual risk perception (Siegrist, Keller and Kiers 2005). However, this paradigm assumes people can provide meaningful answers to difficult questions, and the questions generally examine cognitions rather than actual behaviors (Slovic 1992), i.e., how one acquires knowledge or
understanding through thought, experience, and senses. This research will rely on the psychometric paradigm as a guide since this research focuses more on the individual than society, culture or quantitative analysis of risk and, more specifically, how the individual risk perception can impact preparedness.

**How perception can impact preparedness**

How people perceive risk will affect how they prepare for it. Harris (2012) reminds us that previous experience with risk does not equate to a person being better prepared. Territorial functioning, ontological security, memory bias, and unrealistic optimism are highly influential in risk preparedness. Territorial functioning occurs when a person attempts to control events that affect personal space or place (Taylor 1988). James, Ardeman-Merten and Kihlgren (2014) describe ontological security as a sense of safety in one’s normal habits and routines. Memory bias distorts memories of past events based on current knowledge and beliefs (Schacter, Chiao and Mitchell 2003). Any disruption of normal life can make the elderly feel insecure. Harris (2012) notes that emotions related to past experiences affect perception as well. The social attachment theory suggests that people will seek out familiar persons and places (e.g., staying home when an evacuation has been called) because separation from attachment figures is a greater stressor than physical danger itself (Bañgate et al 2017, Bowser 2013). Johnson and Levin (2009) discuss the importance of psychological, sensory, organizational, and political biases on disaster preparation. They point out that these biases cause society to turn a blind eye to risk preparation as inconvenient, distant, unnecessary, and costly. They also note that society tends to have “positive illusions” about its ability to control events.
Oftentimes, decisions regarding risk preparation and response must be made within a small window of time. Yu, Zhu and Donaldson (2018) suggest that when time constraint is involved, it often results in poor decision making. They examined the effects of time pressure and disaster decision-making on sixty people (average age of 31) with emergency response experience in China. Participants were presented with a typhoon scenario and asked to make decisions regarding disaster preparation. One group was given a time limit and the other was not. The researchers found that time pressure negatively impacted decision performance by occupying the decision maker’s cognitive resources. When presented with the prospect of a traumatic experience, the elderly may feel overwhelmed (Pekovic, Seff and Rothman 2007), and past exposure to traumatic experiences may numb people to future warnings (McLelland et al 2017). The elderly have a stronger adverse reaction to negative stimuli than young adults, and they are more focused on boosting their contentment and avoiding regret (Cooper and Perez Hooks 2016). Behavioral reactions can range from isolation to reluctance to leave home (Pekovic, Seff and Rothman 2007). Wang’s 2016 study examines the elderly population in Sarasota County, Florida and specifically focuses on hurricanes. She notes that people tend to distance themselves from risk by maintaining a positive emotional state (e.g., “it won’t happen here”).

Wang further suggests that the elderly are prone to the recency effect as well as spatial optimism bias. The in-depth interviews Wang conducted with the elderly support these suggestions. The recency effect occurs when response options are more likely to be chosen when given at the end of the options list (Lavrakas 2008). Using the example of a hurricane evacuation, emergency management professionals will always stress first that the community needs to leave and, only afterwards, explain what to do if someone decides to stay. In this case the recency effect
suggests that information regarding staying in place is prioritized because it is most recent in memory.

Spatial optimism bias occurs when a person views his or her geographical area in a more favorable light than other areas (Milfont, Abrahamse and McCarthy 2011). Again, using the example of a hurricane, an individual may believe he or she will be okay to stay because “it never floods here” or “the storm will turn away.” Ngo (2001) suggests that a strong sense of independence and life experience make the elderly fail to heed warnings of impending disaster. While all individuals can be subject to the factors discussed above (territorial functioning, ontological security, memory bias, unrealistic optimism, time constraints on decisions, stronger adverse reactions to negative stimuli, recency effect, and spatial optimism), the impacts of perception can be amplified on the elderly as they are a vulnerable population, which is further discussed in the next section.

_Elderly vulnerability_

In order to better understand how vulnerable the elderly can be, one need not look further than disaster casualty statistics. The elderly are more likely to become casualties during a disaster than young adults (Mayhorn 2005). In Louisiana 75% of fatalities attributed to Hurricane Katrina were over the age of 65 (Bowser 2013), while the elderly made up less than 11% of the population (City of New Orleans 2010). The elderly accounted for less than 20% of the population but accounted for more than half of the casualties from the 1995 Hanshin-Awaji earthquake (Tanida 1996). Following Hurricane Andrew in 1992, 32% of casualties were over the age of 65 (Lew and Wetli 1996). The numbers alone demonstrate that the elderly are a
vulnerable population. Social processes and power relations found in every society will put
certain groups of people in disaster’s way more so than other groups (Hillhorst, Frerks and
Bankoff 2004). Schröder-Butterfill and Maranti (2006) note that vulnerability is a social
construction based on the inequalities found in society. They point out that these inequalities
cause an uneven distribution of vulnerability. When factoring in physical and cognitive decline,
fixed income, and other inequalities often associated with the elderly, the vulnerability of the
elderly increases. But what exactly is vulnerability? Is there a standardized definition, or is it
fluid like risk perception?

Vulnerability is not something that can be easily defined. It can have various forms within a
single community, and there is no set definition due to epistemological differences within fields
of study and methodologies (Weichselgartner 2001). As Adger (2006) notes, though, in all
definitions, vulnerability is the sensitivity and adaptive capacity of a system to a given stressor.
He further explains that vulnerability is dynamic and not easily measured. There are many
factors that influence vulnerability such as geographic location, structural integrity, personal
attributes of an individual (e.g., age or physical health), social network strength, language, etc.
(Flanagan et al 2011). Chambers (1989) defined vulnerability as exposure to contingencies and
the stress and difficulty coping with them. He notes that vulnerability has two parts: external
and internal. The external factors are those things imposed on an individual by the risk, e.g.,
high risk geography such as living below sea level, poverty, or physical decline. The internal
factors are the individual’s response to the external factors, e.g., inability or unwillingness to
mitigate one’s home for high water, not taking advantage of disaster preparedness and recovery
programs for low-income families, not wanting to seek assistance for one’s limited physical
abilities. In addressing elderly vulnerability, this paper refers to the internal factors of vulnerability. Wingate et al (2007) further explained that vulnerability arises from the inability to access resources through standard channels, i.e., someone needs special assistance or attention to ensure resources are adequately reached. For the purposes of this research, elderly vulnerability is defined as an elderly person who needs special assistance or attention to ensure that they have equitable access to resources to ensure safety and well-being.

Labeling a population as “vulnerable” is often taken in a negative context. Danis and Patrick (2002) note that “labeling individuals as ‘vulnerable’ risks viewing vulnerable individuals as ‘others’ worthy of pity, a view rarely appreciated.” This is especially true of the elderly population. Receiving assistance with preparation, response, and recovery during a given disaster may make the elderly feel that they are admitting to the inability to live independently (Bowser 2013). Hillcoat-Nallétamby (2014) notes that the ability to do things without assistance is an integral part of the definition of independence and a means of self-identity. Thus, the label of “vulnerable” may provoke the rejection of assistance by the elderly so as not to appear as incapable of taking care of themselves. As a result, in addition to the problems associated with defining vulnerability and subsequently identifying qualifying vulnerable populations, some vulnerable individuals may refuse to identify with the term “vulnerable” and refuse assistance thereby creating a greater vulnerability.

Vulnerability is not just a term assigned to certain groups of people. Vulnerability has real implications for those identified populations. McLelland et al (2017) cite a 2012 study which indicates that two-thirds of the U.S. elderly population do not have an emergency plan in place.
Without a plan, the elderly are left to make decisions under pressure, which can result in a negative outcome (Yu, Zhu and Donaldson 2018). How much more would time pressure affect the elderly who suffer from physical and cognitive impairments? Mayhorn (2005) examines the effects of cognitive aging on information processing. He suggests that the elderly tend to be more socially isolated or have mobility and sensory impairments, which results in them being less likely to encounter risk information and warnings. Jenkins, Laska and Williamson (2007) specifically look at the elderly in New Orleans at the time of Hurricane Katrina in 2005. They point out that the elderly are less likely to evacuate their homes, and those who have the ability to leave are often overwhelmed or frightened by the prospect. Howell (2006) also notes that older adults are less likely to evacuate. She specifically notes respondents reported staying due to “better” homes, i.e., sense of safety influenced by perception of home construction, and the inability of the elderly to evacuate alone. Even those who do choose to evacuate or who are evacuated by family, friends, or organizations may be negatively impacted. Bodstein, Vanda Azevedo de Lima and Abreu de Barros (2012) focus on the elderly in Brazil and note that the elderly are more prone to suffer cognitively during an evacuation. They may become confused, disoriented, or even aggressive when taken out of their normal environment (Oriol 1999). Kaniasty, Norris and Murrell (1990) conducted three-staged stratified interviews of 1981 Kentucky flood victims aged 55 or older to examine perceived versus received social support. The results suggest the elderly are at an increased risk to hazard impacts because they are more likely to inhabit areas more susceptible to damage from natural hazards. Vulnerability not only plays a role in direct impacts during a disaster but also in the response to said disaster.
**Aging process and vulnerability**

Age in of itself does not make a person vulnerable, i.e., just being over the age of 65 does not automatically mean an individual’s vulnerability is increased. There are physical and psychological issues that are prevalent in the elderly that can make them more vulnerable (McLelland et al 2017). Functional decline is the main manifestation of elderly vulnerability (Bodstein, Vanda Azevedo de Lima and Abreau de Barros 2012). Functional decline is the reduction in ability to perform activities of daily living (ADLs) due to physical or cognitive decline (Abdulaziz et al 2016). Cognitive impairment is present in 10-30% of the elderly (Pekovic, Seff and Rothman 2007). Brain size decreases with age. Changes in the structure and function of synapses and changes in neuronal networks correlate with cognitive changes (Murman 2015). Murman (2015) refers to studies that indicate while crystallized abilities continue to improve until age 60, there is a steady decline in fluid abilities from age 20 until age 80. Crystallized abilities refer to skills, abilities and knowledge that are overlearned, well-practiced, and familiar (Harada, Natelson Love and Triebel 2013). Language is an example of a crystallized ability. Fluid abilities refer to problem-solving and reasoning about things one is less familiar with (Harada, Natelson Love and Triebel 2013). Sensory and processing speed as well as executive cognitive functions decline with age (Pekovic, Seff and Rothman 2007) and are considered fluid abilities (Harada, Natelson Love and Triebel 2013). With the decreasing ability to process unfamiliar information and make reasoned decisions based on the new information, the elderly are at a higher risk of misunderstanding risk communication. The elderly are also more likely to suffer long-term psychological stress and somatic symptoms (Mayhorn 2005). Mayhorn (2005) suggests that receiver characteristics (e.g., personality) influence pre-existing beliefs regarding the seriousness of a risk warning and the credibility of the source, i.e., how
trustworthy the audience believes the source of information to be. The importance of trust in the communication process will be discussed in more detail later in this chapter.

Dementia is a major factor when considering cognitive decline in the elderly. The World Health Organization (2019a) estimated that in 2015 50 million people worldwide were living with some form of dementia. They estimate this number will be 82 million in 2030 and 152 million in 2050 (American Speech-Language-Hearing Association n.d.). In the U.S. there are currently an estimated 5.8 million people living with Alzheimer’s disease (the most common form of dementia), and 5.6 million of these people are over the age of 65 (Alzheimer’s Association 2019). But what is dementia and how does it impact risk perception? Dementia is the progressive loss of cognitive functioning to the extent that it interferes with daily life (National Institute on Aging 2017). It occurs when the nerve cells in the brain stop functioning and die (National Institute on Aging 2017). Dementia symptoms vary from person to person depending on the type of dementia, how fast the disease progresses, and individual personality (Weill Institute for Neurosciences n.d.). However, common symptoms of dementia are short-term memory loss, difficulty communicating, difficulty with visual and spatial abilities, difficulty reasoning, difficulty with complex tasks, difficulty with planning and organizing, difficulty with coordinating and motor functions, confusion, and disorientation (Mayo Clinic 2019). Even in the early stages of dementia, there is difficulty processing risk warning information. This is an issue that should be noted by emergency management professionals because 13% of people with dementia are living alone (Gould et al 2015).
Age-related physical changes are something emergency management professionals should consider when drafting messages regarding risks. Normal age-related physical changes make it difficult for the elderly to respond to risk information and warnings in the same way as younger adults. Changes to vision and hearing make messages more difficult to receive. Presbyopia, senile miosis, cataracts, glaucoma, macular degeneration, and diabetic retinopathy are common vision issues in older adults (Nylén et al 2014). Presbyopia is the hardening of the natural lenses thus making it difficult for the eyes to change shape and allow light to hit directly on the retina. Focusing on close objects becomes more difficult (National Eye Institute n.d.). Senile miosis is the reduction of the pupil size due to atrophy of the muscles in the eye. This restricts the amount of light allowed into the eye thus increasing the need for higher illumination (Sloane, Owsley and Alvarez 1988). Cataracts are the clouding of natural lenses caused by the breakdown of proteins (American Academy of Ophthalmology 2019). Glaucoma is an optic nerve disease that causes gradual vision loss and is usual associated with fluid pressure on the eye nerves (American Optometric Association n.d.). Macular degeneration is an incurable eye disease that leads to vision loss. It occurs when the central portion of the retina begins to deteriorate (American Macular Degeneration Foundation n.d.). Diabetic retinopathy is a diabetic complication caused by damage to the retina’s blood vessels (Mayo Clinic n.d.). All these vision issues make it difficult for the elderly to see and read risk warnings. Thus, a ticker on a television screen or newspaper articles relaying important risk warning information could go unread if the elderly have difficulties reading the print. Presbycusis or age-related hearing loss is a gradual loss of hearing as a person gets older. It appears to run in families and may occur due to changes in the inner ear or auditory nerves (National Institute on Aging 2018). Older adults may also have difficulties hearing sounds over a frequency of 4 KHz or filtering out distracting
noises (Mayhorn 2005). Thus, audible risk warnings may not be heard clearly or not heard at all if issued at higher frequencies. If elderly listeners are subject to other noises while a risk warning is issued, they may have difficulties following the message.

Physical functional decline impacts the elderly’s ability to perform activities of daily living (ADLs). Physical decline can be due to chronic health conditions (e.g., heart disease, diabetes, arthritis), sedentary lifestyle, extended hospital stay, or trauma (Colón-Emeric et al 2013, Hartford Institute for Geriatric Nursing n.d., Northwestern University 2005). Muscle mass and strength decrease 30%-50% between the ages of 30 and 80, and strength decreases 12%-14% per decade after the age of 50 (Milanović et al 2018). Physical decline can leave the elderly feeling vulnerable and afraid to leave the security and familiarity of their homes which may lead them to ignore evacuation orders.

Vulnerability is dynamic (Hansson et al 2002). In studies and planning one can seemingly narrow it down to a concise concept, but in practice its variations make it difficult to address in a single method. Communicating with and providing resources for vulnerable groups can be difficult unless the process allows for adaptation to dynamic vulnerability.

**Risk communication**

Hansson et al (2020) note that vulnerability can often stem from communication-related factors. Communication must take on a different form when trying to reach vulnerable populations. The World Health Organization (2019b) explains that perception of risk must be taken into consideration when communicating with vulnerable populations. Most risk communication is
designed for the general public (Klaiman et al 2010). Rowel et al (2012) explain that this generalization of audience can be ineffective in addressing the unstable information environment of the vulnerable. How can communication be rendered more effective for vulnerable populations? Brown et al (2016) recommend looking at risk communication as a process and not a product. They point to the National Research Council definition of risk communication: “an interactive process of exchange of information and opinions among individuals, groups, and institutions. It involves multiple messages about the nature of risk and other messages, not strictly about risk, that express concerns, opinions, or reactions to risk messages or to legal or institutional arrangements for risk management.” They further recommend that emergency management professionals should speak to the interests of the target audience and not themselves. Eisenman et al (2007) note that risk information is often understood, but instructions tend to be ambiguous for vulnerable populations. Communicating uncertainty of risk is a challenge no matter who the target audience is (Fakhruddin et al 2020). Furthermore, emergency management professionals face the challenge of “information disorder,” i.e., quick, widespread dissemination and consumption of false or incorrect information (Hansson et al 2020).

Yasui (2017) notes that to effectively reach vulnerable populations, risk communication efforts must go beyond merely the distribution of information. Communication must target the underlying factors constraining appropriate response to the risk. Beckjord et al (2008) and Kiefer et al (2008) recommend multiple formats, channels, and frequencies to ensure as many individuals as possible receive and comprehend the risk information. Miletí et al (2011) refer to this as information density. Campbell, Roper-Fetter and Yoder (2020) note that story telling is
an effective method to relay information. It makes the information more relatable and easier to remember. When dealing with populations whose primary language is not that of the general community, translation plays a huge role. Literal translation into another language does not guarantee comprehension (Beckjord et al 2008). The messages must be linguistically and culturally accurate (Beckjord et al 2008). Community-based communicators are another method of reaching target populations. Community-based communicators can be individuals who are trusted leaders or trusted organizations in the community such as religious or advocacy groups. Use of local communicators help to identify and effectively use the best channels in which to reach vulnerable populations as Rowel et al (2012) suggest in their study of low-income minority populations affected by Hurricane Katrina. People make decisions based on personal experiences, familiar practices, and influences of trusted social networks (Eisenman et al 2007, World Health Organization 2019b, Yasui 2017), so community-based communicators can prove invaluable in building trust so essential to the communication process. The exact methods chosen will vary from vulnerable population to vulnerable population, but the general principle of customized, population-specific communications can help reduce communication-based vulnerability.

Ng and Hamby (1997) explain that, historically, risk communication has been one-way with the public being told what the experts think is important. However, they further explain that this is no longer enough for many people as they desire more involvement. They recommend communicators consider audience demographics and to keep in mind the goal of the message. Is the communicator trying to inform or influence the audience? Ng and Hamby (1997) further suggest making the process interactive through listening and validation of concerns. Kasperson,
Golding and Tuler (1992) also note that the goal of risk communication needs to be more than just transmission of information. The National Research Academy (1989) suggests that risk communication should be an interactive process of information exchange. It must be noted though that people do not all share the same interests and values (National Research Academy 1989), and so there are barriers that communicators will face. The Office of Coastal Management (2016) notes that knowing your audience is an important part of effective risk communication. Kiefer et al (2008) further note the importance of knowing your audience’s vulnerabilities as an important part of risk communication.

Effective communication with the public can be complicated, but it is even more so with vulnerable populations. Risk communication often involves messages regarding threatening or poorly understood hazards (Ng and Hamby 1997). This makes effective communication more difficult because one must explain something that is frightening or unknown to the audience. To achieve effective communication, emergency management professionals need to understand the psychological proximity of their audience to a given risk (Reynolds and Seeger 2014), i.e., how this risk will impact them personally, e.g., physically, mentally, emotionally, or financially. Emergency management professionals must also understand the qualities that help define a population as “vulnerable.” Qualities that render a population vulnerable can inhibit their access to and understanding of risk communications. Language barriers, physical or cognitive disabilities, and technological disadvantages are just a few examples of the issues that emergency management professional face when trying to communicate risk (Meredith et al 2008).
Emergency management professionals face many challenges when trying to communicate risk to vulnerable populations. As Janoske, Liu and Sheppard (2012) note from method of delivery to message content, care must be taken that messages are customized for each target population. They further note that the elderly may rely more on emotion-based processing of information and be less likely to use newer technologies that they perceive as difficult to use. Customization usually requires more time, effort, and money to accomplish (Meredith et al 2008), and all too frequently emergency management professionals rely on a one-size-fits-all format (Bean et al 2016). However, this method only works if the community is homogenous in all aspects (Janoske, Liu and Sheppard 2012).

Part of the process of achieving effective communication involves developing clear, concise, and meaningful messages that target your audience (Kiefer et al 2008, Mileti et al 2011). Fischoff (2009) points out that poorly chosen information wastes time, diminishes confidence in leaders, and makes the public appear incapable of processing risk information. He further notes that risk communication cannot simply be an afterthought that informs the public about what officials have decided. When targeting a vulnerable population, messages that take population qualities into account are crucial. If the audience is an ethnic community, consider distributing the message not only in English but also the ethnic language of the community. If the audience is the elderly, visual accompaniment to the verbal message is a way to attract attention and make complex information easier to comprehend (Finucane 2008, Millet et al 2020).

Designing effective risk communication in general can be tricky, but it is more so for vulnerable populations. The elderly present a unique challenge. As mentioned previously, age-associated
visual and auditory decline make it difficult for the elderly to receive risk communications. Cognitive decline makes it difficult to process and understand received communications. Garg et al (2012) surveyed older adults and the impacts of intrusions during communication. They discuss several items that help make risk communication easier for the elderly to comprehend. The first is to avoid overloading sensory channels whether individually or simultaneously. As mentioned previously, the elderly have a hard time filtering out distracting noises, and cognitive issues can arise with visual bombardment (Mayhorn 2005, Nylén et al 2014). Similarly, they suggest avoiding additional noises such as music or sound effects. Garg et al (2012) also recommend avoiding irrelevant data. When dealing with a population that may or may not have cognitive issues at varying levels, inclusion of irrelevant data will only serve as a distraction. They also suggest avoiding presenting two sets of data at once to allow time for each message to be processed individually and without competition. Finally, they recommend the use of graphics with words. Sometimes an image can be more of an effective communicator than words. For example, a stop sign can be a better deterrent than simply the word “Stop.”

Mode of communication is a critical part of disaster management. As we become a digital society, much of our information regarding risk comes from the Internet. Since our current elderly population spent most of their lives in the pre-digital age, this can be problematic. A 2015 study indicates that 61% of people 75 years or older have never used the Internet (McLellan et al 2017). Risk communications published on the web or sent out via text or emergency alert notifications on cell phones may be overlooked because the elderly may not know how to access this information due to anxiety about using technology or lack of interest (Navabi, Ghaffari and Jannat-Alipoor 2016). Other vulnerable populations such as the poor may
not have access to the basic technology that society takes for granted and as such may not have access to digital risk communications. Ideally, emergency management professionals should use multiple media outlets for disseminating risk communication. However, it is very important that the messages are consistent across all mediums to avoid confusion (Ng and Hamby 2014).

**Vulnerability and disaster recovery**

Vulnerability implications are not limited to preparation and direct impact. Vulnerability impacts recovery as well. Kilijanek and Drabek (1979) interviewed the elderly affected by the 1966 Topeka Tornado. They identify nine categories of disaster aid (relatives, friends, religious organizations, Red Cross, Salvation Army, other volunteer organizations, governmental agencies, strangers, and employers). In those categories the elderly received less aid than other victims, and 20% received no aid at all. Mayhorn (2005) notes that previous research suggests the elderly are less likely to utilize disaster aid after an area has been struck. This could be due to the negative perceptions of receiving aid. As previously mentioned, Bowser (2013) notes that such assistance may make the elderly feel their independence is being threatened. There is also a stigma of welfare attached to receiving government aid in the form of “soft” services. Failure to engage governmental assistance can cause the elderly to “slip through the cracks.” On the other hand, the elderly may also perceive their losses to be greater than they are. Kilijanek and Drabek (1979) note that the elderly are twice as likely to report greater losses even if the damages were evenly distributed among the victims. They are twice as likely to report their post-disaster situation as worse even if there are no significant differences among victims. This raises the issue of emotional attachment to property which was discussed previously (Bańgate et al 2017, Bowser 2013).
Addressing vulnerability and other factors

The issue of addressing vulnerability is a persistent one. Vulnerability, if addressed once, does not simply vanish. It must continue to be addressed to mitigate the ramifications of vulnerability. Emergency management professionals should approach the topic with long-term goals in mind rather than solely immediate changes. Short-term plans involve immediate response and quickest results and as such are much more popular. However, short-term plans do not fix the problem. Long-term plans address the cause of the problems but are not as popular because the results are not quickly seen. That is not to say that short-term plans should not be a part of addressing vulnerability. Short-term and long-term plans should work together. When vulnerability is only addressed when chances are high for a negative event, people tend to ignore it until the last minute, and then it is often too late. When risk becomes part of everyday life, it becomes second nature to prepare and mitigate (Yasui 2017).

Assessment of a population’s vulnerability should be part of a risk management routine (Beckjord et al 2008). How can emergency management professionals get communities committed to long-term strategies? Getting communities involved and invested in risk mitigation and disaster preparedness is a chronic issue. If a community does not see the value in a particular strategy or even the value of preparedness in of itself, positive results are difficult, if not impossible, to attain. Helping a community to take ownership of risk information is one way to increase involvement and investment in disaster planning and risk mitigation. When communities use information to solve problems collectively, the information becomes community knowledge. This ownership of knowledge helps instill a sense of responsibility within the community (Yasui 2017). However, knowledge alone does not prompt action on the
part of vulnerable populations. Knowledge, in conjunction with guidance and options, helps people to respond in the appropriate manner (Campbell, Roper-Fetter and Yoder 2020). Customization of planning is another strategy supported in the literature. Hansson et al (2002) note that vulnerability should be considered dynamic. When disaster planning and risk mitigation strategies fail to consider the values and priorities of the target population, they will often be ineffective even if adopted (Yasui 2017). Offering options and solutions that are conformable with local values and priorities gives the target population a sense of autonomy (Brown et al 2016, Campbell, Roper-Fetter and Yoder 2020, Yasui 2017). Giving vulnerable populations a sense of independence and control in such decisions helps them to become more invested and aids in making resources better available to those populations (Yasui 2017).

Trust is another important aspect of addressing vulnerability. Zimmer, Zschiesche and Hölzinger (2009) note that trust is one of the most important parameters influencing public acceptance of communication reliability. Without trust people will not listen to risk communication or adopt risk mitigation programs. Corbett and Le Dantec (2018) explain that building trust must be a continuous and open communication between all actors. Renn and Levine (1991) define trust in communication as follows: “Trust in communication refers to the generalized expectancy that a message received is true and reliable and that the communicator demonstrates competence and honesty by conveying accurate, objective, and complete information.” They further note that trust plays a critical role particularly when there is information overload or lack of knowledge exists. Hyland-Wood, Gardner, Leask and Ecker (2021) note that people’s preferred method of communication as well as who and what they perceive as a “trustworthy authority” is influenced by culture, social identity, age, gender, and resource access. Trusting the official or agency
relaying the information can prompt people to accept the warning rather than disregard it due to lack of understanding. Positive relationships do not just happen. They require conscious effort to establish and maintain (Wälivaara, Sävenstedt and Axelsson 2013). This is where Michael Lipsky’s (1980) street-level bureaucrats applies. Emergency management professionals need to make sure they are building positive relationships with the elderly. Reaching out to vulnerable populations and making them understand that their concerns and needs are important is the foundation for building trust. Wälivaara, Sävenstedt and Axelsson (2014) explain that such relationships offer the opportunity for reciprocal benefits. Not only do elderly receive the benefits of customized attention and inclusion in planning to reduce their vulnerability but also emergency management professionals can benefit from the knowledge and skills that the elderly have to offer. It opens a mutual trust that benefits the community as a whole.

Attachment to place is a huge hurdle to overcome when it comes to disaster preparedness and resiliency in the elderly population. Bowser (2013) conducted interviews with the elderly in eight counties in South Carolina. The results support the notion of attachment to place with interviewees indicating a preference for sheltering in place or returning to high-risk areas after an evacuation. Understanding why the elderly have attachment to place is key to addressing reluctance to evacuate. The idea of “home” or “place” is more than just physical space. It is social connections and a sense of belonging, and it represents values, beliefs, and ethnicity (Iecovich 2014). It reflects an extension of oneself and promotes a sense of personhood (Edwards and Hall 2015). Acosta et al (2018) note that more and more adults are choosing to remain in their homes rather than move to senior care facilities. Encouraging successful aging in place is one way to approach this growing trend. The concept of aging in place has been around
since the 1970s, but it is gaining more traction as people seek alternatives to the traditional retirement community options (Olick 2019). Aging in place is defined as one living at home in a community with a certain level of independence (Iecovich 2014, Wiles et al 2011). The main idea behind it is to create a home space that is elder-friendly (i.e., single story, wider doorways to accommodate wheelchairs, walk-in showers without curbs, grab bars, etc.). However, scholars are now finding that successful aging in place goes beyond the home itself. Neighborhoods and communities are also essential pieces in allowing the elderly to remain in their homes (Wiles et al 2011). As mobility decreases due to age-related issues, accessibility to community services and amenities becomes harder. Incorporating elderly accessibility into community planning is an important part of making a community age-friendly and enabling successful aging in place (Iecovich 2014). Currently there are two types of organizations that promote aging-in-place: age-friendly communities (AFCs) and villages (Acosta et al 2018). AFCs are collaborations between community groups and local government that promote social networks and inclusion in community life (Acosta et al 2018). Villages are membership-driven, grassroots nonprofits that assist the elderly through programs and services (Acosta et al 2018). Villages can cover a neighborhood or city or cross municipal boundaries. The concept of aging in place is less likely to draw resistance from the elderly since it promotes their independence in the community.

Resiliency is the ability to cope and recover from an adverse situation (Edwards and Hall 2015). Research on community and individual resiliency has increased in recent years but has not really focused on the elderly (Hoare 2015). Resiliency is fluid and can change as a person ages (McClain, Gullatt and Lee 2018). It also has multiple components (e.g., financial, mental, cultural, etc.). It is therefore important that resiliency programs address these various facets and
be able to adapt to fluid situations. If the elderly resist change to their current lifestyle though, how can one successfully coax them to change their behavior to become more resilient? As mentioned previously, the elderly have a stronger adverse reaction to negative stimuli (Cooper and Perez Hooks 2016). One way of building resiliency would be to focus on building the ability to savor positive experiences (MacLeod et al 2016). When resilient behaviors boost contentment and happiness, people may be more prone to adopt such behaviors (e.g., if mitigation plan A is adopted now, risk event X will be less likely to disrupt one’s normal routine). As people age and become more dependent on others for assistance, they often lose their sense of purpose in life.

Giving the elderly the opportunity to participate in an activity or program that gives them a sense of purpose and belonging in the community (e.g., contributing their knowledge of impacts of past disasters to a planning committee) is another method of encouraging resiliency (Edwards and Hall 2015). Ng and Hamby (2014) note that participation in the process makes the outcome more palatable to the audience. Hartog (2014) notes that HelpAge International has successfully created older adult associations in several countries. These associations focus on resilience-building activities by promoting mutual support and reducing isolation and vulnerability through social support networks. The associations also give the elderly the opportunity to pass on knowledge and skills that can help younger generations become more resilient. By involving the elderly in such organizations, it gives them a sense of purpose, engages them in disaster and mitigation planning activities, and helps the entire community become more resilient. Edwards and Hall (2015) suggest that giving back a sense of control over one’s life by means of the ability to solve one’s own problems is yet another method of encouraging resiliency. They recommend helping the elderly build personal connections and a sense of purpose to encourage resilient behaviors. Feeling like one has some sort of control over or voice in a potentially stressful
situation can be empowering particularly for a vulnerable population (Hoare 2015) (e.g., choosing between two mitigation plan options rather than just being handed one plan).

Addressing the specific issue of elderly vulnerability is not an easy task. As mentioned previously, many older adults are adamant about maintaining their current lifestyles and living situations, and proposed interruptions of regular routine are met with resistance. Rather than work against the target population and their lifestyle choices by conscious or subconscious exclusion of stakeholders from the planning process, emergency management professionals should work with the elderly to create a resilient community. Horney, Strickland and Dwyer (2020) note that the key impediments to engaging vulnerable populations in planning are access to information, social barriers, and cultural barriers. They stress that it is critical for disaster and mitigation planners to engage vulnerable populations now because the longer it is delayed, the harder it will be to minimize the representation gaps between the general public and vulnerable populations.

Summary

The purpose of this literature review is to provide background information regarding risk perception, the influences of aging on risk perception, and how risk perception can impact elderly vulnerability. The literature demonstrates that while the basic definition of risk remains constant, what individuals perceive or categorize under that definition of risk is dynamic. The literature demonstrates that the aging process has important physical and psychological influences on vulnerability and risk perception. The impacts of the aging process and its contribution to vulnerability are not contested in the literature. The elderly are accepted as a
vulnerable population, and methods of addressing vulnerability are discussed. However, there is a literature gap in how risk perception contributes to elderly vulnerability when it comes to natural hazards and what this means for disaster planning. The position of this research is that more work needs to be done to incorporate long-term planning for elderly vulnerability and including them in the planning process rather than addressing it when potential disasters approach. Understanding the elderly’s perception of risk will be crucial to developing long-term plans. Methods of addressing vulnerability that are palatable to the vulnerable population as well as addressing issues viewed as priority by the given population are posited as critical to the long-term success of disaster planning.
CHAPTER 3: RESEARCH DESIGN AND METHODS

This chapter outlines the design and methods used for this research project. First, it explains the exploratory and qualitative nature of the study. Second, it identifies and describes the target population. Third, it describes the methods of data collection used. Last, it provides an overview of how the data will be analyzed.

*Design*

Risk perception in the elderly is not a widely studied subject. Swedberg (2018) explains that research conducted on such topics becomes exploratory by default. Researchers explore when there is little or no scientific knowledge about a given subject that they feel is worth discovering (Stebbins 2001). Stebbins (2001) further notes that exploratory research seeks to develop a generalization of the subject, which can lead to a more detailed understanding. Polit and Beck (2010) explain that generalization involves drawing broad conclusions from particular instances.

Exploratory researchers must be flexible in looking for data (Stebbins 2001). Sue and Ritter (2012) note that exploratory research does not necessarily involve random sampling but rather seeks out individuals who are knowledgeable about the subject.

Critics of exploratory research are concerned over the matter of design and the literature review but fail to view the research as a process that unfolds over many successive studies (Stebbins 2001). This is often used in exploratory research literature reviews and can help researchers examine relationships and help validate the study (Stebbins 2001).
The purpose of this research is to examine questions for which there is little to no information and to help map out direction for future studies, which Babbie (2014) notes is one of the main purposes of exploratory research. Therefore, this research is an exploratory design.

Creswell (2013) notes that qualitative research attempts to make sense of or interpret the meanings people bring to phenomena. This research attempts to understand the impact of perception on behavioral responses to risk and is qualitative. Focus groups and interviews were used as the method of data collection.

**Target population**

Bowser (2013), Gray-Graves, Turner and Swan (2011), and Wang (2016) used senior centers as the sites of data collection, which as Wang (2016) notes attracts the more physically and mentally active portion of the elderly population. The reasoning behind their selection was that the more active portion of the population would be more apt to participate in disaster planning. However, the target population for this research is the more vulnerable portion of the elderly population who, due to increasing physical or cognitive impairments, are less likely to frequent senior centers. This specific portion of the elderly population was chosen because they are in greater need of assistance in disaster planning and response due to physical and cognitive issues. Based on this researcher’s professional experience in elder care, assisted living facilities were deemed a good place to reach this portion of the population.

The definition of the term “elderly” or “senior” is subjective. Often the minimum age of such terms increase as an individual grows older. What is “old” for a 21-year old is different from
what is “old” for a 50-year old. For the purposes of this research, “elderly” or “senior” refers to the traditional definition of anyone who is 65 years of age or older (Lohr 1990). Additionally, since this research focuses on the “more vulnerable” portion of the elderly population, it was necessary to develop a scale of vulnerability to guide the sampling. The following scale was created using the [Louisiana-based Continuing Care Retirement Community (CCRC)] Assessment Tool¹, Dalhousie University / Nova Scotia Health Authority Clinical Frailty Scale and the Edmonton Frail Scale. The CCRC assessment tool was obtained through the researcher’s professional contacts while the Dalhousie University/Nova Scotia and Edmonton scales were obtained online. The Louisiana-based CCRC assessment tool is a chart used to classify levels of care for potential residents based on physical and cognitive conditions. The Dalhousie University / Nova Scotia Health Authority Clinical Frailty Scale is used to assess overall fitness levels after evaluation by a healthcare professional. The Edmonton Frail Scale is designed to be used by healthcare professionals without specialization in geriatrics to help assess level of frailty. The “Levels of Elderly Vulnerability” scale (Table 1) includes four levels: Least, Somewhat, More, and Most. The “Least” category contains those elderly who are still independent in all aspects of their lives. The “Somewhat” category contains those elderly who are beginning to experience physical or cognitive decline, but the decline generally does not significantly impact their everyday lives. The “More” category contains those elderly who are experiencing physical or cognitive decline that does impact their daily lives, resulting in the need for assistance with some daily activities. The “Most” category contains those elderly who due to advanced physical or cognitive decline need constant care and assistance with daily activities.

¹ Due to the confidentiality policy of this study, the Louisiana-based CCRC cannot be identified
Most people in assisted living will fall into the “more” level and a lesser amount into the “somewhat” level.

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<tr>
<th>LEVEL</th>
<th>DEFINITION</th>
<th>EXAMPLES</th>
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<tbody>
<tr>
<td>Least</td>
<td>Healthy physically and mentally</td>
<td>No assistance needed, able to live independently</td>
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<tr>
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<td>Active physically and mentally</td>
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<tr>
<td></td>
<td>Independent in all aspects of Activities of Daily Living (ADLs)</td>
<td></td>
</tr>
<tr>
<td>Somewhat</td>
<td>May begin to have some physical or mental declination, which may or may not be noticeable to others</td>
<td>Tires more quickly than before</td>
</tr>
<tr>
<td></td>
<td>Activity begins to decrease</td>
<td>Does not go out or participate in more strenuous activities as frequently, may or may not drive</td>
</tr>
<tr>
<td></td>
<td>Needs some assistance with more strenuous activities</td>
<td>Needs assistance with lifting heavy items, climbing ladders</td>
</tr>
<tr>
<td>More</td>
<td>Noticeable physical or mental declination</td>
<td>Needs assistance walking, forgetful, tires easily, diagnosed conditions</td>
</tr>
<tr>
<td></td>
<td>Activity significantly decreases</td>
<td>Cannot tolerate strenuous physical or mental activities, may not want to leave the house much, no longer drives</td>
</tr>
<tr>
<td></td>
<td>Needs assistance with some ADLs</td>
<td>Needs assistance with some ADLs</td>
</tr>
<tr>
<td>Most</td>
<td>Advanced physical or mental declination</td>
<td>Walking is difficult, wheelchair bound, advanced dementia</td>
</tr>
<tr>
<td></td>
<td>Activity is limited</td>
<td>Activities must be adapted to individual’s limited capacities</td>
</tr>
<tr>
<td></td>
<td>24/7 assistance with ADLs required</td>
<td>Unable to perform ADLs without assistance, usually in a LTC facility or has caregivers at home</td>
</tr>
</tbody>
</table>

Table 1: Levels of Elderly Vulnerability

Scale developed referencing the following sources: [Louisiana-based CCRC] Assessment Tool, Dalhousie University / Nova Scotia Health Authority Clinical Frailty Scale and the Edmonton Frail Scale.
Methods

Three methods for data collection were considered for this research. The first method follows suit of previous research on elderly evacuation behavior (Bowser 2013, Gray-Graves, Turner and Swan 2011, and Wang 2016) by gathering data at senior centers. Gray-Graves Turner and Swan (2011) did not provide a reason for using senior centers. However, Bowser (2013) uses senior centers because they are a hub of activity for the elderly population, and Wang (2016) uses them because they attract the more active portion of the elderly population which was deemed as the portion who would be more likely to participate in evacuation activities. While this does allow for easy access to the elderly and perhaps a higher rate of participation, it overlooks the individuals who due to physical and cognitive issues are more reclusive. These individuals are more vulnerable due to these ailments yet are not accounted for in this method. The second method involves traditional survey mailing. This allows for a larger sample size, no pressure to the respondent, and complete anonymity (Kanuk and Berenson 1975). However, the rate of returned surveys remains an issue (Daly et al 2011). Individuals with physical or cognitive issues may be less inclined to complete the survey. The third method involves conducting focus groups with the elderly at assisted living facilities. Bowser (2013) avoids the use of focus groups because they were deemed more challenging to conduct with the elderly who may have physical or cognitive issues that impede focus and concentration in a group setting. However, when conducted in a dedicated and quiet room these concerns can be addressed. Individuals at assisted living facilities need physical assistance and may be experiencing some cognitive changes, enough to make them feel vulnerable but not enough to impede their participation in meaningful conversations. However, with this method there are more complicated processes to obtain permission to conduct the focus groups due to state senior care facility regulations and a need for
a facility social worker to assist in recruitment of participants. Additionally, living in a facility adds a layer of protection that would not otherwise exist in the general community as assisted living facilities are required to have disaster plans in place in the state of Louisiana (LAC 48:1, Chapter 68, Subchapter G, §6875).

This research is focused on how risk perception impacts elderly vulnerability, and as such it will focus on the more vulnerable portion of the elderly population. Therefore, the first method (i.e., using senior centers) was discarded since the population utilizing these centers is the more active portion of the elderly population (Wang 2013). The uncertainty regarding the rate of return as well as the uncertainty as to whether the more vulnerable elderly are being represented is a major concern for the second method (i.e., traditional mail surveys). Hence, this method was also discarded. Despite the limitations of needing to rely on facility staff to assist in the recruitment of focus group participants, the third method was deemed the best method. It allows for access to the more vulnerable elderly population, which is the focus of this research. The extra protection of an existing disaster plan is not deemed as an impediment to obtaining satisfactory results because in assisted living facilities there is still a level of personal responsibility associated with the disaster planning for each resident.

Once the design and methods was approved by the dissertation committee, a research proposal was submitted to and approved by the University of New Orleans Institutional Review Board (IRB # 03JUN21).
Sample selection

The non-probability method of convenience sampling was used in selecting the assisted living sites at which the data were collected. In convenience sampling, members of the target population meet certain practical criteria such as easy accessibility or willingness to participate (Etikan, Musa and Alkassin 2016). This sampling method was chosen because of the involvement of a vulnerable population. Elder fraud results in $3 billion losses annually (FBI, n.d.). Assisted living facilities provide a level of protection to the elderly that otherwise may not exist in private home settings. By using professional connections to reach out to these facilities, the facility administrators have assurance as to the legitimacy and trustworthiness of both the researcher and study, and thus the approval process becomes quicker and easier. Additionally, the use of assisted living facilities limits the number of data collection sites. With the use of convenience sampling, it is generally expected that the results cannot be applied to a larger population (Etikan, Musa and Alkassin 2016, Setia 2016). However, Jager, Putnick and Bornstein (2017) point out that the use of a homogeneous convenience samples (in the case of this study, elders who fall into the “more vulnerable” category of Levels of Elderly Vulnerability Scale – see Table 1) have a clearer generalizability than conventional convenience sampling (e.g., surveying students on campus about the condition of local infrastructure).

The initial site for data collection was chosen because the researcher is employed there and thus could more easily gain access to the residents. The original sampling method included using professional connections to gain access to additional assisted living facilities in the New Orleans metropolitan area for further data collection. This sampling method changed to reconvening the
original four focus groups after Hurricane Ida in order to take advantage of the opportunity to examine pre- and post-storm perceptions.

Permission was obtained from the CEO of the initial site to conduct the study. The director of assisted living, the social worker, the director of life enrichment, and the assisted living life enrichment coordinator were consulted on the best approach for recruitment of focus group participants as well as the scheduling and venue. The original plan was to introduce the study at a resident council meeting through the council president. However, at the time of recruitment, the resident council presidency was vacant. Therefore, introductory letters, which explained the details and goals of the study, were distributed to each resident. Residents were instructed to sign up for the study by contacting either the assisted living life enrichment coordinator or the researcher. The assisted living life enrichment coordinator obtained the signed consent forms (Appendix A) for each resident who volunteered. Residents could choose which group in which they would participate based on specified times. If no preference was given, a group was selected for the resident. Four focus groups consisting of fourteen residents total were organized. The sessions were held in a room where distractions were minimal and privacy could be ensured. Facility COVID-19 guidelines were followed at each session. Each session was scheduled for 30-45 minutes. Each session was recorded, and once transcribed, the recording was deleted. The facility and the residents are not identified to ensure the privacy of the participants.

After Hurricane Ida struck southeast Louisiana, the same residents were approached via letter and in person to ask if they would be willing to participate in follow-up focus groups. Thirteen of the fourteen residents agreed. An additional four focus groups were scheduled. However, due
to medical issues, two residents were unable to attend, bringing the total number of participants to eleven. The sessions followed the same procedures as the original four focus groups.

**Original focus group questions**

A twenty question guide was designed to help facilitate the focus group conversations (see Appendix B for a copy of the guide). The research questions seek to answer:

- How does risk perception contribute to elderly vulnerability?
- Are there any predominant perceptions? What are the possible implications?
- What perceptions are of particular concern for emergency management professionals?
- How does the aging process contribute to the challenges of disaster preparedness?
- How can the issue of risk perception be addressed?

The focus group guide was designed to address these research questions by:

- Highlighting the impact of perception on elderly vulnerability through questions designed to encourage discussion about personal perceptions. Analysis of focus group conversations will attempt to understand how individual perception can contribute to vulnerability.
- Highlighting predominant perceptions and the implications on vulnerability and disaster planning through the identification of any predominant perceptions that exist in the target population. Further analysis can help identify possible implications of those predominant perceptions on elderly vulnerability and disaster planning. This can assist stakeholders in addressing concerns of the elderly and overcoming challenges to participation in disaster preparedness, response, and recovery activities.
• Examining the challenges of aging on disaster preparedness through the perceptions of the elderly based on attempts to identify effects of aging that appear to have impacts on risk perception in the target population.

• Highlight weaknesses and strengths in communication, support/resources, and education through questions that ask participants what they see as strengths and weaknesses in governmental disaster response and support for the elderly. This can help identify areas of disconnect between disaster management professional and the elderly.

As noted in the literature review, this research is using the psychometric paradigm as a guide. The psychometric paradigm focuses on risk as a product of psychological reactions that affect an individual's judgement of said risk (Sjöberg, Moen and Rundmo 2004). It seeks to answer the “why” behind perceptions (Siegrist, Keller and Kiers 2005). Additionally, micro-level factors of individual knowledge and optimism bias were taken into consideration. The extent of personal knowledge of risk as well as level of optimistic bias for one’s situation can have an important influence on perception (Harris 2012, Inouye 2014). Focus group questions were designed to draw attention to the importance of the individual in risk perception.

Participants were asked some demographic questions, which in the original design was to be used to see if there was any correlation between demographics and perceptions. Participants were then asked about their personal experiences with natural disasters and what hazards they felt were a threat to the New Orleans metropolitan area to gauge hazard awareness. Next participants were asked about whether they monitored hazard warnings and whether they thought the government and media did a good job of communicating those warnings. These questions
not only relate to hazard awareness but also provided a look at how a specific population received and interpreted those warnings. Next participants were asked whether they thought the government addressed the specific needs of the elderly during a disaster. This was designed to highlight gaps in services from the viewpoint of the target population. Participants were then asked about their personal emergency plans and awareness of assisted evacuation programs to gauge level of preparedness. Finally, participants were asked what they thought was the most important thing necessary to keep the elderly safe during a disaster. This was designed to highlight what was important to each participant. Each group was then offered the chance to discuss any final comments or identify items they believed had been overlooked.

**Hurricane Ida and follow-up focus groups**

On August 29, 2021, Hurricane Ida made landfall on the southeast Louisiana coast as a category 4 storm with maximum sustained winds of 150 mph. The impacts of the storm were felt in twenty-five parishes across Louisiana (FEMA, n.d.). During the storm’s landfall and in the aftermath, there were many issues that arose regarding the elderly. While the storm was passing over the New Orleans metropolitan area, the roof collapsed on Metairie Towers, a condominium for senior citizens. Due to the dangerous conditions, emergency responders were unable to immediately reach the residents (KATC 2021). Also, seven nursing homes under the same ownership were evacuated to a warehouse in Independence, LA. Conditions severely deteriorated at the warehouse during and after the hurricane, and 12 residents died (Moore 2021). Additionally, welfare checks at several low-income senior housing complexes revealed unlivable conditions after the storm due to the intense heat and lack of power, water, food, and medical attention, and local officials evacuated these facilities (WDSU 2021).
At the time the hurricane made landfall, four focus groups had already been conducted. The above mentioned senior-related stories presented a challenge to the continuation of the study. With a disaster still fresh and senior welfare concerns dominating the news headlines, issues with validity were expected to arise if the study continued along the same path. After consultation with the dissertation committee, it was decided to take a different approach to the research. Hurricane Ida presented a rare opportunity to assess pre- and post-storm perceptions. The first four focus groups would be reconvened to assess whether there were any significant changes in risk perception post-Ida. Changes in perception would warrant an in-depth analysis of those original four focus groups. If there were no significant changes in perception, the research would continue with the reconvened focus groups serving as a control to demonstrate the validity of the results post-Ida.

An eighteen question guide was developed for the follow up focus groups (see Appendix C). The demographic questions and natural disaster experience questions from the original guide were removed. Instead, participants were asked whether they sheltered in place or evacuated and asked to discuss their experiences with Hurricane Ida. They were also asked if they experienced any losses from the storm. This was to gauge the impacts of experience on perception. Next participants were asked about monitoring warnings and the efficacy of those warnings but in the context of their Hurricane Ida experiences. Participants were asked whether they believed the government addressed the specific needs of seniors during Hurricane Ida, what went well and what was lacking. Next participants were asked if they implemented their original emergency plan or modified it for Hurricane Ida and what they would change for next time. Participants were asked whether they would be willing to participate in an assisted evacuation program based
on Hurricane Ida performance of these programs. Next participants were asked what they believed was the most important thing that needed to be done to keep seniors safe during a disaster. Finally, participants were given the opportunity to add any comments or discuss any items they felt had been overlooked.

**Subject matter expert interviews**

Subject matter experts are those who are considered experts in their respective fields. They have working knowledge of existing policies and procedures and, as such, can be of assistance in identifying weaknesses and solutions. For this research two emergency/disaster management experts and two elder care experts from the New Orleans metropolitan area were identified through professional and academic networks and interviewed. The purpose of these interviews was to gain experts’ insights on the challenges of working with the elderly and existing programs targeting the elderly for disaster preparedness, response, and recovery. An eleven question interview was designed (see Appendix D) and emailed to the experts. First, they were asked to describe their background in their respective fields. Then they were asked to identify what they believed are the greatest vulnerabilities of the elderly population when it comes to disaster safety. Next, they were asked to identify any differences in perception of risk between the elderly and general populace. These questions were designed to highlight what is currently viewed as forefront vulnerabilities in the elderly. Next, the experts were asked about their experiences or knowledge of working with the elderly. This was designed to determine if challenging experiences are being considered as vulnerabilities in the population by comparing these answers with identified vulnerabilities. Then, the experts were asked about existing programs/plans in place for the elderly and the success rate of these programs/plans. This was
designed to identify any weaknesses or opportunities for improvements in existing planning. Experts were then asked if there are any best practices in use for other vulnerable populations that might be useful for protecting the elderly. This was designed to “think outside the box” in terms of solutions for addressing elderly vulnerability. Next, experts were asked if Hurricane Ida exposed any issues with current plans to determine what hidden problems were now brought to light. Finally, the experts were asked what one thing they would like to do to better protect the elderly during a disaster.

**Data analysis**

Focus groups conversations were transcribed. Demographic data were extracted and recorded in Excel. Using the open coding method, responses were analyzed and coded by hand and aggregated in theme categories (Linneberg and Korsgaard 2019, Züll 2016). The data were recorded in Excel. Charts and graphs were created to display demographic and categorized data. Categorized responses were analyzed to determine what specific perceptions could contribute to elderly vulnerability and what risk perceptions emergency management professionals should look to address in disaster planning.

Subject matter expert interviews were used to gain insight on known challenges and existing disaster planning for the elderly. Responses were compared among the experts to explore the similarities or differences among experts in two fields. Responses were also compared against the responses from the focus groups to explore the similarities and differences between experts and the vulnerable population. The responses were incorporated into the discussion chapter to help highlight gaps in existing planning and possible solutions to highlighted issues.
Limitations

As with all research, there are limitations associated with the design and methods of this research. The exploratory nature of the research means that the ability to draw definite conclusions are hindered. Therefore, this research will aim to lay groundwork for future research.

Within the data set itself, there are some notable limitations. Firstly, the sample is being drawn from a facility-based population. While these individuals will meet the designated vulnerability criteria selected and there is some level of personal responsibility involved in disaster planning, these individuals are living in long-term care facilities where there is oversight of their safety, and the Louisiana Department of Health and Hospitals (LDH) requires disaster plans to be in place. In facilities, the families play less of a role in disaster planning and are replaced by facilities administrators. There may also be more feeling of security in a facility setting. Cultural and socio-economic factors (e.g., different primary language, distrust of government, low- or fixed-income) are also important contributors to vulnerability. However, the more factors added, the more complex the analysis will become. In the interest of time and consideration of available resources, cultural and socio-economic factors will not be part of the analysis.
CHAPTER 4: RESULTS

This chapter delves into the focus group results and the responses from the subject matter experts. First, it reports the results of the focus groups and subject matter expert interviews. Second, it reports the findings of the data analysis, which can be used to determine what specific perceptions could contribute to elderly vulnerability and which perceptions warrant attention from emergency management professionals.

Demographic data

Demographic information on participants was collected with the initial intention of looking for any correlations between sex, age, and nativity and risk perception. Once the design changed to revisit the original four focus groups post-Hurricane Ida though, the sample size was determined to be too small to accurately analyze for such correlations. However, these data are still reported as they describe the sample population.

Eighty-six percent of participants were female and 14% were male. This bias was due to the predominantly female population of the facility. Participants ranged in age from 68 years old to 102 years old with an average age of 86 years old.

Four (29%) participants were natives of southeast Louisiana, eight (57%) were domestic transplants, and two (14%) were international transplants.
All participants reported prior experience with a natural disaster, the most common being hurricanes (Fig. 1). However, only one participant reported suffering a loss due to a natural disaster.

![NATURAL HAZARD EXPERIENCE](image)

**Figure 1:** Natural Hazard Experience

*Initial focus groups*

Data collected in the four initial focus groups will be presented first. These groups convened in late July 2021, approximately one month before Hurricane Ida made landfall.

When asked what natural hazards are seen as a threat to the New Orleans Metropolitan Area, “hurricanes” was the most common response (Fig. 2). While there were a few other hazards mentioned, participants generally focused on hurricanes - a regular annual occurrence for the area.
Eighty-six percent of the participants reported that they monitored government and media warnings regarding natural hazards with television being the most common medium utilized (Fig. 3). Fourteen percent reported that they did not monitor government and media warnings.
When asked to identify the strengths and weaknesses in government and media hazard/disaster warnings, participants reported more weaknesses than strengths (Figs. 4 and 5). Participants agreed that advanced technology has made the scientific/technical side of hazard communications much more robust. They reported improved understanding of hurricanes specifically and natural hazards in general as a strength. One participant noted the avoidance of information overload as a strength. They also reported advanced warning through more sophisticated technology as a strength as one participant noted:

“I think it's getting better and better and better because we got more flights... well hurricane planes flying. They got all kinds of more technologies.”

![Strengths in Hazard Communication](image)

**Figure 4: Strengths in Hazard Communication**

Participants had much more to say about communication weaknesses. The communication issues with the ongoing pandemic was the top theme as the following participants noted:
“For something like COVID, I think that it still becomes so broad that it allows so many interpretations and differences of opinion.”

“I do think they could do a better job of getting away from some of that disinformation and doing a better job of promoting the vaccine. For example, like what they did with smoking. They had a tremendous campaign and it worked. And I think they could do better than they’re doing with informing the public, reaching certain people who don’t have all the electronic stuff that most people have. I don’t think they’re doing a good job of reaching those pockets that are resisting the vaccine and explaining it in a way that gets to them. It's become so angry and so nonscientific that you find people aren’t listening.”

More familiar themes such as “crying wolf” and weak educational campaigns were also common responses as the following participants stated:

“I think it's just a really tough balance in the media as to whether they're over... you know they always say you're crying foul too often, and then people won't believe you.”

“So it's just a problem that we've always had, and we still have, and that's education. That's the bottom line. So once you could make people see more clearly, I think that would help the city.”

Participants reported politicized warnings and information and government corruption as a problem in communication as well. They believed when warnings were issued under the
influence of political agendas or when government distrust was prevalent, warnings were less effective.

One participant pointed out that local weather reporters no longer provided coordinates as part of the regular hurricane forecast. The participant felt that this was a weakness because coordinates allowed viewers to better understand location.

Another participant emphasized the importance of dispelling myths surrounding hazards, referencing the myths surrounding COVID-19. Another noted that clear instructions are needed so there is no misunderstanding about what needs to be done. Yet another said there was always room for improvement in everything.

![Weaknesses in Hazard Communication](image)

**Figure 5: Weaknesses in Hazard Communication**

When participants were asked to identify strengths and weaknesses in the government’s response to natural hazards, particularly seniors, they identified more weaknesses than strengths (Figs. 6 and 7). Participants again mentioned the advanced storm warnings. They also believed that the
state of Louisiana had a strong response to the pandemic and did well in nursing home safety regulations. Interestingly, some participants mentioned the identification of vulnerable populations as a strength. One participant noted the use of independent advocacy groups as a strength in government response.

“I think they had certain focus groups that help... there are groups that meet for people who need help.”

![STRENGTHS IN GOVERNMENT'S DISASTER RESPONSE FOR SENIORS](chart)

Figure 6: Strengths in Government’s Disaster Response for Seniors

Weaknesses again outnumbered strengths for this question. Participants did not believe the elderly received as much attention and assistance as they needed in disaster response. One participant stated:

“I don't think they focus that much attention on seniors, just seniors. I don’t think seniors are blown up to be helped and whatnot as much as they could be.”
Participants explained that communication directed towards the elderly was lacking. Some noted the variations of demographics within the elderly population are not being taken into consideration. Others did not believe that educational outreach for the elderly was as robust as it could be, and there was a need for more structure in planning and a great need for transportation. Some participants noted a need for a senior registry in every community whereby government officials could know the geographical distribution of the elderly beforehand. The issue of elderly individuals with pets was also mentioned as an issue that needs more attention as well as the need for dedicated advocates for the elderly in disaster planning, response, and recovery.

![Weaknesses in Government’s Disaster Response for Seniors](chart.png)

**Figure 7: Weaknesses in Government’s Disaster Response for Seniors**

Most of the participants reported having an emergency plan in place (Fig. 8) with the majority of the plans being to rely on family (Fig. 8). A small number rely on the facility for their emergency planning.
Most participants (79%) were unaware of the existence of government-sponsored assisted evacuation programs (Fig. 9), and when shown a picture of the City of New Orleans evacuation pick up site statues, most did not recall ever seeing them. Additionally, many were hesitant or unwilling to participate in such programs (Fig. 10). Participants’ top concerns related to participating in such programs were availability of medication and specialized care/assistance as noted below:

“I wouldn't because I'm alone. That would be irresponsible for my health.”

“I think most of them would have food and blankets and cots or whatever. Of course, most of us with a cot would be in dire trouble.”
When asked to identify the most important factor to keep the elderly safe, participants reported medical assistance, reduction of stress/trauma, and compassion as the top three items (Fig. 11). As some participants noted:
“I cannot walk by myself, and that's worrisome.”

“Well, I think we're special. People in a facility like this are special groups. I do think that in a group like this, after a disaster, you need people to come in or if you have sufficient staff to give them psychological counseling and because I'm sure there's a lot of trauma and shock involved in something like that.”

Transportation and being proactive before disaster strikes were also mentioned as priorities for keeping the elderly safe. Some participants mentioned the need for assistance with damage repair as well as resources as priorities.

![Figure 11: Most Important Thing to Keep Seniors Safe](image)

When offered the opportunity to address any additional items that were not covered during the focus groups, participants brought up a wide range of issues and concerns (Fig. 12). Most
participants noted the need for better communication methods. They also stated that there needs to be better communication from the City of New Orleans regarding the assisted evacuation pick up points as they would not recognize the silver statues as indicating a pickup location. There was concern about the administration of medication during an evacuation (whether facility or government-assisted). Knowing what items to bring on evacuation as well as the stress of making decisions during time constraints were also common topics. The local government senior registry was also brought up again as an important item as well as addressing the specific needs of the elderly. Some participants noted the importance of keeping variation in individual experiences in mind because this can result in differing reactions to warnings. Concerns about senior-friendly and pet-friendly accommodations were discussed as well as making sure that families or responsible parties remained aware of their loved ones’ situations. Additionally, funding for elder care during a disaster was a concern as well as the tendency to focus on the most prevalent hazard and sidelining others. Mental health was also mentioned.
Follow-up focus groups

The focus groups were reconvened in mid-October 2021 to evaluate post-Ida perceptions. This was approximately a month and a half after Hurricane Ida made landfall and almost three months after the initial focus groups. This allowed for services and routines to be restored as well as the absorption of disaster-related information by participants.

All eleven participants from the follow-up focus groups reported they sheltered in place at the facility during Hurricane Ida. All participants reported an overall good experience with sheltering in place and that they wanted to stay to avoid the stress of an evacuation (Fig. 13). As one participant noted:
“I was delighted we were able to shelter in place because if we had to evacuate, it’s a big deal for me and my wife... I don’t want to go because then you have all your medications and your clothes.”

Some participants stated the storm seemed less of an event than they anticipated. Others remarked on wishing they had a radio on hand especially with the inconvenience of cable television outages, which was noted as the biggest issue throughout the event. Some participants said that while they had the opportunity to evacuate with family, they preferred to stay to avoid a crowded house and to be with trained staff who could assist them medically.

![HURRICANE IDA EXPERIENCE](image)

Figure 13: Hurricane Ida Experience
When asked about losses, participants reported that they suffered no losses from Hurricane Ida, and two commented that they saw the value in not owning any property at this stage of their lives.

Sixty-four percent of the participants said that they had monitored government and media warnings regarding Hurricane Ida. Twenty-seven percent said they monitored it only passively (i.e., did not actively seek information on their own). Nine percent said they did not monitor the warnings (Fig. 14). One participant noted:

“I do read the daily newspaper and of course television when it was operating and then whatever news we got here. So I could have been much more informed if I had the ability to really access a smartphone or something like that, but I do have a computer. I suppose I could have found things on the computer, but I felt that I was as informed as I could be under the circumstances, and I'm not one to listen to [news] morning, noon or night. There's a feeling of fatality.”

![Monitor Government/Media Storm Warnings](image)

**Figure 14: Monitor Government/Media Storm Warnings**
The most used medium for monitoring warnings was the television, which was consistent with the pre-Ida answers (Fig. 15).

![Most Used Communication Medium](image)

**Figure 15: Most Used Communication Medium**

The majority (82%) of participants said they believed the government and media did a good job of communicating warnings about Hurricane Ida. Nine percent said they did not believe the government and media did a good job of communicating warnings, and 9% said they could offer no opinion. However, they reported more weaknesses than strengths in the warnings (Figs. 16 and 17). Repetition and the sense of urgency were the only two strengths mentioned by participants. Too much drama was the biggest complaint regarding Hurricane Ida warnings as the participants noted below:
“I think in a way they overhype things. But I’d rather it be more scientific and less this dramatic stuff. As far as the government, I don’t know. I really can’t answer that. Just the memos we would get and what I would see on the television or read in the newspaper.”

“If you’re too dramatic, it loses its value.”

The lack of storm coordinates was mentioned again as in the pre-Ida focus groups. Some participants noted the need for reminders about stocking up on critical supplies, particularly medication. The loss of cable television was felt in the form of lack of information. Participants noted that those who depend on cable television for information have no idea what is going on when service is down. One participant suggested the increased use of tickers on the television as a way to keep information in front people at all times.

![Figure 16: Strengths in Storm Warnings](image-url)
Eighty-two percent of participants thought the specific needs of seniors were not being addressed by the government’s disaster response, and 18% said they were unsure.

There were only a few strengths discussed (Fig. 18) which included getting the word out about evacuating and the consequences of failing to do so, providing shelter/essential supplies, and the occasional over-preparation.
However, the weaknesses ranged from lack of resources to emotional attachment to home and belongings or lack of government regulation (Fig. 19). Regulation of senior living centers was cited as a weakness in governmental response as well as the lack of resources and support for the elderly. The inability of the elderly to reach assisted evacuation points and the need for assistance with making personal disaster preparation plans was also a concern. The lack of consideration of emotional attachment to home and belongings by local government was noted by one participant as a weakness. Another mentioned the prevalent uncertainty during disasters as making decision-making for the elderly more difficult.

![Weaknesses in Government's Disaster Response for Seniors]

Concerns about the true availability of support for the elderly were expressed as noted below by participants.

“Will you get the support you need? And if something does happen, will you get what you need or will you get the runaround?”
“I think not because Louisiana in general has an older population... so that simple fact of Louisiana in general and then in the countryside many of those people are older, maybe living in trailers. So I would think that it’s just the time period for when it happened to when these people could get support is unacceptable.”

“Well no one is in charge of seniors.”

Sixty-four percent of participants reported they executed rather than modified their emergency plans (Fig. 20).

![Figure 20: Executed or Modified Emergency Plan?](image)

When asked what they wanted to change in their plans for the future, the most common response was to be better prepared for evacuation by having a bag packed ahead of time (Fig. 21).
Participants wanted more facility-initiated preparations, i.e., having the facility remind and assist with the resident’s required tasks of preparation as noted below:

“I need to prepare probably not a suitcase, maybe just a big duffel thing that has the things I would really need, including I would take medications.”

“I think that I should have had a bag packed with what things I needed that were essential. And I didn’t do that. I couldn’t get it together.”

One participant wanted a backup method of communication. Another mentioned the importance of having important documents in order and ready to take at a moment’s notice.

![Figure 21: What Changes Would You Like to Make for the Future?](image-url)
When asked what was considered the most important factor in keeping seniors safe during a disaster, mental health was the most common response (Fig. 22). The experience of being confined in a single location with limited activities and no contact with the outside world was the driving factor behind this theme. Availability of medication was another factor. Participants were concerned about the unknown extent to which one must survive on limited supplies. Some participants believed that instructions on practical applications, such as generator-connected power outlets, was important. Additionally, transportation assistance, increased communication, and advanced warning were also cited as important factors to keeping the elderly safe.

![Figure 22: Most Important Factor to Keep Seniors Safe](image)

When offered the opportunity to bring up anything that was not discussed, participants discussed a range of topics (Fig. 23). Participants did not feel prepared for an evacuation and expressed concern about medication supplies and medical assistance during an evacuation as noted below:
“I think [resident name] really hit on it with medications. Because that is something that is mandatory. Like if you don’t have the right clothes, you can survive, but if you don’t have the right medication...”

“Well, those people in Baton Rouge are in mattresses on the floor. And I think oh my gosh I could not get up to you know go to bathroom, and of course that would be a problem anyway. Yeah, we were very fortunate. But there is just so much that the city can do for a large population.”

One participant questioned how the government could get the elderly to pay more attention to warnings. Another stressed the importance of having important documents ready to take with you. One participant was concerned about government-assisted evacuation programs and ending up at a shelter with people one does not know. The need for clarification on facility evacuation rules and why the city did not call a mandatory evacuation was also questioned.

Figure 23: Other Items
Subject matter experts

Subject matter experts were sought to provide their opinions and experiences regarding elders and disaster management. Using a suggested list of disaster management experts from the committee, four experts were invited via email to participate in the interview. Only two responded and agreed to be interviewed. Due to time constraints, no other disaster management experts were contacted. Additionally, two elder care experts were identified through professional connections. Two were chosen to have the same number of experts in each field. Table 1 provides the qualifications of each expert. Both elder care experts have master’s degrees with over nine years of experience in various aspects of elder care. Both disaster management experts have over seventeen years of experience in the field of emergency management and working for FEMA.

<table>
<thead>
<tr>
<th>Experience</th>
<th>Elder Care Expert 1</th>
<th>Elder Care Expert 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>• BS in Rehabilitation Services</td>
<td>• BS in Psychology</td>
<td></td>
</tr>
<tr>
<td>• MS in Social Work</td>
<td>• MS in Gerontology</td>
<td></td>
</tr>
<tr>
<td>• LCSW</td>
<td>• 9 years in elder day program</td>
<td></td>
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<tr>
<td>• 3 years in geriatric psychiatric behavioral center</td>
<td>• 4 years director of elder memory care unit</td>
<td></td>
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<tr>
<td>• 16 years in elder long-term care</td>
<td>• Community educator and support services coordinator for Alzheimer’s and Lewy Body dementia caregivers</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Experience</th>
<th>Disaster Management Expert 1</th>
<th>Disaster Management Expert 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 21+ years as disaster management consultant</td>
<td>• MA in Public Administration</td>
<td></td>
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<tr>
<td>• 8 years top level FEMA administration</td>
<td>• PhD in Urban Studies</td>
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<tr>
<td>• 20+ years teaching graduate level disaster management courses</td>
<td>• 17 years in emergency management</td>
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<tr>
<td></td>
<td>• Community resilience specialist focusing on small/indigenous communities</td>
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<td>• FEMA Reservist</td>
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<td>• Certified Floodplain Manager</td>
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Table 2: Subject Matter Expert Qualifications
The interview responses were compared between disciplines and among all the experts to look for similarities and differences in discipline and individuals. Responses were also compared against the focus group responses to look for similarities and differences.

When asked about the elderly’s greatest vulnerabilities related to disaster management, three experts agreed that physical and cognitive decline was one of the greatest concerns. Elder Care Expert 2 and Disaster Management Expert 1 noted that the elderly often lack a support system in which they can rely for specialized assistance in disaster planning. Disaster Management Expert 2 said that the elderly’s needs are often overlooked in disaster planning, which increases their vulnerability.

The next question asked if the experts believed there was any difference between how the elderly view risk versus the general populace. All experts believed there was a difference in risk perception between the elderly and the general populace, but they believed that the variation in risk perception was just as great within the elderly population. This variation within the subgroup was attributed to experience and socioeconomic status.

When asked what they believed was the biggest challenge in working with the elderly in disaster management, the experts differed in response. Elder Care Expert 1 cited cognitive decline as the biggest challenge since it incumbered understanding of risk. Elder Care Expert 2 cited the need for quick, precise action, noting that physical and cognitive decline make it difficult for the elderly to respond within the needed time constraints. Disaster Management Expert 1 cited lack of trust as the biggest challenge, noting that a trusted source of information is critical during any
emergency. Disaster Expert 2 noted finding effective ways to include the voices of the elderly in planning is difficult.

The experts were asked if they encountered difficulties with risk perception when working with the elderly. Both elder care experts said they do encounter difficulties due to risk perception. Elder Care Expert 1 noted that risk perception affects behavioral response, which can be an issue if the perception leads to an undesirable response. Elder Care Expert 2 cited declining cognition and used an example of fall risk:

“Some elders with dementia may have extreme imbalance or an injury but not retain that information, making them at a greater risk for falls. In many cases, you can’t convince that person of their risks and limits, so you have to be more creative, give them reasons to stay seated or assist with transfers and walking, preempting their unsafe movements & creating safe options.”

Disaster Management Expert 1 did not have any direct experience to report in this regard. Disaster Management Expert 2 noted that the elderly may be less comfortable taking actions that disrupt their routines, which can present difficulties when action is required to remain safe.

The experts were asked how their agency/facility was working to protect the elderly and whether there was any specific plan/program in place. The elder care experts reported that their facilities have a disaster plan in place as required by the Louisiana Department of Health and Hospitals. This plan is updated annually to ensure both facilities have all necessary supplies on hand and on
stand-by should a disaster strike. Both experts reported successful implementations of those plans during recent hurricanes. The disaster management experts did not have any direct experience to report in this regard.

When asked about current plans/programs for other vulnerable populations that may help the elderly, responses differed. Elder Care Expert 1 noted that hospital patients remain on site as long as it is safe to do so and suggested that such an approach be taken with the elderly who live in secured facilities. Elder Care Expert 2 pointed out that there are transportation programs for people with complex medical needs and suggested that elder-specific transportation needs to be a consideration. Disaster Management Expert 1 could not offer an opinion in this regard while Disaster Management Expert 2 said the best practice is inclusion in all stages of planning coupled with real time evaluation.

Experts were asked whether Hurricane Ida exposed any deficiencies in existing disaster plans for the elderly. Elder Care Expert 1 noted that communication was an issue in the immediate aftermath. Though the expert’s facility had supplies ready to be brought in, communicating with those suppliers was difficult due to no landline telephone service, no Internet, and limited cell phone service. Elder Care Expert 2 similarly noted weakened or destroyed infrastructure as a challenge for a mass shelter-in-place. Both disaster management experts cited the extreme heat post-Ida as something that needs to be an important consideration for future shelter-in-place events. Disaster Management Expert 2 also noted the shortcomings in regulations of senior living facility and their evacuation plans.
When asked about previously unknown challenges highlighted by Hurricane Ida, Elder Care Expert 1 and 2 both cited the extended use of generator power for elder care facilities, noting that consideration of more robust equipment and on-site maintenance is a must for future plans. Disaster Management Expert 1 again cited the extreme heat as a previously unconsidered risk that needs to be accounted for in future plans. Disaster Management Expert 2 noted that rapidly intensifying storms needs to be a consideration for all future planning.

All experts were asked for a “wish list” to help keep the elderly safe if resources were not an issue. Elder Care Expert 1 wanted on-site maintenance specialists to keep generators and HVAC systems operational as well as on-site buses with drivers. Elder Care Expert 2 wanted to develop a plan that would have a database of elder medications through hospitals and pharmacies. A month supply of an elder’s medications would be delivered to the responsible party for any elder in a disaster zone or evacuated from it and have a month supply of medications on standby for delivery. The plan would also include emergency plan resources for the families. Disaster Management Expert 1 wanted to dedicate more resources into helping the elderly develop personal support systems they can rely on before, during, and after disasters. Disaster Management Expert 2 wanted direct contact with the elderly immediately post-disaster and during the initial recovery period, which would include in-person visits to facilities and housing units to ensure adequate supplies and safety.
Summary

Perception of risk can be influenced by experience especially if that experience is recent, i.e., recency effect (Lavrakas 2008). Pre- and post-Ida responses will be compared to highlight changes in perception (if any).

The facility at which this research was conducted fared well during the storm. Participants all reported a good experience with sheltering in place there, and many said they were glad to stay and avoid the stress of evacuation, which, as McLelland et al (2017) and Pekovic, Seff and Rothman (2007) pointed out, is a source of trauma for the elderly. Additionally, no one reported suffering any losses from Hurricane Ida.

While 86% of participants reported that they monitored hazard warnings in the initial focus groups, this number increased to 91% for Hurricane Ida warnings. With a category 4 storm threatening the area, this increase in warning monitoring does not come as a surprise. However, it is interesting to note that 27% of participants reported only passive monitoring, i.e., they listened to warnings if they came across them but did not actively seek information.

Television remained the primary source of hazard warnings. However, after the storm there was an increase in reliance on family and friends for information. This was due to cable service being down for about two weeks after the storm. Calls with loved ones became the primary source of information until cable and newspaper services were restored.
Before Hurricane Ida, all participants said they thought the government and media did a good job of communicating hazard warnings. However, after Hurricane Ida, this dropped to 82%. Those who gave a negative response specifically referred to the post-Ida issues at the senior living centers (no power, excessive heat, no supplies, no evacuation plans) for their changed response. Regarding warning strengths, pre-Ida responses focused more on message content whereas post-Ida responses were more focused on repetition and emphasis on the urgency of the situation. Pre-Ida weaknesses focused more on the COVID-19 pandemic, politicizing of information, and “crying wolf.” Post-Ida weaknesses were more hazard-specific and focused on reducing stress while not omitting information and reminders about critical preparations.

Pre-Hurricane Ida, all participants said they thought that the needs of seniors were being addressed in disaster response. However, after the storm 82% of participants said they did not believe the needs of seniors were being addressed. This could be attributed to the events at the senior living centers previously discussed. Eighteen percent said they were unsure and cited the fact that they felt protected in a facility and therefore not able to render judgement on response outside of their community. When asked about strengths of the post-Ida disaster response for seniors, only three items were listed (getting the word out about evacuating and the consequences of failing to do so, providing shelter/essential supplies, and the occasional over-preparation), each only once, and were very basic actions taken during a disaster response. However, post-Ida weaknesses clearly highlighted the need for regulation of non-medical senior living centers, the need for more resources and support for the aging population, and the inability of the aging population to manage disaster preparation and recovery alone. This again could be attributed to the events at the senior living centers previously discussed.
Sixty-four percent of participants reported executing their existing emergency plans by following the facility’s plans to shelter in place. Thirty-six percent reported modifying their existing plans by choosing to shelter in place at the facility rather than evacuate or shelter in place with family. When asked what lessons were learned from Hurricane Ida for future emergency plans, the predominant response was to have an “evacuation bag” packed ahead of time. Many participants said they felt unprepared to go if the facility had called an evacuation and that having a pre-packed bag would eliminate some of the stress associated with evacuation. Additionally, participants were amenable to the idea of the facility assisting them with preparations such as providing a list of items to pack. The specter of having to leave on short notice appeared to have made an impression on participants and raised awareness about personal readiness for a disaster, which supports the findings of Yu, Zhu and Donaldson (2018) regarding the impacts of time constraints on decision making.

When asked whether they would be willing to participate in a local government-sponsored assisted evacuation program, pre-Ida only 36% of participants said yes. Those who said no cited distrust in government or concerns about medical needs and accommodations. Post-Ida all participants said they would only participate as a last resort again citing distrust in government or concerns about medical needs and accommodations.

When asked pre-Ida what the most important factor was to keep seniors safe, participants focused on medical-related assistance, mental health, and compassion. However, post-Ida mental health was the dominant focus followed by medical-related assistance and practical survival assistance. The lack of communication due to cable television outages as well as the
limited activities that the facility was able to provide during the shelter-in-place seemed to have created a void in mental stimulation and positive distractions. Participants reported a need for positive influences and activities to prevent agitation and depression.

Communication was a dominant theme in both the pre- and post-Ida focus groups. Participants stressed the need for clear, straightforward, consistent communication to assist seniors, as Fischoff (2009) suggested. Participants said they had no issues following instructions so long as they knew exactly what they were supposed to do. Assistance with medicine and medical assistance during an evacuation were also of concern. Participants worried about who would handle their medications as well as having a sufficient supply. Additionally, they were concerned about senior-friendly accommodations, e.g., being able to get in and out of the provided bed on their own.

Subject matter expert responses provide a different perspective on existing disaster planning and aftermath of Hurricane Ida. While the post-Ida focus group participants highlighted more personal themes, the experts focused on big picture items. Focus group participants expressed anxiety about the unknown and the trauma associated with evacuation, whereas the expert responses, while acknowledging the stress of evacuation, pointed out the importance of evacuation and the ability to do so quickly. Focus group participants prioritized mental health post-event and the necessity of personal care (medical and non-medical). The experts, while not directly mentioning mental health or personal care, acknowledged the importance of assistance and building support networks for the elderly. Provision of assistance and strengthening support networks can help alleviate some of the stress associated with a disaster and make accessing
assistance easier. The experts also stressed the importance of strengthening infrastructure and the evaluation of regulations governing non-medical senior living facilities. Overall, the results demonstrate a difference of perception in what is most important to keep seniors safe, which will be discussed in more detail in the following chapter.
CHAPTER 5: DISCUSSION

The results from both the pre- and post-Ida focus groups reveal some interesting perspectives from the point of the elderly living in an assisted living facility. Additionally, the results highlight how a disaster can change perceptions. Participants reported good experiences with sheltering in place and the relief of avoiding an evacuation. No one reported any losses due to Hurricane Ida. Therefore, changes in perception should not be considered the result of bad or traumatic experiences.

The implications of these perceptions on elderly vulnerability will be examined in more detail. Input from emergency management and elder care experts will help highlight areas that need more attention to help the elderly be better prepared and less vulnerable. This discussion will attempt to provide answers for the research questions guiding this study:

- How does risk perception contribute to elderly vulnerability?
- Are there any predominant perceptions and what are the possible implications?
- What perceptions are of particular concern for emergency management professionals?
- How does the aging process contribute to the challenges of disaster preparedness?
- How can the issue of risk perception be addressed?

Perception of risk and disaster preparation

Focus group results indicate a limited view on what risks threaten the New Orleans metropolitan area. The predominant response was hurricanes with only three other hazards listed (tornadoes, earthquakes, and rain). Other common hazards for the New Orleans metropolitan area, e.g.,
severe thunderstorms, tornadoes, extreme heat or cold (City of New Orleans 2021), were not mentioned. As noted in the literature review, Šotić and Rajić (2015) explain that risk means different things to different people. Results suggest that those events that are not a continual topic of conversation in the media are out-of-sight-out-of-mind. This can increase vulnerability because if the elderly do not identify such events as risks then they will be less prepared for the impacts of those events. Individual perception of risk play an important role in subsequent actions (Millstein and Halper-Felsher 2001). Moreover, Ferrer and Klein (2015) note that risk perception is higher when an event is feared than when it is not. As noted in the literature review, internal factors of vulnerability are individuals’ responses to external factors (Chambers 1989). This can include little or no preparation for a disaster. While vulnerability can impede one’s ability to prepare, the lack of preparedness contributes to increased vulnerability (Hansson et al 2020). For example, an elderly person living alone with cognitive decline is already considered vulnerable. Due to cognitive decline the elder struggles to understand the risk associated with an approaching hurricane and does not evacuate or prepare to shelter-in-place. This lack of preparation increases the elder’s existing vulnerability for this particular event. Vulnerability and lack of preparedness thus create a cycle of vulnerability.

The post-Ida focus groups demonstrated the relief the elderly feel when an evacuation can be averted. Participants remained at the facility during Hurricane Ida. Even those whose original plans were to go with family whenever they evacuated chose to remain at the facility rather than leave. Evacuations are traumatic for people of all ages (La Greca, Brodar, Danzi, Tarlow, Silva and Comer 2019, Kuroda and Koyama 2020). However, they can be particularly stressful for the elderly. Elder Care Expert 1 explained that any change of routine or environment can increase
vulnerability and accelerate decline, which agrees with the social attachment theory discussed in the literature review. Evacuations can be called suddenly, and the elderly may be or feel unable to react quickly enough. This can result in poor decision making (Yu, Zhu and Donaldson 2019). The focus group results support this with participants reporting anxiety at the thought of an evacuation and not feeling prepared enough to react timely. The perceived difficulties of evacuation may serve as a deterrent to making the decision to leave. As people age and can do less for themselves, something as simple as packing a bag for an extended stay away from home can be overwhelming. The mere prospect of a major stressor can cause the elderly to refuse that option altogether even though it may be the safer option. Physical and cognitive decline can also exacerbate an already stressful situation.

**Perception of disaster-related change**

Change does not come easy. As people age, it is harder to let go of what they know especially if physical or cognitive decline is involved. The focus group results indicate an anxiety over the prospect of an environmental change, specifically an evacuation.

James, Ardeman-Merten and Kihlgren (2014) note that people feel secure in familiar places and routines. This is even more applicable as people age. Familiarity and routine become more important as Elder Care Expert 1 noted. The elderly feel safe in a known environment. This may be more noticeable if the individual has a long history in a particular place (Silverglow et al 2021). Additionally, the elderly may use the security of familiar surroundings to hide their physical and mental decline, which increases vulnerability. It is easier to hide that one is getting forgetful when one is very familiar with the surroundings because an established pattern of
events can help transfer a daily routine into the long-term memory part of the brain (Alzheimer’s Project 2020). It is easier to hide a physical decline when the home is already arranged to make movement easier or where one has memorized paths throughout the house. This feeling of security can exacerbate vulnerability by creating a false sense of safety from disasters. Elders may feel they are safer in their own familiar home rather than face the stress of evacuation. This could be more prevalent if the individual had safely survived prior disasters in the same environment.

Focus group results indicate a concern about evacuation accommodations. Those who need medical and personal assistance with ADLs have a particular concern about evacuations and the aftermath of a disaster. Daily tasks that most take for granted, such as getting out of bed by oneself, can be a struggle or impossible without assistance. Illnesses can render one in constant need of special medical attention. Many people with such needs live at home, and there is legitimate concern about the availability of required assistance on evacuation. Those who would evacuate with family worry if their caregivers would have the necessary equipment to continue to provide specialized care. Even if there are special needs shelters, the fear of the unknown is a deterrent for evacuation. Will the accommodations made for special needs cover my special needs? There are also concerns about medicine supplies on an extended stay. What if the evacuation lasts longer than my medicine supply? How will I access additional medication if I run out? Concerns such as these can push an elderly person to refuse evacuation. Additionally, as pointed out by all interviewed experts, failing infrastructure is a major concern during a mass shelter-in-place. This was highlighted in the aftermath of Hurricane Ida. Excessive heat or cold can bring health problems and even death on top of an already difficult situation. The
implications of failing infrastructure coupled with harsh weather must be a consideration in disaster planning especially when looking at vulnerable populations.

**Perception and mental health**

Focus group participants expressed a need to address the elderly’s mental health in any disaster situation, i.e., evacuation or shelter-in-place. As people age, the brain’s ability to process new and difficult information decreases. As noted in the literature review, fluid abilities decrease. Cognitive impairments such as dementia present new struggles. Routine tasks become a challenge. Frustration mounts when the brain and the body will not work as desired. The specter of losing the ability to do things for oneself is depressing. Realizing that you are starting to forget things is frightening. The aging brain can be an emotional rollercoaster as one struggles to come to terms with increasing and often humbling dependence on others (Riley, Burgener and Buckwalter 2014, Silverglow et al 2021). Depression is not uncommon in the elderly. Some people experience anosognosia, which is the inability to realize that one has an illness and needs help. The frontal lobe is damaged by diseases such as dementia resulting in the inability to update self-image, and thus one is stuck in the pre-disease self-image (National Alliance on Mental Illness n.d.). With these challenges happening daily, perception of risk and disaster can change. Deonna (2006) notes that people often project their “state of mind” onto current situations. Making informed decisions can be difficult when the mind is already under duress. Reduction in stress becomes a priority when trying to encourage safety before, during, and after disasters and, as discussed previously in the literature review, is a focus of the elderly. Focus group results demonstrate a heightened realization of the importance of mental health post-Ida. Clear, direct instructions help guide the elderly on appropriate actions, and, if possible,
assistance with those actions help foster a sense of security. Emphasis should be placed on reducing stress with positive distractions and mental stimulation. Focus group results show a desire for positive activities to distract from the stressful event as well as mental stimulation to keep one from going “stir crazy” (Fig 22). Participants recognized the need to keep one’s mind focused on the positive and of lifting spirits when routine and environment are dramatically disturbed especially for the elderly.

**Perception of communication**

Communication was a dominant theme throughout the focus groups. Participants stressed the need for clear, direct communication. This was not only for the quantity of communications received but also the quality. Participants noted a lack of communication as well as ambiguity in received communications. Lack of communication in itself is an issue, but when your target population has the challenge of cognitive decline, it can worsen the problem. Those with cognitive decline may have difficulty remembering in the short-term, and thus repetition and reminders become important in the communication process. In addition to the lack of communication, if the elderly see existing communication as ambiguous or otherwise difficult to understand, they will be more likely to miss important information if they do not outright disregard the communication. Interview responses from the experts support this as they all cite cognitive decline as a challenge to effectively communicating and working with the elderly through a disaster. This could be addressed through customized messaging as discussed in the literature review. However, as mentioned previously, customized messaging for targeted audiences requires time, effort, and money (Meredith et al 2008), and oftentimes the one-size-fits-all method is the default method (Bean et al 2016).
Methods of communication can also contribute to elderly vulnerability. As society incorporates technology into more and more aspects of life, communication methods also become more digital. Newspaper print subscriptions are declining (Pew Research Center 2021). More government agencies are adopting SMS communication methods. However, physical and cognitive decline can make newer and ever-evolving technologies challenging for the elderly. If the elderly perceive a communication method as difficult to use, they may simply not use it, giving emergency management professionals one less channel to use. Furthermore, a strong preference for one communication method and a sole focus on that method can present the issue of putting all one’s apples in a single basket. When it fails, there is nothing to fall back on.

The focus group results highlight a dependency on cable television as the primary source of information. This dependency came into focus for this researcher when participants did not have much to say about the post-Ida issues at the senior living centers. It was expected that those issues would be a dominant topic of discussion. However, they were mentioned with little detail, leaving an interesting omission in expected perceptions. Further discussion led to the disclosure of cable television being the primary source of information. It has been noted by researchers that the elderly watch more television than young people, and this is often to compensate for social disengagement associated with aging (Depp, Schkade, Thompson and Jeste 2010, Hilt 1992, Johnson and Cobb-Walgren 1994, Real, Anderson and Harrington 1980, Van Der Goot, Beentjes and Van Selm 2012). Nguyen, Wittink, Murray and Barg (2008) also note that the elderly tend to use television to block dysphoric moods. When Hurricane Ida struck, it disabled cable television service. Additionally, the power went out thus adding one more hurdle for service restoration. In mass shelter-in-place situations such as for Hurricane Ida this can present a
serious communication issue for vulnerable populations who depend on cable television for information. For the focus group participants, it was not disastrous because they are in a protected community. However, for those who live in their own homes, it raises the question as to how officials communicate with the elderly when primary communication channels are disabled. The lack of cable television service is only one part of the problem. Although the lack of cable service can be overcome by the installation of a “rabbit ear” antenna, many elderly individuals may struggle to disengage cable equipment and set up an analog antenna. Advancing technology is a challenge for the elderly as fluid abilities decline with age (Murman 2015). The second part of the problem is the lack of power. When power is out, it cannot be assumed that everyone has a generator in which to power a television. Both interviewed elder care experts cited weakened and down communication systems as a major issue post-Ida. They noted that ensuring that supplies could be brought to their facilities was made more difficult due to the damage inflicted on communication systems by the storm. Contingency plans for such scenarios need to be explored because mass shelter-in-place events may become more common as storms increase in frequency, size, and intensity.

Twenty-seven percent of participants post-Ida reported that they passively listened to storm warnings. In this particular sample population, passive monitoring could be attributed to the feeling of safety being at prepared facility. However, it raises the question of whether or not passive monitoring would occur in a home where an elderly person may have a false sense of safety. Being dependent on television for social interaction replacement may cause the individual to be overwhelmed with the media reports of “impending doom” and choose not to actively seek information on the event as was mentioned in the focus groups.
The pre-Ida focus groups highlighted natural hazard warning weaknesses as “big picture” items, e.g., politics, pandemic, “crying wolf,” whereas post-Ida weaknesses were more hazard-specific focusing on stress/drama reduction and retention of pertinent information. This indicates a shift in perception about warning content. Interestingly, pre-Ida focus groups were more like the “big picture” items of the interviewed experts than the post-Ida focus groups. This suggests a change in perception when a population is threatened versus when it perceives itself safe. Larger scale issues are forefront when a population does not feel threatened, but when it does feel unsafe people narrow their focus to more personal issues. This presents a problem for emergency management professionals because shifting preferences for message content can cause target population to disregard the warning.

Support systems

The importance of caregivers and personal support systems in disaster planning for the elderly cannot be over emphasized. Focus group participants noted the importance of having someone to tend to special needs, and the two of the experts interviewed also stressed the importance of such assistance.

Personal support systems, e.g., family and personal caregivers, play an important role in keeping the elderly safe during a disaster. As people age, family becomes the most important source of support and emotional bonding (Świderska 2014). For those who do not have family to provide such support, non-family personal caregivers often take on this role. Having one’s world dramatically changed due to a disaster can cause significant negative impacts physically and mentally for an elder (American Psychological Association, n.d.). Additionally, physical and
cognitive decline can render the elderly unable to cope with preparation and recovery (e.g., securing the home, ensuring adequate supplies, repairing damage, restoring services, etc.). This is where the role of family and caregivers comes to forefront as pointed out by Disaster Management Expert 1.

Caregivers can face many challenges though when attempting to provide necessary support. Working with adults experiencing both physical and cognitive decline is not easy (Pickering, Dancey, Paik and O’Sullivan 2021). Both interviewed elder care experts reported encountering such difficulties. The day-to-day stressors of providing physical and psychological care to the elderly can result in fatigue, isolation, frustration, and depression (Ziemba 2002). Having to subject themselves to caregiving can be humbling, frustrating, and depressing for the elderly (Montenko and Greenberg 1995). Negative perceptions on the part of the elder can add to the caregiver’s burden. Adding disaster preparation, response, and recovery to responsibilities can push a caregiver beyond personal capacity if the resources and support are not readily available (American Psychological Association, n.d.).

Family and personal caregivers are the frontline when it comes to protecting the elderly during a disaster. They can assist with personal and property preparations, provide emotional support, and maintain as much normalcy as possible for the elderly and assist in recovery be it repairs or simply returning home.

To ensure that caregivers are able to assist in protecting the elderly during a disaster, it is important to ensure resources and support are available. Pickering, Dancey, Paik and O’Sullivan
(2021) note that currently education and training for informal caregivers, whether family or hired help, is lacking. Providing not only education and training but also resources can improve individual disaster preparedness. Positive caregiving experiences can be achieved by encouraging as much independence, self-esteem, and identity as possible for the elder (Montenko and Greenberg 1995). Providing formal services, i.e., government or organization-sponsored, to informal caregivers can help alleviate some of the difficulties of caregiving and make a more positive experience for all.

**Education**

A common theme in focus groups was the need for more aggressive educational campaigns to raise awareness in the elderly and their caregivers about risk and disaster management. However, several focus group participants noted that even within a subgroup such as the elderly there are variations of perception due to educational, cultural, and socioeconomic status. All the interviewed experts agreed with this. Targeted educational campaigns must therefore consider those differences.

**Elderly’s perceptions vs experts’ perceptions**

Subject matter expert responses provide a different perspective on existing disaster planning and aftermath of Hurricane Ida. While the post-Ida focus group participants highlighted more personal themes, the experts focused on the bigger picture. Focus group participants expressed anxiety about the unknown and the trauma associated with evacuation, whereas the expert responses, while acknowledging the stress of evacuation, pointed out the importance of evacuation and the ability to do so quickly. Focus group participants prioritized mental health
post-event and the necessity of personal care (medical and non-medical). The experts, while not directly mentioning mental health or personal care, acknowledged the importance of assistance and building support networks for the elderly. Provision of assistance and strengthening support networks can help alleviate some of the stress associated with a disaster and make accessing assistance easier. The experts also stressed the importance of strengthening infrastructure and the evaluation of regulations governing non-medical senior living facilities. This demonstrates a difference of perception in what is most important to keep seniors safe. It is no surprise that the experts should focus on larger scope items. They are responsible for the physical safety of a larger population. However, it raises the question of how palatable such larger scale plans are to vulnerable groups. If the elderly are focusing on highly personal issues, are the existing plans addressing these needs and concerns? If they feel their concerns are not being addressed, would that make them more inclined to cooperate less with existing plans? There must be a balance achieved between addressing the specific concerns of a vulnerable population while not sacrificing overall safety of the population.

**Summary**

The results indicate that risk perception has an impact on elderly vulnerability. Participants’ anxiety over potentially leaving familiar surroundings and routines as well as the availability of critical supplies and assistance can serve as a deterrent to evacuation. As Ferrer and Klein (2015) note, presence or absence of fear can shift perceptions in different directions, which is supported by the difference in perceptions pre- and post-Ida. If one attempts to factor in risk perception when the elderly feel relatively safe, the results could be very different versus when they do not feel safe. The dynamic and personal definition of risk determines how a person
responds to a potential threat. This can result in the elderly being less prepared for events they
do not see as severe, thus increasing their vulnerability for that particular event. Additionally,
cognitive impairments can skew assessment of a potential risk. Frustration and depression,
commonly seen in persons dealing with age-associated decline, can cause a person to project his
“state of mind” onto a situation, thus changing perception.

There were several predominant perceptions that could have implications for disaster
preparedness. All participants expressed anxiety over potential evacuation. It was something
that was stressful, bad, and to be avoided if possible. The stress of leaving the familiar and
disrupting routines was hard in itself, but the unknown of evacuation accommodations added
another layer of anxiety. The perception was that critical supplies such as medication as well as
medical and non-medical assistance would most likely be lacking. This results in the active
avoidance of evacuation, which presents a challenge when local officials are trying to evacuate
high risk areas and populations. Perception of communication was another predominant
perception. Participants noted a need for more direction and clarity in risk communication,
which indicates a perception of ambiguous or confusing existing communication. This can result
in the elderly simply disregarding what is deemed as unhelpful, confusing, or not-applicable as
their perception of the message content dictates. Additionally, over-communication was noted as
a sense of “impending doom” and distasteful. This can also result in the elderly not seeking
information and possibly missing critical information that could help reduce their vulnerability.
All of these predominant perceptions can contribute to negative outcomes and should be of
particular concern for emergency management professionals.
The aging process presents challenges to disaster preparedness. The elderly have a negative reaction to change of routine and environment. This aversion can cause the elderly to refuse to evacuate since they view such a disruption as worse than facing a potential risk. Cognitive decline presents the challenge of ensuring that the elderly fully understand the extent of the risk and the results of their actions. Additionally, it is harder to get someone to prepare for potential risks if cognitive decline is preventing them from fully comprehending or remembering the information they are given. The elderly often require assistance with daily activities and medication management. This presents a challenge because evacuation sites may not be staffed or equipped to assist with the specialized needs of the elderly. This can also be applied to personal evacuation sites such as the homes of extended family or friends. Even though extended family or friends can provide an emotional comfort and a sense of the familiar during an evacuation, they may not be trained or equipped to assist with special needs associated with aging. Mental health of the elderly also has an impact on disaster preparedness. The elderly often suffer from frustration and depression due to age- and decline-associated limitations. This can cause the elderly to refuse to participate in activities to keep them safe. Evolving technologies can prove challenging for the elderly especially when physical or cognitive decline is involved. Learning new technologies for communication can be overwhelming resulting in the elderly relying on one type of communication channel for information. This reliance on a single communication channel can have negative consequences as seen in post-Ida focus group discussions.

We must then examine how the issue of risk perception can be addressed to better assist the elderly prepare for disasters. Perception is influenced by the aging process, and thus, it must be
acknowledged that changing personal perceptions is difficult and at times impossible. However, there are steps that can be taken to help the elderly become more prepared, which can lessen vulnerability. Focus group results suggest that clear, specific directions can aid in disaster preparations. Kiefer et al (2008) and Mileti et al (2011) note the importance of clear, consistent directives as an influential factor on public action-taking from risk communication. Participants agreed that having a written guide as to what should be packed as well as some assistance in packing a bag ahead of time would reduce stress by allowing them to “grab and go” when an evacuation was called. A key point here is increasing the involvement of family and caregivers. The role of family and caregiver support in disaster preparation and response is crucial to the physical and mental health of the elderly (Brown and Walsh, n.d., Gibson, Walsh, and Brown 2018). Elkins, Holt and Miles (2014) note that the more enhanced the resilience of caregivers the better the disaster survival rates are for the elderly. Customized messages and targeted communication channels is also critical to reaching vulnerable populations. Demuth, Morss, Lazo and Trumbo (2016) suggest determining which sources are most trusted by the target population for message delivery. Disaster Expert 2 noted the importance of giving the elderly a voice in disaster planning. However, as the results indicate a shift in perception between the feeling of safe and not safe, it is important to note the timing of inclusion. Perhaps before and after perspectives would be most beneficial as emergency management professionals could gain insight into both the big picture and the personal needs of the elderly.
CHAPTER 6: CONCLUSION

The physical and cognitive decline associated with aging seem to have an important impact on perception as demonstrated by the literature and the focus group results. Physical and cognitive declines affect self-esteem, moods, and willingness to participate in activities. Cognitive decline affects the brain’s ability to process information, reach conclusions, and make rational decisions. With these issues in mind, emergency management professionals must seek alternative methods of approaching the elderly. Addressing their specific needs while not degrading their dignity can be key to increasing participation in disaster preparation and recovery activities.

Key findings

Pre-Ida focus groups drew attention to issues such as “it isn’t a problem until it’s a problem,” i.e., wait until an issue is looming before addressing, and big picture items, e.g., creating stronger educational campaigns. Perceptions tended more to those broader planning items that could be part of a community-wide plan. For example, one participant noted pre-Ida:

“[The elderly] should have to register somewhere because they don’t move, and how is anyone going to know who is there that needs to be evacuated?”

Post-Ida focus groups demonstrated a shift in perceptions to more personal themes such as anxiety at the prospect of evacuation and addressing mental health issues after a disaster. Perceptions tended more towards items that would be part of personal or family plan. As noted by another participant post-Ida:
“Relax the residents as much as possible. Don’t keep talking about a storm, and the wind, and everything. Say we’re going to have fun. Go play games and say we’re just going on a little trip. But in other words, if you want to say a slumber party. Why dread it out and scare people when it's not necessary?”

This shift in perception by itself can be challenging to address since what people perceive as priority prior to a disaster may not be a priority afterwards, thus creating the potential for true needs being missed.

The elderly seek to avoid the trauma of an evacuation and separation from their environment and, even acknowledging their own vulnerability, will prefer to stay in their homes rather than voluntarily evacuate. This can create an increased vulnerability in the event of damaged or destroyed infrastructure as demonstrated in the aftermath of Hurricane Ida. Both pre- and post-Ida focus groups results supported this with participants expressing anxiety over the thought of having to leave especially at short notice.

Mental health was a common theme particularly in the post-Ida focus groups. Anxiety and depression are not uncommon in the elderly as they try to cope with declining health. Disaster-associated trauma adds to the burden. Focus groups participants acknowledged anxiety, boredom, and depression following Hurricane Ida.

Weaknesses in communication systems were highlighted post-Ida. Many of the elderly depend on cable television as their primary source of information. When utilities fail after a disaster, the
elderly may be left with no other source of information. Focus group participants acknowledged the impact of losing this method of communication even within a protected assisted living community. Clarity in instructions and information was also requested. Participants expressed a need for straightforward instructions, noting they do not mind being told what to do if they understand what is expected of them.

**Contribution to literature**

This research addresses the gap in existing literature by examining how risk perception impacts elderly vulnerability, a topic which is lacking in existing research. Some prior studies examined the influence of physical and cognitive decline on vulnerability but did not account for influence on risk perception (Jenkins, Laska and Williamson 2007, Mayhorn 2005, McLelland et al 2017). Other studies only examined the influence of risk perception on evacuation behavior, which, as Hurricane Ida demonstrated, is not the only scenario for which emergency management professionals must prepare (Bowser 2013, Gray-Graves, Turner and Swan 2011, and Wang 2016). Additionally, these prior studies did not account for the more vulnerable portion of the elderly population. Still other studies examined elderly resilience but did not take into account pre-disaster risk perception (Henderson, Roberto and Kamo 2010, Kilijanek and Drabek 1979, Ngo 2001). This research included the impacts of physical and cognitive decline on risk perception, which is not something considered in prior studies. Research findings indicate that risk perception can affect vulnerability by influencing response to disaster threats and aftermath. The impacts of physical and cognitive decline on behavior is documented in medical studies, but it is a topic that needs further study in the field of disaster management. Dominant perceptions both pre- and post-Ida indicate an interesting shift from big picture perceptions to views based on
more personal themes, which also warrants further study. The Levels of Elderly Vulnerability scale discussed in chapter 3 contributes to the literature by providing a way for researchers and planners to differentiate among the different levels of vulnerability that exist within the elderly population based on physical and cognitive capacities. It can assist in identifying potential needs and challenges that may arise in disaster planning.

**Recommendations**

Emergency management professionals need to be more aware of the elderly’s desire to ward off stress and changes to routine and environment because this can decrease participation in disaster preparedness and recovery activities. Offering choices of disaster preparedness and recovery activities and encouraging family and trusted caregivers to become more involved can help increase participation. Offering choices help maintain the elderly’s sense of dignity and independence. Family and trusted caregivers can help alleviate the stress of a disaster by helping to maintain as much normalcy of routine and environment as possible.

Rapidly intensifying storms should be a consideration for future planning. Mass shelter-in-places will become more common as storms explode in strength and intensity after it is too late to call for an evacuation. Communication channel backup needs to be considered for implementation. Elder care experts noted the importance of communication contingency plans for shelter-in-place events as reliance on the normal grid can prove costly when critical supplies are needed or important information needs to be relayed. Reliance on a single channel of communication can have disastrous results for both emergency management professionals and
the populations they are trying to reach. However, accessibility for the elderly needs to be included in backup plans.

Encouraging the strengthening of personal support systems for the elderly can be key to helping them be more prepared. As noted in the literature review, the elderly often suffer from physical and cognitive decline that makes preparation and recovery difficult, if not impossible, to handle alone. Disaster Management Expert 1 noted the importance of such a support system. Developing these support systems can create a network that enables emergency management professionals to reach the elderly and ensure more efficient delivery of resources.

Caregivers themselves need to have support system as well. Families or non-related caregivers often find themselves at a loss when trying to balance their own lives with the responsibilities of taking care of the elderly. Providing resources and support through government or organizations can ease the stress and help them maintain a balance.

**Future research**

Perception of risk is difficult to measure because it is influenced by so many factors and, as the focus group results show, can change. This research lays the groundwork for more study of this important realm of disaster preparedness, which can be applicable to other vulnerable populations beyond the elderly. The results of the research suggest that further research is necessary to better understand the impacts of risk perception on elderly vulnerability. Future research could utilize the original research plan by including more assisted living sites to make results more generalizable. Additionally, future studies could expand the sample population to
include home-based elderly who do not have the added protection of living in a state-regulated facility. Further investigation into some of the key findings such as reducing evacuation anxiety, developing communication contingencies, addressing disaster-related mental health issues, and developing formal services and support for caregivers may help emergency managers address the needs of the elderly in disaster planning, response, and recovery.

Much work remains to be done to protect the elderly. Addressing their vulnerability is difficult, and, when coupled with their unique perceptions of risk, it can seem overwhelming to take on. No plan will ever be perfect, but every plan can be better. If disaster management professionals take a moment to see risk through the eyes of the elderly, it can help them to better address the special needs of the elderly and increase their participation in disaster preparedness and recovery activities.
BIBLIOGRAPHY


Milanović, Zoran, Saša Pantelić, Nebojša Trajković, Goran Sporiš, Radmila Kostić and Nic James. “Age-related decrease in physical activity and functional fitness among elderly men and women.” *Clinical Interventions in Aging,* No. 8, 2013, pp. 549-556.


Oriol, William. “Psychosocial issues for older adults in disasters.” Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, 1999.


APPENDIX A: CONSENT FORM

Dear Resident:

I am a graduate student under the direction of Dr Monica Farris in the Urban Studies Department at the University of New Orleans. I am conducting a research study to examine how perception of risk influences vulnerability in senior citizens.

I am requesting your participation, which will involve participation in a small focus group for about one hour. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty and it will not affect your care.

The results of the research study may be published, but neither you nor your facility will be identified. Focus groups sessions will be recorded. Once the sessions are transcribed, the recordings will be deleted. No personally identifiable information will be retained or reported.

Although there may be no direct benefit to you, the possible benefit of your participation is that the data collected may help emergency management professionals better plan for the needs of senior citizens during a disaster.

If you have any questions concerning the research study, please contact me at XXX-XXX-XXXX or XXX@uno.edu.

Sincerely,

Jackie Marchand

By signing below you are giving consent to participate in the above described study.

__________________________________________     ______________
Printed Name                             Date

_______________________________________________
Signature

Please contact Dr. Roberto Refinetti (XXX-XXX-XXXX) at the University of New Orleans for answers to questions about this research, your rights as a human subject, and your concerns regarding a research-related injury.
APPENDIX B: ORIGINAL FOCUS GROUP QUESTIONS

How long have you lived in the New Orleans metropolitan area?
   If transplant, where did you live prior to New Orleans metro area?

Have you experienced a natural disaster before?
   What kind?
   Did you suffer any loss?

What types of natural hazards do you think are a threat to the New Orleans metro area?

Do you monitor/listen to government/media warnings regarding natural hazards?
   How do you monitor these warnings? (radio, TV, newspaper, etc)?
   If you do not monitor/listen to warnings, why not?

Do you think the government/media does a good job of communicating hazard/disaster warning?
   Explain.
   If you do not think the government/media communicates warning effectively, how do you think these warnings can be improved?

Do you think the government addresses the specific needs of seniors during a natural hazard event?
   What are they doing well?
   What do you think is lacking in the government’s response to natural hazards particularly for seniors?

Do you have an emergency plan in place?
   If yes, what is your plan?

Are you aware of assisted evacuation programs in your area?
   Would you be interested in participating in an assisted evacuation program?

What do you think is the most important thing that needs to be done to help keep seniors safe before, during and after disasters?

Do you have any other comments that you want to add?
APPENDIX C: FOLLOW-UP FOCUS GROUP QUESTIONS

Did you shelter in place or evacuate for Hurricane Ida?  
Tell me about your experience.

Did you experience any losses due to Hurricane Ida?  
What kind?

Did you monitor/listen to government/media warnings regarding Hurricane Ida?  
If you do not monitor/listen to warnings, why not?  
How do you monitor these warnings (radio, TV, newspaper, etc)?

Do you think the government/media did a good job of communicating hazard/disaster warnings?  
Explain.

If you do not think the government/media communicates warnings effectively, how do you think these warnings can be improved?

Do you think the government addresses the specific needs of seniors during a natural hazard event?  
What are they doing well?  
What do you think is lacking in the government’s response to natural hazards particularly for seniors?

Do you have an emergency plan in place?  Was your plan implemented for Hurricane Ida or did your plans change?  Explain.

Did your experience in Hurricane Ida make you rethink your existing emergency plan?  
If you feel the need to change your plan, is this something you need/want assistance with?

Based on the performance of post-Ida evacuations sponsored by local governments, would you still be willing to participate in an assisted evacuation program if required?

What do you think is the most important thing that needs to be done to help keep seniors safe before, during and after disasters?

Do you have any other comments that you want to add?
APPENDIX D: SUBJECT MATTER EXPERT INTERVIEW QUESTIONS

Interview Questions – Emergency/Disaster Management Professionals

A. Briefly describe your background in emergency/disaster management.

1. What do you believe are the greatest vulnerabilities in the elderly population when it comes to emergency/disaster management?

2. Do you believe there are any differences between how the elderly view risk and how the general populace views risk? Explain.

3. What is the biggest challenge in working with the elderly in emergency/disaster management?

4. Do you encounter difficulties with risk perception when working with the elderly? Explain.

5. How is your department working to protect the elderly? Are there any specifics programs/plans in place? Explain. (If this is not applicable to your current position, any insights on current programs/plans in place for the elderly would be helpful. Otherwise you can skip this question and number 6.)

6. How successful have these programs/plans been? Are there any specific issues that need to be addressed? Explain.

7. Are there any best practices in place for other vulnerable populations that might work well with the elderly population?


9. Did Hurricane Ida highlight any issues that were previously not considered? Explain.

10. If resources were not an issue, what is one thing that you would like to do to better protect the elderly during disasters?
**Interview Questions – Elder Services**

Briefly describe your background in elder care services.

What do you believe are the greatest vulnerabilities in the elderly population when it comes to keeping the elderly safe during a disaster?

Do you believe there are any differences between how the elderly view risk and how the general populace views risk? Explain.

What is the biggest challenge in working with the elderly to keep them safe during a disaster?

Do you encounter difficulties with risk perception when working with the elderly? Explain.

How is your agency/facility working to protect the elderly? Are there any specific programs/plans in place? Explain.

How successful have these programs/plans been? Are there any specific issues that need to be addressed? Explain.

Are you aware of any best practices in place for other vulnerable populations that might work well with the elderly population?

Did Hurricane Ida highlight any deficiencies/weaknesses in existing plans? Explain.

Did Hurricane Ida highlight any issues that were previously not considered? Explain.

If resources were not an issue, what is one thing that you would like to do to better protect the elderly during a disaster?
VITA

Jacquelyn Marchand was born in New Orleans, Louisiana in 1984. She received her B.A. in Geography from the University of New Orleans in 2007 and her M.A. in Geography from the University of New Orleans in 2009. She is a member of Gamma Theta Upsilon International Geographical Honor Society, Phi Kappa Phi Honor Society, and Pi Gamma Mu International Honor Society in Social Sciences.