# INVESTIGATING PREPAREDNESS LEVEL, THREAT PERCEPTION AND PREFERRED DISASTER COMMUNICATION STRATEGIES OF OLDER ADULTS IN RURAL GEORGIA

By

EVA N. CLEVELAND

(Under the Direction of Jessica Legge Muilenburg)

## ABSTRACT

*Introduction:* Older adults are less likely than younger populations to engage in preparedness behaviors (Federal Emergency Management Agency, 2012). They are also more likely to be affected by negative health outcomes after a disaster, especially those in rural communities (Ashida, Robinson, Gay, & Ramirez, 2016). This preparedness gap translates into lack of overall preparedness within the vulnerable population communities. With the ever changing priorities in preparedness, ensuring that preparing older adults remains a priority is an important focus. The focus of this research is to investigate preparedness communication strategies, barriers and the relationship between preparedness behavior and risk perception with older adults and emergency management personnel in Georgia. *Methods:* This research was conducted in two phases using adapted measures for preparedness, susceptibility and severity in face to face and online surveys. Phase I encompassed one qualitative aim, collecting data from local emergency management personnel and older adults on their perceptions of hazards, communication needs/strategies and barriers. Phase II consisted of two quantitative aims investigating

the association between preparedness behaviors and risk perception. Aim two of this phase investigated the effects of race, education and income on preparedness and risk perception. *Results:* Phase I data indicated that emergency management personnel and older adults in Georgia perceive many of the same risks, but older adults perceive risk more in the effects of hazards rather than the hazards themselves. Emergency management personnel need to use communication strategies that reflects the diversity in the older adult population. Aims 2 analysis indicated there was not a significant relationship between preparedness behaviors and threat perception. Aim 3 analysis did not significantly support effects of education, race and income on preparedness and threat perception. *Conclusions:* Yet, these results indicate ways to address this issue with older adults in Georgia. By tailoring message strategies specifically for their local older adults and using local agencies for dissemination, emergency management personnel can cue this population to action in preparedness behavior. *Limitations:* Qualitatively, low numbers of interviewees and focus group members may not wholly reflect all Georgia residents. The creation of average scores for indexed preparedness and risk perception measures may have underestimated associations.

INDEX WORDS: Disaster preparedness; older adults

# INVESTIGATING PREPAREDENSS LEVEL, THREAT PERCEPTION AND PREFERRED DISASTER COMMUNICATION STRATEGIES OF AGING ADULTS IN GEORGIA

by

EVA N. CLEVELAND

BSW, University of Georgia, 1994

MPH, University of Georgia, 2006

A Dissertation Submitted to the Graduate Faculty of the University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2018

# INVESTIGATING PREPAREDNESS LEVEL, THREAT PERCEPTION AND PREFERRED DISASTER COMMUNICATION STRATEGIES OF OLDER ADULTS IN RURAL GEORGIA

by

EVA N. CLEVELAND

| | |
|---|---|
| Major Professor: | Jessica Muilenburg |
| Committee: | Nathan Hansen |
| | Carolyn Lauckner |
| | Curtis Harris |

Electronic Version Approved:

Suzanne Barbour
Dean of the Graduate School
The University of Georgia
May 2018

## DEDICATION

This dissertation is dedicated to my sons, especially my eldest son as well as my Major Professor. It was with their support, encouragement, patience and dedication that I was able to complete this program. I owe them a great debt of gratitude.

ACKNOWLEDGEMENTS

There were many that contributed significantly to this dissertation who deserve a great deal of recognition. First, I would like to acknowledge the contributions of my community partners, Sarah Peck, Mark Palen, and Julie Miller from Georgia Public Health Districts 2, 10 and 8-2, as well as Beth Burgess from Athens/Clarke County Emergency Management. They were vital in my ability to reach the older adult populations in their jurisdictions. Second, I would also like to acknowledge the Community Councils on Aging in these districts for allowing me to come into their agencies to complete this research. I hope that these data and the trainings will be helpful in their preparedness efforts.

Additionally, I would like to acknowledge Rob Hood and Cody Dailey for their assistance with SAS analysis. Their assistance was invaluable.

Finally, an additional acknowledgment to Mark Palen from District 2 is warranted. It was from our ongoing collaborations that the idea for this dissertation originated.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

# CHAPTER 1

## Introduction

Throughout the decades, disaster management focus in the United States has shifted with ever-changing administrations and disasters. In response to the attacks on September 11th and the subsequent anthrax mailings, a concerted effort from the federal level began to address preparedness at the individual level through communication campaigns. These campaigns included the Federal Emergency Management Agency's (FEMA) Ready Campaign and the Centers for Disease Control and Prevention's Get a Kit/Make a Plan campaign (Centers for Disease Control and Prevention, 2015a; Federal Emergency Management Agency, 2015b).

Even with this increased emphasis on communications campaigns, limited data exists that detail preparedness at the individual level. One such data set is the Personal Preparedness in America: Findings from the 2012 FEMA National Survey. Data from this survey highlights several gaps in preparedness. One major gap indicated that although there have been fluctuations in reported individual preparedness, there has not been a significant increase in individual preparedness overall (Federal Emergency Management Agency, 2012). Conversely, those who had read, seen or heard information about disaster preparedness in the last year were more likely to engage in preparedness behavior (Federal Emergency Management Agency, 2012). Additionally, these data indicate that a lack of preparedness extends to vulnerable populations such as older adults (Federal Emergency Management Agency, 2012).

Older adults are less likely than younger populations to engage in preparedness behaviors (Federal Emergency Management Agency, 2012). They are also more likely to be affected by negative health outcomes after a disaster, especially those in rural communities (Ashida, Robinson, Gay, & Ramirez, 2016). This preparedness gap translates into lack of overall preparedness within the vulnerable population communities. Further, it decreases overall community resilience when disasters occur (Federal Emergency Management Agency, 2012). The connection between individual preparedness and community resilience underscores a need to understand the relationship between disaster management communication strategies and individual preparedness. To truly explore this relationship, it is essential to understand the history of disaster management and how it affected its current structure.

## History of Disaster Management

Disasters can take many forms. They range from natural disasters such as earthquakes, severe weather and disease outbreaks to the man-made such as chemical spills and terrorism. Natural and man-made response to disaster evolved separately from that of disease outbreak. It would take two centuries for the two fields to come together on a wider, strategically focused scale with the formation of the Department of Homeland Security (Haddow, Bullock, & Coppola, 2014; Tognotti, 2013).

### *Natural Disaster Response*

Disaster management has always occurred at the local level, but over time the federal government has tried to set a standard for national response. These standards were put in place by various key legislative acts and tended to be reactionary in nature.

The first was the enactment of response-specific legislation in the early 1800's (Lindell, 2007). These legislative acts allowed for the provision of resources to the locality, most notably funding resources. The first act provided financial support to a New Hampshire town following a disastrous fire (Lindell, 2007). This act was passed in 1803; however, further federal intervention on local responses was not seen until the 1930s (Haddow et al., 2014).

This trend of reactionary response to disasters continued through the next three decades. During the 1930's legislative acts focused on reconstruction after disasters (Lindell, 2007). For example, the Reconstruction Finance Corporation and the Bureau of Public Roads provided the power to make disaster loans for repair of identified public facilities (Haddow et al., 2014). Additionally, the Tennessee Valley Authority was created to both produce hydroelectric power and reduce flooding as a part of environmental stewardship (Lindell, 2007). About the same time, the Flood Control Act of 1936 provided the Army Corps of Engineers more control in the design and construction of flood control projects, mandating that all engineer districts develop flood disaster plans (Headquarters of the US Army Corps of Engineers, 2017). However, historical evidence shows that this strategy was not effective in controlling flooding (Haddow et al., 2014). Most legislation did little more than create funding streams for rebuilding post disaster. These early federal level mitigations set the tone of continued ad hoc response, with little strategic planning. This lasted through the 1950's, which is when individual community preparedness was introduced (Lindell, 2007). It was during this time that the Office of Defense Mobilization was created (Haddow et al., 2014). Creation

of this office enabled resources to mobilize quickly while allowing for the stockpiling of resources primarily for war (Haddow et al., 2014).

Other significant legislation was put into place in response to natural disasters, but the approach to disaster management remained piecemeal until the 1970's. This legislation included the National Flood Insurance Program (NFIP), which provided flood insurance programs. The NFIP is noteworthy as it was the first prevention-focused legislation that implemented community-based efforts into disaster management (Haddow et al., 2014). However, during this time, this ad hoc legislative approach gave as many as 100 different agencies differing levels of response roles (Haddow et al., 2014).

It was not until the Carter administration that attempts were made to streamline these agencies under one umbrella: the Federal Emergency Management Agency (Federal Emergency Management Agency, 2017a). Despite this move toward a streamlined approach, changes in administrations affected its ability to come together as an agency (Haddow et al., 2014). They brought in different directors and foci for the agency, undermining its ability to streamline. It was also plagued by an attitude that the priority of programs within FEMA depended on whether there were significant disasters related to those scenarios (Haddow et al., 2014). Therefore, at one time, earthquake, hurricane and flood programs were seen as least important (Haddow et al., 2014). This approach remains today as seen in shifting funding priorities dependent on the current disaster.

*Public Health Disaster Response*

From the disease related disaster perspective, it can be argued that an outbreak is a natural disaster. The impact on persons, communities and nations have been catastrophic and is exemplified by outbreaks such as the 1918 Spanish Flu, bubonic plague, smallpox and cholera, (Tognotti, 2013).

State and federal public health response to disease outbreak began to evolve in the U.S. earlier than that of traditional disaster management. Public health disaster management originates with the formation of quarantine stations in the 1700's. This was accomplished through the formation of legislation at the state level for isolation and quarantine of smallpox victims (Centers for Disease Control and Prevention Division of Global Migration and Quarantine, 2014). In the early 1700's, Massachusetts was first to pass laws for isolation and quarantine of individuals and ships coming to port.
By the end of the 1700's, several other port cities instituted the use of quarantine stations preventing the spread of infectious disease outbreaks such as typhoid, yellow fever, plague and cholera (Tognotti, 2013). Prevention of disease outbreak gained support at the state and federal levels from this time onward (Tognotti, 2013). In addition to the quarantine stations, the formation of the Epidemiological Investigation Service (EIS), the advent of medical tools and interventions and public support for social programs were pivotal to federal level response support (Centers for Disease Control and Prevention, 2017a).

However, a significant change in paradigm gives an interesting contrast to management of natural disasters. In the mid-1800's, inspired by work in Europe, local communities began conducting sanitary surveys (Committee for the Study of the Future

of Public Health, 1988). Science at the time began comparing morbidity and mortality rates between communities. The differing rates between communities were contributed to urbanization and sanitation. This emphasis on sanitation as a contributor of disease outbreak brought about development of sanitation infrastructure. (Committee for the Study of the Future of Public Health, 1988). Along with this infrastructure came a focus on outbreak prevention rather than outbreak response alone. Outbreak control became a part of society's activities and public health disaster management moved out of reaction into prevention (Committee for the Study of the Future of Public Health, 1988).

Along with adequate sanitation, traditional public health outbreak management measures hinge on the quarantine of persons exposed and isolation of those who are ill. The use of these measures has a long history dating back half a millennium and is most relied upon today when there are no medical countermeasures. In addition, these measures can be implemented in differing ways corresponding to differing diseases (Tognotti, 2013). Yet, controversy continues to surround their use.

Central to this controversy is the inherent need to keep people separated from one another. This is done to prevent an outbreak, contain an outbreak, avert terror and death, and maintain public safety (Tognotti, 2013). Quarantine and isolation measures are, by their nature, mistrusted and viewed as intrusive (Tognotti, 2013). Individual rights and liberties have been infringed upon and minorities have been stigmatized during the process of quarantine (Tognotti, 2013). Therefore, powers of quarantine granted and used have undulated across the spectrum.

Added to this mistrust of quarantine powers, public health disaster management has been affected by changing administrations. Though public health established an

infrastructure early on, focus on social welfare has come in and out of vogue, affecting funding for public health programs and response to disease outbreaks. These funding issues continue to plague preparedness and response efforts on the local level (Centers for Disease Control and Prevention, 2015b; Nadeau, 2015).

This historical perspective highlights the struggles of implementing a concerted effort to planning and response. Understanding the history of disaster management from the all-hazards perspective sheds light on the structure in place today.

## Disaster Management Today

### *Current Landscape*

The current landscape of disaster management was fundamentally shaped by four critical events, with disease related disaster response having its own pivotal point. First, a new focus would come in the form of domestic terrorism response after the bombing of the World Trade Center in 1993 and the Oklahoma City bombing in 1995 (Haddow et al., 2014). The aftermath of these events foreshadowed more issues to come within the agency. Yet, as disagreements between agencies and their roles continued, another program was established which highlighted community and individual resilience through preparedness. This was the Project Impact: Building Disaster-Resistant Communities program introduced by James Lee Witt during the Clinton administration (Haddow et al., 2014).

With a focus on disaster management and preparedness on the community level, it, like the civil defense programs, provided funding for education and preparedness (Haddow et al., 2014). Unlike Civil Defense, it called for communities and individuals to

identify and plan for all risks (Haddow et al., 2014). This was the first thread of all-hazards planning.

Second, September 11, 2001 would be a pivotal point in today's disaster management preparedness and response. However, its passage had unintended consequences. The passage of the executive order establishing the Department of Homeland Security actually decreased the country's ability to respond to natural disasters in a concerted fashion (Haddow et al., 2014). The creation of the department aimed to increase overall preparedness, create better transportation security systems, strengthen borders, improve the department and maximize performance (Department of Homeland Security, 2017). Yet, what it actually accomplished was to take authority away from FEMA and spread response tasks across many different departments and agencies once again (Haddow et al., 2014). FEMA became a part of Department of Homeland Security (DHS) with its director no longer reporting directly to the president (Department of Homeland Security, 2017). More disconcerting was the inexperience of FEMA leadership with disaster management (Haddow et al., 2014). The effects of these changes would be felt in the failed response to Hurricanes Rita and Katrina in 2007.

The failed responses to these two hurricanes is the third major event that shaped the current landscape of disaster management. It is still held as the antithesis of concerted response efforts (Lindell, 2007). There were more than 1088 reported deaths with tens of thousands of people displaced (Haddow et al., 2014). Those with medical problems were flown throughout the country and many have never returned to their homes (Haddow et al., 2014). As a result, both houses of Congress conducted hearings into the causes of the failure (Haddow et al., 2014). This report was published as the

Senate Committee on Homeland Security and Government Affairs (Committee on Homeland Security and Governmental Affairs, 2006).

The analysis of the data from the hearings indicated that the reorganizations of FEMA through the creation of the Department of Homeland Security caused many issues. No longer appointed at the Cabinet level, the director had difficulty with tasking and directing the responding agencies. It was also unclear who was in charge of efforts and assets were not deployed effectively beforehand, though there was 72 hours' notice before the storm (Committee on Homeland Security and Governmental Affairs, 2006). Funding for FEMA priorities were redirected to DHS initiatives (Committee on Homeland Security and Governmental Affairs, 2006).

Other findings in the hearings pointed to the change in focus from all-hazards to terrorism planning as a factor in this failed response (Committee on Homeland Security and Governmental Affairs, 2006). In fact, this change seemed indicative of a decrease in overall capability to respond nationally (Committee on Homeland Security and Governmental Affairs, 2006). After the publication of this report there were struggles between legislative members to rectify the problems and several statutes were enacted that did not have much of an effect (Haddow et al., 2014). However, the Post-Katrina Emergency Management Reform Act of 2006 expanded FEMA's authority, reorganized it and imposed new requirements on its operation (109th Congress (2005-2006), 2005). Specifically, it brings all of the disaster management and preparedness functions back under FEMA and prohibits the reallocation of assets from FEMA (109th Congress (2005-2006), 2005). It also allowed the FEMA Director to communicate directly with Congress (109th Congress (2005-2006), 2005).

With a new administrator at the helm, David Paulson, came a change in internal operations. This change was in the form of a top-down approach, making funding dependent on adherence to federal response planning and operations requirements at the state and local level (Haddow et al., 2014). One of these conditions was the required state and local adherence to National Information Management System (NIMS). These adherences meant that the Federal level supplanted the local level instead of acting as support (Haddow et al., 2014). The National Response Plan became the National Response Framework (NFR), which did more to confuse the lines of responsibility between DHS, FEMA and other agencies rather than help it (Haddow et al., 2014).

Finally, in 2008, there was a fourth event that shaped current disaster management. The incoming Obama administration and the new FEMA Director, Craig Fugate, ushered in "A Whole Community Approach to Disaster Management: Principles, Themes, and Pathways for Action" (Federal Emergency Management Agency, 2011). In an effort to re-energize FEMA, the Whole Community Approach relies on community engagement theory to support interaction and planning on the local level between disaster management, local officials, residents and community leaders (Wallerstein, 2008).

Community engagement theory supports the idea that communities understand best how to organize themselves and their assets to promote overall community resilience (Wallerstein, 2008). The Whole Community Approach document acknowledges the diversity of communities and their residents and that planning cannot take a one-size-fits-all approach (Federal Emergency Management Agency, 2011). It also acknowledges the underlying planning assumption that responses are local (Federal Emergency

Management Agency, 2011). Since the implementation of this approach, there have been several natural disasters that have tested this approach. Responses to tornadoes in Joplin, Missouri and Super storm Sandy on the east coast were by most accounts successful from the FEMA standpoint; however there is not much evidence at this time that provides a linkage with whole community planning (Haddow et al., 2014).

Meanwhile, response to disease related disasters continued to evolve, building upon the resources of the CDC. However, with the 2001 anthrax mailings, bioterrorism as a threat was magnified. This was the pivotal point for disease related disaster preparedness and response. To underscore this importance, Public Health was recognized as a terrorism response partner in the NRP and given primary and secondary support functions (Federal Emergency Management Agency, 2016b). Today, it is recognized federally and locally as a response partner in any disease, sheltering or exposure related response (Federal Emergency Management Agency, 2016b). It has been given dedicated funding to develop, first bioterrorism, then emergency preparedness teams at federal, state and local levels (Centers for Disease Control and Prevention, 2015b).

As a response partner, public health agencies have had to refine and define quarantine powers. Recently, the extent of federal level quarantine powers was in the spotlight. Within the context of the recent Ebola Virus Disease (EVD) response, quarantine powers remained controversial, given the global community.

In response to lessons learned with EVD, new federal legislation has been proposed. This legislation, called the final rule for the Control of Communicable Diseases, seeks to amend powers to grant federal agencies such as Department of Health and Human Services (DHHS) and CDC increased powers for quarantine (Centers for Disease

Control and Prevention, 2017b). This rule expands the ability for public health to quarantine anyone suspected of having or at risk of having cholera, plague, diphtheria, smallpox, yellow fever, infectious tuberculosis, viral hemorrhagic fevers [like Ebola Viral Disease], severe acute respiratory syndrome [SARS] or influenza (Centers for Disease Control and Prevention, 2017b). Operationally, this means that travelers coming into the U.S. would be subject to these expanded powers. This expansion of power is concerning from an individual liberty point of view, bringing to light the narrow line between the protection of the public and individual rights.

The effects of natural, terror, environmental and disease related disasters underscores the need for a coordinated national response strategy. This strategy, evolving over time, has become the National Preparedness Goal (Federal Emergency Management Agency, 2015a). The National Preparedness Goal has provided a strategic approach to all-hazards preparedness and response, providing for the integration of all levels of government, private sector and nongovernmental organizations (NGOs), underpinning the current structure nationally (Federal Emergency Management Agency, 2015a).

*Current Structure of Disaster Management*

The National Preparedness Goal defines the meaning of preparedness as "- secure and resilient nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk." This goal is accomplished through addressing the four mission areas which are: prevention, protection, mitigation, and response.

Prevention is as vital to disaster management as it is with all other causes of morbidity and mortality. This mission describes prevention as those activities and

capabilities that avoid actual acts of terrorism (Federal Emergency Management Agency, 2016c). This focus is specific and directly refers to imminent terror threats. It differs from mitigation in that mitigation refers to the capabilities that prevent loss of life and property during a disaster (Federal Emergency Management Agency, 2016c). Tied to the idea of prevention is the concept of protection. Protection relates to all hazards and is defined as the capabilities that provide security against the effects of terrorism, man-made or natural disasters (Federal Emergency Management Agency, 2016c).

Preparedness and resilience, whether community or individual, is a focus of protection (Federal Emergency Management Agency, 2016b). The response mission refers to the capability to respond quickly to a disaster to save lives and protect property and environment. Finally, the mission of recovery encompasses those activities that assist communities in their restoration to functioning after a disaster, hopefully, to stronger functioning than pre-disaster.

Specific to the response mission, the newest iteration of the NRF provides not only for the previous integrative principles, but goes a step further with the National Preparedness System. This system provides for a more holistic approach to preparedness along with response, bringing a whole-community emphasis to the framework. This version of the NRF provides guidance for individuals, families, households, communities, private/nonprofit sectors and faith-based organizations, in addition to entities at all levels of government. Roles and responsibilities for incident management during a response is outlined in the National Incident Management System (NIMS). NIMS is the template through which the whole community works together to address the five mission areas.

These roles are spelled out in the Emergency Support Functions (ESF) within the NRF and National Incident Management System (NIMS). The ESF structure provides the mechanisms through which coordinated assistance is achieved (Department of Homeland Security, 2008). In all, there are fifteen ESFs, that correspond to a government agency and each agency has primary and secondary roles. An exception to this is the American Red Cross, which is a non-governmental agency assigned to ESF 6, Mass Care. (See Appendix A.)

Though all ESF roles are important, understanding two specific ones is important with older adults due to their increased vulnerability. These are disaster management (ESF 5) and public health (ESF 8). The ESF framework is applied at different governmental levels (Federal Emergency Management Agency, 2015a). There are ESF 5 and 8 agencies at the federal, state and local levels, each having a different focus (Federal Emergency Management Agency, 2016b). Underlying each focus is the planning assumption that all disasters are local.

The Emergency Management Agency lead role, ESF 5, provides for the coordination and administration of all federal departments for preparedness and response (Federal Emergency Management Agency, 2017b). Included in these activities are coordination of operations, logistics management, information collection, request facilitation, financial and facilities management and incident action planning (Department of Homeland Security, 2008). All other ESF response agencies act as support for ESF 5 (Department of Homeland Security, 2008). During preparedness, ESF 5 is responsible for all planning and multi-agency coordination. Such planning activities would include

identification of resources and providing trained staff for coordination centers and disaster operations centers (Federal Emergency Management Agency, 2017b).

ESF 8, Public Health and Medical Services activities encompass all things medical, from assessment of needs and surveillance to medical personnel and supplies (Office of the Assistant Secretary for Preparedness and Response, 2017a). Additionally, it covers support for patient services, hospital care, victim decontamination and veterinarian services (Department of Homeland Security, 2008). Public health has a support role as well in ESF 6, Mass Care, Housing and Human Services (Department of Homeland Security, 2008). Supporting the American Red Cross, Public Health aids with nursing support and inspection of shelters (Department of Homeland Security, 2008).

ESF 5 and 8 agencies at the federal and state levels include the Federal Emergency Management Agency and Department of Health and Human Services respectively, to include Centers for Disease Control and Prevention (Department of Homeland Security, 2008). At this level, response and planning activities are primarily focused on how assets are coordinated to either the state or local level. Once resources are overwhelmed at the state and local levels, declarations are made by the Governor to move these assets (Federal Emergency Management Agency, 2016b).

Therefore, at the local community level, ESF 8 planning and response focuses on direct operations such as actual dispensing of medications or evacuations. These operations would include planning for the reception, dispensing or allocating state and federal resources locally (Department of Homeland Security, 2008; Office of the Assistant Secretary for Preparedness and Response, 2017b). Agencies involved in planning at the community level include local government, local Emergency

Management Agencies, schools, public health departments, jails, local businesses, hospitals and clinics, among many others. Communities are advised to plan for at least 72 hours before state or federal assets arrive (Federal Emergency Management Agency, 2016b). This local planning assumption underpins all of disaster management's planning efforts. Because of this, it is imperative that there be an understanding of community level response planning.

*Community Preparedness*

Individual and community preparedness were introduced through the rise of civil defense in the 1950's (Haddow et al., 2014). Additionally, civil defense ushered in a pre-curser structure for disaster management in response to the potential for nuclear war post World War II (Haddow et al., 2014). Civil defense directors carried out their civil defense duties in addition to other duties. This precedent set the pattern for current emergency management directors and is seen in many rural emergency management departments today (Haddow et al., 2014).

Individual and community preparedness was woven into this formalized structure in the form of organized preparedness education (Haddow et al., 2014). In the home, families were taught how to build bomb shelters along with learning how to shelter in place. K-12 schools carried out mandated drills on a regular basis (Haddow et al., 2014).

Today, community and individual preparedness and response incorporate many different approaches. Many local preparedness and response programs are adopting community-focused strategies (Gamboa-Maldona, et.al. 2015). These community focused strategies have taken many forms such as the state level Regional Coordinating Hospital programs funded through the Assistance Secretary for Preparedness and

Response (Department of Health and Human Services 2018). This funding provides for the formation of local coalitions comprised of healthcare agencies, public health, public safety and emergency management (Department of Health and Human Services 2018). Another strategy is the Local Emergency Planning Committees (LEPC). Created by the Emergency Planning and Community Right to Know Act of 1986, these are community based planning organizations that support planning for hazardous materials preparedness and response (Georgia Emergency Management Agency 2018).

Viewing disaster management through the lens of history magnifies the patchwork nature of its evolution. More importantly it shows that the approach to management is rooted in community and individual preparedness. It has come full circle from the 1950's Civil Defense preparedness to the FEMA's Whole Community Approach (Haddow et al., 2014). It is imperative that preparedness and resilience at the community level be adequately supported through federal, state and local resources. (Federal Emergency Management Agency, 2011; Tognotti, 2013). Focusing this support begins with thorough local hazard vulnerability assessments.

*Local Management and Hazard Vulnerability Assessments*

Hazard vulnerability assessments (HVAs) constitute the foundation of planning and it is carried out in a systematic, evidence-based process called hazard mitigation planning (Federal Emergency Management Agency, 2016a). This is a multi-step process which allows state, local and tribal officials to assess disasters that their communities are most at risk for. Along with assessing risk, this process allows for opportunities for mitigation and preparedness efforts as well (Federal Emergency Management Agency, 2016a). These opportunities include the ability to increase awareness, educate, and build

partnerships, or "trade business cards" before a disaster (Federal Emergency Management Agency, 2016a). This planning provides additional opportunities to identify strategies for risk reduction in alignment with other community objectives, as well as identifying approaches to reducing these risks (Federal Emergency Management Agency, 2016a). Finally, and possibly one of the most important opportunities this planning provides, is foundational data to support funding (Federal Emergency Management Agency, 2016a).

Detailed HVAs include risk and hazard information, but they also detail the potential population at risk, the number of structures that might be impacted and the lifelines, such as bridges or power lines, that might be damaged (Federal Emergency Management Agency, 2015c). HVAs describe the potential exposure of people and the built environment. More inclusive HVAs incorporate hazard assessment to the public's health.

As a part of planning, HVAs are conducted in four components. They are: 1) hazard identification, 2) profiling of hazard events, 3) inventory of assets, and 4) estimation of potential human and economic losses based on the exposure and vulnerability of people, buildings and infrastructure (Federal Emergency Management Agency, 2016b). Assessments are always in draft form and should be assessed on a regular basis and after a disaster (Federal Emergency Management Agency, 2016b). Each assessment within the plan should include a summary of all the risks that have the potential to affect the locality.

*Barriers to Hazard Vulnerability Assessments*

At the local level, HVAs are fraught with barriers to completion. First, as it was with civil defense coordinators in the 1950's, local EMA directors are also the fire chiefs

and/or disaster services directors and/or coroners in their counties (Emergency Management Key Informant Interview, 2016). Complicating this is the lack of a line-item in county budgets. This means little or no support staff (Emergency Management Key Informant Interview, 2016). This lack of personnel and financial support affects their ability to implement ongoing assessments. It also affects their ability to seasonally revise HVAs to make changes in planning priorities.

Second, new legislative mandates require localities to produce HVAs that use multi-hazard maps. There are many tools available for use; however, many local disaster managers are unfamiliar with the technologies (106th Congress, 2000). This lack of familiarity makes it difficult to access accurate local data for severe weather, man-made, geological and environmental hazards. Public Health's data access issues can be challenging as well, given gaps in provider driven surveillance (Georgia District Public Health, 2016). However, having access to this data is crucial for accurate assessments. Additionally, there is little guidance on the use of the mapping tools commercially available. For example, assessing hazard vulnerability from accidental spills can now be done though the combination of sources. Risk zones for harmful chlorine can be obtained using the Environmental Protection Agency's Area Locations of Hazardous Atmospheres (ALOHA) Program (Cameo, 2015). These can then be inputted into Arc Geographical Information Systems (ArcGIS) to display the number of people at risk for exposure (ESRI, 2015). Finally, there are social vulnerability index tools that use census track data to assess vulnerability layering several types of data. These layers include English spoken and house-holds with elder or disabled persons (North Carolina

Preparedness and Emergency Response Research Center, 2014). The barrier here is the lack of knowledge about these tools and guidance on how to use them in assessments.

Finally, another barrier to HVAs is the identification and incorporation of vulnerable populations in the assessment of risk. In fact, local EMA coordinators indicate that it is a liability if these needs are not taken into consideration when assessing vulnerability (Emergency Management Key Informant Interview, 2016). They note the example of another local jurisdiction that "was successfully sued because there was not a plan in place for a vulnerable population" (Emergency Management Key Informant Interview, 2016).

To put HVA in a local context, Georgia Emergency Management Agency (GEMA) Area 1 and Public Health Districts two and ten serve as good examples. Two jurisdictions encompass twenty-three counties located in the northeast corner of Georgia. Each of these Public Health jurisdictions, or districts, have a lead county that houses the largest population within the district. These counties house the district offices.

Population wise, these jurisdictions are predominately rural, with three areas that could be considered urban or more populous (United States Department of Commerce, 2015). These urban areas are Athens and Gainesville and Albany. Demographics reflect a growing senior population and most of those seniors reside within their local communities (United States Department of Commerce, 2015). Given this growing population and the importance of their preparedness to community and individual preparedness, their incorporation into local HVAs is needed.

Regardless of the type of disaster, these local disaster managers express that the HVA is only the beginning. Moving forward with planning includes communicating

these hazards to local officials to increase support and resources. However, these same disaster management personnel indicate that communicating local risk of all-hazards events within their jurisdictions has been difficult (Burgess, 2014; Heath, Lee, & Ni, 2009). They indicate that when requesting resources for planning and disaster response coordination for these scenarios, local officials do not seem to perceive their community as susceptible to risk.

An attitude of, "it won't happen here seems to prevail." With such statements as, "Why should we be planning for these, no one will ever target our city" or "we have never had a tornado here", it remains a struggle to procure funding and other resources, not to mention a line item budget for planning and response activities (Burgess, 2014). Though, subjectively, when these local officials are involved in tabletop exercises with scenarios that use local examples of natural, disease related and man-made events there seems to be a change in their perception of risk and intent to allocate resources for planning (Burgess, 2014; Emergency Management Key Informant Interview, 2016)

The historical perspective of traditional and public health disaster management and the HVA process underscores the barriers with preparedness planning. The historically reactionary approach to disaster management at the Federal level, coupled with inconsistent funding for local HVAs and planning, does little to promote consistency in preparedness efforts at the community level. However, as the FEMA report notes, targeted communications and education with individuals may offset these barriers to preparedness (FEMA 2012). Therefore, interventions that do so will be extremely important going forward.

# CHAPTER 2

## Literature Review

The first steps in developing preparedness interventions is understanding populations at risk, the communication issues in emergency management and the challenges communicating hazard poses. The next step is delving into intervention literature supporting the development of targeted strategies. This literature review will focus on these areas while emphasizing theoretical models that support interventions.

### Populations at Risk

Reaching vulnerable populations has been the focus of health promotion efforts for many years. The list of social determinants affecting vulnerability is long, but generally speaking, vulnerable populations are those that carry higher risk of negative health outcomes for any given health issue (Banks, 2013). For disaster response planning, this includes populations that cannot readily receive crisis communication or preparedness education. Further, it includes populations that are not able to leave their homes to receive medications or evacuate (Ballen, 2009). Finally, populations are considered vulnerable if they would be cut off from life-saving equipment such as oxygen or dialysis (Ballen, 2009). Given this broad definition of vulnerability, populations that meet these descriptions are many. For example, those in low socio-economic status may lack transportation for evacuation or extra monetary resources to stockpile food, water or medications. By the same token, those for whom English is a second language may not have accesses to culturally competent preparedness materials,

thereby decreasing their ability to be resilient. (Hutchins, Fiscella, Levine, Ompad, & McDonald, 2009).

One population that overlaps many social determinants of vulnerability are seniors (Ballen, 2009). Seniors who live independently, or aging adults (AGING ADULTS), can be especially vulnerable after a disaster when their community and medical supports are affected (Al-rousan, Rubenstein, & Wallace, 2014;Palen,2014; Whitney, Visker, Haithcox-Dennis, & DeWeese, 2012).

In Georgia, approximately 11% of residents are 65 and older. Demographics in Georgia Health Districts 2, 8-2 and 10, contained in Georgia Emergency Management Agency area one and six, show that approximately one third of all census tracts have populations where over half of the residents are 65or older (North Carolina Preparedness and Emergency Response Research Center, 2014; United States Census Bureau, 2016). This reflects the growing senior population nationally (United States Census Bureau, 2016).

Though mitigating these risks is paramount for this population and overall community resilience, it is challenging. Older adults as a vulnerable population may be invisible to emergency management because they are not on any list or registry (O'Brien, 2003). For example, after the September 11th attacks, there was an effort to locate abandoned pets quickly, yet older people and those with disabilities were trapped for days before being rescued (O'Brien, 2003). In addition to being invisible in the planning process, there are other barriers and considerations emergency management personnel need assess in their planning with this population.

## Barriers to Preparedness Planning with Older Adults

Barriers to preparedness planning with older adults are present, but can be addressed. These barriers relate to variations in differing environments, vulnerabilities and supports (Banks, 2013). Some seniors live in assisted living or skilled care facilities, while others remain in their homes with or without support (Banks, 2013). They also have variations in health and mobility (Banks, 2013). For instance, nationally, nearly 15% report using electrically powered medical devices (Al-rousan et al., 2014). Seven percent report having hearing difficulties that could prevent them from hearing warning sirens or radio reports and instructions (Al-rousan et al., 2014). Additionally, 21.2% of older adults report an annual income less than $17,000. Most report good health status; however, about 37.6% reported their health to be fair or poor. Importantly, 37.6% report one or more Americans With Disabilities limitations (Al-rousan et al., 2014). This variation in environment, health and mobility statuses makes overall planning difficult

Social isolation is another barrier that must be addressed. However, there is wide variety in the population regarding degrees of social isolation (Centers for Disease Control and Prevention, 2016b). However, as a population, their overall risk for isolation and the impacts that come with it is higher. When older adults are isolated socially, and living on their own, they may not have anyone checking on them or making sure they are receiving vital information. Emergency planners may not know where they are in order to assist them (Burgess, 2014; Palen, 2014). There have been many attempts over the years to address this planning barrier. The most prevalent to date is the use of registries (Burgess, 2014; Palen, 2014; O'Brien 2003).

Supported by data from the field, the use of registries has a couple of major drawbacks, however. The shear amount of time it takes to keep the registries up to date

is usually more than can be allocated in emergency planning offices that are staffed by directors filling several roles (Burgess, 2014; Palen, 2014). Even then, the accuracy is difficult to maintain. The second, and perhaps most tragic problem, is the general belief that people who are on registries will have preferential access to resources (Burgess, 2014). Sadly, this is not the case and communicating this information is difficult and sensitive.

## Communication Issues and Challenges

Of the many barriers to planning for older adults in response, communicating hazard vulnerability before and during the event is one of the most critical. Hazard vulnerability communications are likened to other health risk communications in that they aim to increase a behavior that decreases a health risk. In this case, preparedness behavior can decrease negative health outcomes related to exacerbation of mental health problems, chronic diseases and access to lifesaving treatments and medications after a disaster (Banks, 2013). They can reduce risk of contracting an infectious disease during an outbreak due to lack of access to new medications or healthcare (Banks, 2013).

The challenge for messaging is increasing preparedness behavior. Regarding older adults, increasing preparedness can have a two-fold effect. First, it can decrease negative health outcomes due to medication and service interruption. Additionally, it decreases financial and mental health stressors (Banks, 2013). In combination, these increase overall resilience in older adults. Second, older adults prepared for disasters can be a resource during a disaster response, serving as subject matter experts and volunteers during response (Banks, 2013). For example, the Medical Reserve Corps in District 2 is

composed of many retirees. These prepared retirees are trained to work in points of dispensing during dispensing of medical counter measures (Palen 2016)

Communication barriers with older adults hinge on getting hazard vulnerability information to them expeditiously before and during disasters. While traditional channels of vulnerability communications, such as radio, TV, billboards and fliers continue to be used- there is a trend towards the use of social media in message dissemination. However, because of hearing and fine motor impairment, older adults may not utilize social media or the Internet as a trusted source of information (Centers for Disease Control and Prevention, 2015b). In fact, in-person social networks and other trusted sources may be more effective in reaching this audience with hazard vulnerability messaging (Heath et al., 2009). Again, because of this variation in the needs of the population, using different voices, channels and trusted sources may increase reach (Heath et al., 2009).

One approach gaining popularity in addressing this barrier is the use of Community Human Service Agencies (CHSA). CHSAs are community-based organizations that assist seniors with aging in place. By visiting homes on a regular basis, they know the population they work with. Those who surround older adults are those that are trusted by that population (Ashida et al., 2016). Additionally, interventions utilizing trusted sources to disseminate information have seen good results so far (David Eisenman et al., 2014). Therefore, it is strongly encouraged that interventions be supported by theory and evidence, using trusted sources and channels in disaster risk dissemination. Along this vein, identifying those trusted community sources is the logical first step in intervention development.

Knowing that older adults are considered vulnerable and that local emergency management personnel rely partially on community agencies to communicate with them advances questions about interventions that utilize these types of approaches. Developing interventions requires knowing the types of effective interventions that have been implemented. It also requires knowing whether these interventions are supported by theoretical frameworks and what those frameworks are.

## Theory Based Interventions

To examine the current theory-based communication interventions, a literature review was performed specifically for interventions in disaster preparedness. Select terms were used to search multiple databases within University of Georgia's GALELIO system including PsycINFO, Social Sciences Citation Index, CINAHL MEDLINE with Full Text, and Science Citation Index databases. Searches on disaster risk communications were completed with an emphasis on theoretical or model-based interventions. To accomplish this, Boolean search strings used key terms to search for articles that addressed disaster risk messages, preparedness, theories and interventions for seniors, older adults and randomized control trials.

The initial search strings produced 5,474 articles. This search was refined further using the limiters of full text, scholarly peer-reviewed journals within the U.S. from 2001 to 2016. The decision to limit the period from 2002 to 2016 was made for two reasons: first, 2001 marked the passage of H.R. 2002 the Homeland Security Act (Thornberry, 2002). Second, this is the timeframe used in the FEMA's National Survey Report (Federal Emergency Management Agency, 2012). The U.S. limiter was used in conjunction with the FEMA report, referencing the September 11, 2001 terror attacks,

prompting the passage of H.R. 2002 (Federal Emergency Management Agency, 2012; Thornberry, 2002). These two events are significant to the U.S. Lastly, the limitation to scholarly peer-review journals ensures an amount of rigor in studies returned.

Final inclusion criteria reviewed the studies for design. Rating for rigor of design was accomplished using a numerical rating from one to four Zaza, Truman, Sosin, & Teutsch, 2000). Using this system, non-comparative studies such as case studies and focus groups were rated as a "1", while cross-sectional studies were rated as "2." Studies that included comparison groups but were not randomized by exposure were rated at "3." Randomized control trials were rated as a "4". Appendix A describes the coding criteria. There were many studies in the literature, but the majority were non-comparative or case studies. Therefore, articles rated at one or two were excluded. Of the 43 articles reviewed for eligibility, the remaining thirteen used the most rigorous methodologies for evaluation.

Of the thirteen studies reviewed, only 3 specifically named a theoretical framework as a foundation (Glik, Eisenman, Zhou, Tseng, & Asch, 2014). However, most studies reviewed mentioned a theory or construct, and many had developed conceptual models for theories or constructs (J. Baseman et al., 2016; Eisenman et al.2009; Glik et al., 2014; Klaiman, Higdon, & Galarce, 2013). The constructs referenced were message framing, community resilience and communication persuasion model (J. Baseman et al., 2016; J. G. Baseman et al., 2013; Bauerle Bass, Gordon, Gordon, Parvanta, & Bass, 2016; Eisenman et al., 2009; Glik et al., 2014; Klaiman et al., 2013; Kruvand & Bryant, 2015; McCabe et al., 2014; Ripberger, Silva, Jenkins-Smith, & James, 2015). Three articles had no mention of a theory or construct (Bauerle Bass et al., 2016; Ripberger et al., 2015).

The first of the three theory based interventions used the precaution adoption process model (PAPM) was used as a foundation in an intervention that provided health education and training to low-income individual household members within the Latino community in Los Angeles (Glik et al., 2014). PAPM seeks to explain the processes by which individuals make decisions about behavior and how that decision is translated into action (Weinstein, Sandman, & Blalock, 2008).

A high-intensity group received instruction in disaster preparedness with community based "promotoras" as trusted sources. The comparison group received media-only information. Looking at the participant's stage of decision making about household disaster preparedness, the study found that the high intensity group had more significant shifts in stages of decision making for the communication plan than the group having media-only communications. Their findings indicate that trusted sources from in-place social networks may impact decisions related to preparedness activity and planning (Glik et al., 2014).

Next, two studies built interventions on a community engagement theory foundation. This theory supports the use of partnership building within communities to increase successful change. This is done by enlisting trusted leaders and agencies within communities to address their identified needs with a long term goal of developing long-term collaborations (Wallerstein, 2008). The first was a study that developed a dual intervention model of capacity-building for public mental health and preparedness and community resilience (McCabe et al., 2014). The study utilized leaders in local health departments and faith-based organizations along with faculty from a local university. Local health department leaders and faculty provided psychological first aid training and

guided preparedness planning to members of faith based organizations. Findings indicated that this model could be an effective approach to promoting public health preparedness and community resilience (McCabe et al., 2014).

Another study utilizing community engagement combined social networks into the framework (Eisenman et al., 2009). This study with Latinos in the Los Angeles area also used a promotora as a trusted source. This group was compared to a media-only group with culturally tailored messages. The study found that among participants who did not have emergency water pre-intervention, 93% of those in the promotora arm had it at a three-month follow-up compared to 63% in the media arm. Additionally, it found that 91.7% of participants who did not have emergency food pre-intervention reported having extra food at three-month follow up compared with 60.6% in the media arm (David Eisenman et al., 2014).

Other interventions included the theoretical constructs of self-efficacy, perceived motivation, perceived susceptibility and message framing. The study focusing on self-efficacy and perceived motivation examined the CDC's Zombie Apocalypse campaign. This study's purpose was to evaluate the campaign's ability to educate young people about emergency preparedness and prompt them to prepare an emergency kit and plan (Kruvand & Bryant, 2015). The study examined an intervention group with the Zombie Apocalypse campaign compared to a group exposed to factual material. The findings indicated that, though the humorous material was enjoyable, the positive affect of the participants did not lead to greater retention of preparedness information or increase intent to prepare. Additionally, there was no significant between-group difference in reported likelihood of developing a kit or plan. However, there were limitations with

generalizability, as the study was conducted at a Midwestern Jesuit college (Kruvand & Bryant, 2015). Therefore, samples more reflective of young people in the United States may yield different results.

Last, there were two studies examining message framing constructs. One tested appropriate evidence-based messages to increase volunteer participation rates in flu clinics (Klaiman et al., 2013). This study utilized positively- and negatively-framed messages for Medical Reserve Corps Volunteers. The study found a strong positive effect of positive framing on volunteerism. Yet, there was a low response rate that most likely biased the effect (Klaiman et al., 2013).

The second study using message framing as a construct examined the influence of consequence-based messages on warning responsiveness (Klaiman et al., 2013). Message framing was used to increase knowledge, perceived risk and preparation for tornadoes. Participants were randomly assigned a consequence-based warning message and were asked how they would respond. The study found that there is a relationship between consequence-based messages and protective action. However this relationship is dependent on the action being considered (Klaiman et al., 2013).

The two study interventions that did not address specific theories or constructs differed in intervention focus. The first utilized an incentive during preparedness training for families of children with special needs (Baker, Baker, & Flagg, 2012). They found no significant differences in pretest preparedness scores for the total group between the group that received the incentive item and the one that did not (Baker et al., 2012). In the second study, the intervention utilized peer mentorship and social networks as trusted sources for a preparedness program for adults with developmental disabilities living

independently (DP Eisenman et al., 2014). This study found that comparing pretest to posttest scores, participants showed significant improvement in their knowledge. Additionally, they increased their preparedness activities (DP Eisenman et al., 2014).

Regarding disaster preparedness communication interventions with seniors, the literature is scant at best. There were a few articles that described preparedness interventions for seniors; however, these interventions took place in assisted living or skilled nursing care facilities. Only one article was returned that evaluated a communication intervention with older adults (Ashida, Robinson, Gay, Slagel, & Ramirez, 2017). This study focused on older adults living in rural communities. It investigated the change in personal disaster support networks of 27 older adults before and after participation in preparedness education intervention. This intervention utilized the PrepWise program which educates participants on types of emergencies, vulnerability assessment, personal support networks, emergency plans and making kits. It found that after participation in PrepWise, social support networks expanded by an average of 3 sources (Ashida et al., 2017)

Review of interventions in the literature show a couple of things. First, and foremost is the scant nature of disaster communication and education interventions that target older adults. Compounding that is the few studies that are founded in theoretical frameworks.

Second, of the studies utilizing constructs or theoretical frameworks, community engagement, precaution adoption and self-efficacy are the ones most commonly used in disaster preparedness communications or education interventions. Further, they indicate that interventions grounded in these frameworks positively impacted preparedness

activities and volunteerism. Additionally, message framing is shown to be important for increasing knowledge, volunteerism retention and preparedness activities.

As the literature indicates, addressing barriers in communicating local hazard vulnerability in the aging adult community should address two things. First, communication interventions that utilize trusted community partners, such as response planners, to assist in dissemination, as well as messages that convey importance and evidence is crucial to the increase in hazard risk perception (Jassempour, Shirazi, Fararooei, Shams, & Shirazi, 2014). This would indicate that communication interventions for localities which educate them on local risk and the benefits in preparedness behavior may predict whether they adapt their behavior (Jassempour et al., 2014).

Next, if community leaders have a low risk perception regarding hazards to their communities then it is unlikely that the community or individuals within the community will have high perception of susceptibility. Yet, preparedness behavior and community resilience is dependent on support from community leaders and residents (Abara et al., 2014; Wallerstein, 2008). If FEMA's Whole Community approach to emergency management is to be achieved, community leaders, including emergency management personnel, will need interventions that effectively communicate hazards to their constituents. Given the importance of reaching older adults with hazard vulnerability messages, developing theory-based interventions is required if increasing preparedness behavior is the goal. Further, through this review, two theories that show promise in these types of interventions are the health belief model and community engagement theory.

## Applicable Theories

### *Health Belief Model*

The Health Belief Model (HBM) is a part of the value expectancy theories. This theory assumes that a person's perception of a threat coupled with the degree to which they believe a certain course of action will prevent this threat will increase the likelihood of behavior adoption (Bandura, 2004). It includes the constructs of perceived susceptibility, perceived severity, cues to action, self-efficacy and perceived benefits/barriers. It conceptualizes gains and losses as perceived benefits/perceived barriers. Gains and losses are not only actual, but are also perceived by the individual or community. Perceived benefits denote the gains individuals or communities believe they will have if the behavior is adopted. Perceived barriers denote those difficulties perceived in adopting a behavior or intervention (Bandura, 2004; Hayden, 2014). If there is a perception of a net gain, then a behavior or intervention is more likely to be adopted (Mhatre, Artani, & Sansgiry, 2011). Perceived susceptibility within HBM denotes the subjective assessment of one's risk of a health issue—in this case, their risk of experiencing a specific disaster. Cues to action are described as the motivators that trigger the decision to adopt the behavior. Cues to action can be internal, such as symptoms of illness. They can be external as well, such as media messages or advice from others. Finally, self-efficacy denotes the level to which one feels confident in their ability to be successful in performing a behavior (Hayden, 2014).

### *Community Engagement Theory*

The theory of Community Engagement (CE) (Wallerstein, Minkler, Carter-Edwards, Avila, & Sánchez, 2015) directly connects with ecological theory. At its basis, CE says

that change, whether social or health related in nature, comes about most effectively when the community is empowered to make it so. CE theory underscores finding strengths within communities and building upon them. It begins with finding "where the people are", then building and organizing so that the community can become self-sufficient. The constructs of empowerment, community building, community organization, and cultural humility underpin this theory, providing the foundation for resilient communities (Wallerstein et al., 2015).

This theory defines a community as a group of people with diverse characteristics, linked by social ties, sharing common perspectives, and engaging in joint action in geographical locations or settings (MacQueen et al., 2001). The definition of community defies geographical barriers. It embraces gender communities, racial communities, teaching communities, art communities, and political communities, among many others (Wallerstein et al., 2015). In terms of capacity building and social action, simply stated, engagement addresses issues of diversity and inequity by developing through community based practices. (Wallerstein et al., 2015). It requires employing these practices to promote ownership by the community. The constructs of community empowerment, community organization, community building and cultural humility describe how to accomplish this engagement (Wallerstein et al., 2015).

CE is applicable to emergency preparedness in the idea that community leaders, such as emergency planners and agency staff, are involved in the process of building and disseminating hazard vulnerability assessment into the community. The use of community leaders in the process of message building and dissemination puts them in the role of trusted sources and channels. Their involvement would encourage the

engagement of older adults in preparedness, which in turn, would bolster community resilience. The use of these community leaders and local hazards as cues to action could increase the moderating effect on threat perception.

## Threat Perception, Preparedness and Conceptual Model

Most research with older adults living in the community focuses on the capacity of institutions working with them to respond during disasters (Tuohy, et.al. 2014). Little is known about threat perception and preparedness of those who live independently in the community (Tuohy, et.al. 2014). Even less is known about how income, racial identity and education effects these two constructs in this population (Tuohy, et.al. 2014).

Utilizing HBM and CE, the following conceptual model is proposed and focuses on the relationship between the constructs of threat perception and preparedness level with cues to action and demographic moderators for older adults. Evidence in the literature is sparse in describing the relationship between these two constructs. However, there are findings in the literature that support both a positive association and no association between the two. (Levac et.al. 2012; Wachinger, et.al. 2012). Further, it has been noted that other aspects of threat perception may affect preparedness level such as type of threat, pattern and duration. Preparedness level may also be affected by perceived significance and whether individuals have caretaking responsibilities (Levac, et.al. 2012)

First, based in HBM, this model uses threat perception as the combination of susceptibility and severity, while incorporating cues to action in the form messages delivered through preferred communication strategies of aging adults. It is expected that these cues to action will moderate threat perception, in turn, affecting preparedness behavior.

Next, CE is introduced into the model in two ways. First, preferred communication strategies include the use of trusted sources and social networks as sources. Specifically, these sources would be agencies that work with aging adults in the community. Additionally, it includes local emergency management as local leaders. Second, preferred message strategies would include hazards that aging adults are at risk for in their local areas. The risks identified in the local HVAs are used to gauge aging adults' perception of these local risks, as well as used to build targeted messaging. See figure 1.

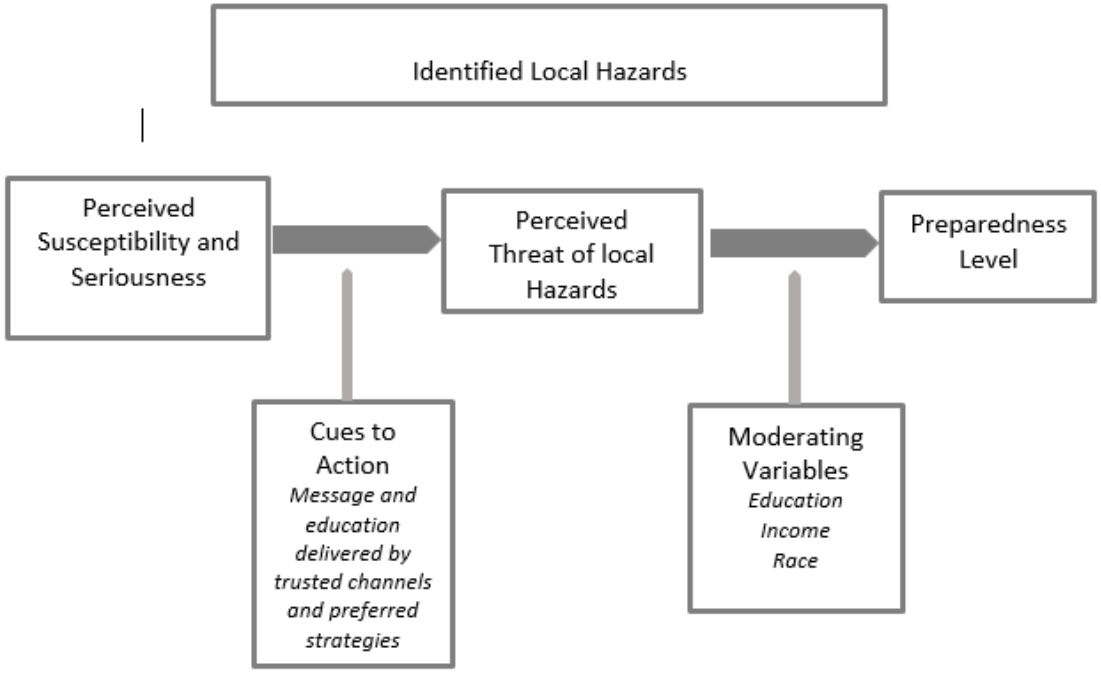


Figure 1. Concept Model Health Belief Model with Local Community Engagement

This model suggests that perceived threat would have a positive association with preparedness level. Therefore, to understand the association more fully, the model suggests that demographic variables such as income, education and race would moderate this association. Further, it suggests that the use of communication strategies that employ

local trusted sources and preferred channels will have an effect on threat perception. To investigate these associations, moderating effects and cues to action, the following aims were developed in two phases:

Phase I

*Aim 1:* Qualitatively examine aging adults and emergency management personnel' perceptions of:

a. Preferred sources of emergency preparedness messages
b. Preferred channels
c. Risks and hazards
d. Barriers to preparedness

Phase II

*Aim 2*: Investigate the association between preparedness and threat perception.

*Aim 3:* Examine whether income, education, or race have a moderating effect on threat perception and preparedness.

# CHAPTER 3

## Methods

This study is the first step in the development of communication and education interventions with older adults in Georgia. As stated in the aims, the purpose of this study are to understand the relationship between preferred messages, threat perception, education, income and race in reference to individual preparedness of older adults living in rural Georgia. Ultimately, data from this study will be shared with emergency response partners to inform a multi-tiered preparedness communication strategy targeting this population.

### Target Population

Targeting older adults for disaster preparedness interventions is paramount to community resilience. The CDC estimated that 70% of those who died as result of impacts from Hurricane Rita in 2005 were older adults (Centers for Disease Control and Prevention, 2016b). Because in-home supports can be affected during disasters, older adults are at higher risk for death and socio-economic impacts after disasters. Older adults, especially those who live in rural communities, may not have emergency kits or plans (Whitney et al., 2012). They may also experience declines in health and normal changes in senses and cognition in aging, which makes recovering from disasters more difficult (Centers for Disease Control and Prevention, 2016b). Though mitigating these risks is paramount for this population and community resilience, accomplishing it is challenging. Therefore, this study targets local Georgia older adults and seeks to address preparedness challenges with this population. Older adults included those in the

following Georgia Public Health Districts: North Health District 2; North Health District 10; and Southwest Health District 8-2.

Each county in the districts houses an Office of Emergency Management. North Health District 2 serves the 13 northeastern most counties in Georgia. These counties include Banks, Dawson, Forsyth, Franklin, Habersham, Hall, Hart, Lumpkin, Rabun, Stephens, Towns, Union, and White. It is described as predominately rural, with one large urban city, Gainesville which is in Hall County. The population of the combined counties is 616,676 and is predominately white (84%) (U.S. Census 2010). Thirty-five percent of the population in the district is fifty years of age or older with 18% being over 65.

Northeast Health District 10 is comprised of ten counties located around the Athens Georgia area. This district serves approximately 713,099 persons. This population is 51% minority. Eleven percent of Northeast Health District 10 is 50 years of age or older, with seven percent age 65 and older (U.S. Census 2010).

Finally, Southwest District 8-2 serves the fourteen southwestern most counties in Georgia. These counties are Baker, Lee, Calhoun, Miller, Colquitt, Mitchell, Decatur, Seminole, Dougherty, Terrell, Early, Thomas, Grady and Worth. The total population of the district is 356,433 and is predominately white (45%). Thirty-one percent are 50 years of age or older with 13% 65 and older (U.S. Census 2010).

## Approach

This study incorporated a mixed-methods design in two phases with Institutional Review Board approval granted in 2017. Phase I, was conducted in two parts. The first part consisted of qualitative interviews with emergency management and response

personnel in health districts, North Health District 2, Northeast Health District 10 and Southwest Health District 8-2. The second part consisted of focus groups conducted with older adults across rural Georgia in North Health District 2, Northeast Health District 2 and Southwest Health District 8-2.

## Phase I

*Aim 1: Qualitatively examine aging adults and emergency management personnel' perceptions of:*

a. *Preferred sources of emergency preparedness messages*
b. *Preferred channels*
c. *Risks and hazards*
d. *Barriers to preparedness*

### *Part One*

The aim of Phase I was to investigate preferred message strategies, perceived hazards, and barriers to preparedness with older adults and emergency management personnel. The purpose of these key informant interviews was two-fold. First, these data would assist in understanding what hazards are being planned for locally. Additionally, these data will assist in understanding how emergency management personnel communicate preparedness information and what barriers they perceive older adults have in preparing for an emergency (See appendix). Second, the hazards identified in the data will be used to inform the survey administered to older adults. Specifically, these hazards were used

to form susceptibility and severity questions in the survey administered to older adults in Phase II.

*Participants*

Part One of Phase I gathered data from local emergency management personnell. Key partner interviews were conducted with each emergency manager, representing local public health districts and county emergency management offices. Public health districts represented were North Health District 2 and Northeast Health District 10. Emergency management personnel were from counties within North Health District 2 and Northeast Health District 10.

*Recruitment*

Emergency manager key partners were identified though network contacts within the preparedness and response community. Each participant was recruited by email or phone to request an interview. A total of four participants were contacted and each consented to be interviewed.

*Materials*

Participants were asked to respond to interview questions developed using guidance from experts in the disaster management field. These subject matter experts indicated that questions about Hazard Vulnerability Analysis (HVAs) provide a comprehensive examination of both hazards and vulnerable populations planned for. From this guidance, an eight-question protocol was developed that began with a consent form. The first questions gathered information on the specific hazards planned for in the HVAs. These questions were, “What hazards are addressed in your response plans?”,

"What would you consider the top three hazards that you plan for?" These responses were then used in the severity and susceptibility question responses in the survey.

HVA's also identify vulnerable populations and the barriers in communicating with them. To understand the vulnerable populations that are being planned for in these areas of Georgia, the question "What vulnerable populations do you plan for and why?" was asked. Additional questions asking about communication strategies they employ were asked for comparison of qualitative responses from older adults. These questions were, "How do you communicate with these populations?", "What are the top channels you use in communicating with these populations?"

The final question sought to understand their perception of barriers for vulnerable populations identified in the HVAs. This question was, "What do you consider as top barriers for individual preparedness for these populations?"

*Procedure*

Key partner's interviews were conducted in a face to face setting at each participant's agency. Each semi-structured interview lasted approximately an hour to an hour and thirty minutes and began with informed consent read to each participant. Participants were asked each question in sequence but given the opportunity for free response on each answer and follow up questions were asked relating to participant responses.

The interview began with introductions and review of the project. Participants were thanked for their time and asked if they had any questions about the interview. Each participant was given the opportunity to make additional comments. Participants granted consent for the interview at which time the first question was asked.

The semi-structured nature of the interview protocol held that the pre-scripted question was asked first, then followed up by probe question relating to the participants answers. The flow of interview probes followed the responses of the participant, providing in-depth explorations into their experience relating to HVA. After giving the participant the opportunity to relate any additional experiences outside of the structured questions, the interview concluded.

During each interview, response notes were recorded within a protocol document. Each participant protocol was then saved on a secure laptop. After each interview, data were transcribed from the raw document and coded for hazards planned for, vulnerable populations, communication strategies used and perception of barriers for populations. These were then analyzed for themes and compared to thematic responses from older adults.

Phase I Part 2:

In Part Two, qualitative data was gathered from the older adult population. Three qualitative focus groups were conducted with older adults in the same public health districts. Questions were developed to reflect those used with emergency management personnell, querying hazards they felt at risk for and communication strategies they preferred as well as their perceived barriers to preparedness.

*Participants*

In all, there were 3 focus groups conducted, one in each health district. There were a total of 12 participants, three from North Health District 2, six from Northeast Health District 10 and three from Southwest Health District 8-2. Participants included for participation were 50 years or older and living in the community as opposed to assisted

living or nursing home facilities. Half of focus group participants identified as white with the other half identifying as African American.

*Recruitment*

Participants were recruited through local community senior centers before a scheduled agency event or preparedness training. Flyers announcing the focus group were developed and sent out to agencies for dissemination four weeks prior. Participants were approached as they came in to participate in the event and asked if they would be willing to participate in an hour long focus group on preparedness. Agencies assisting in recruitment were Union County Legacy Link, Athens Community Council on Aging, Southwest Public Health District 8-2, and Gainesville Georgia Legacy Link. All agencies were housed in one of the three health districts, North Health District 2, Northeast Health District 10 and Southwest Health District 8-2.

*Materials*

Focus group protocols began with informed consent and included six questions which mirrored questions asked of emergency management personnell enabling a comparison between the two groups. These questions were designed to see what older adults viewed as hazards, preferred sources and channels for disaster information, and perceived barriers to preparing. Older adult focus groups were also asked about the types of information they would like to receive.

Data on perceived hazards was asked in the first question, "What disasters do you feel at risk for and why?" Prompts for this question used the hazards identified by emergency management personnel.

Data on preferred information sources and channels were gathered in the second two questions, "Who would you prefer to receive information about disasters from?" and "How would you like to receive this information?" Prompts for preferred sources included the agencies who assisted in recruitment, emergency management offices, churches and local government. Prompts for preferred channels included radio, television, website, phone and print materials.

An additional question about types of information was asked. Prompts for this question asked about information on general planning, planning on a budget, disasters to prepare for, preparedness resources, how to get information before and during disasters.

Barriers were investigated in another question, "What do you consider as top barriers for being able to prepare for disasters?" Prompts for barriers asked about monetary restrictions, time and effort, lack of information, effectiveness of preparing, whether others in the community prepare and whether they felt at risk.

*Procedure*

Older adults agreeing to participate were gathered in an adjoining area to the event at the agency on the assigned date. Each group began with reading of informed consent and answering any questions about consent. Questions were asked in sequential order in each focus group, beginning with the question about perceived hazards. Though scripted, each group was given the opportunity for free response and follow up questions followed the line of their responses.

Data were recorded by one note taker during each focus group and stored on a secure laptop. These notes were then transcribed and coded themes related to hazard, preferred sources and channels, types of information, and barriers to preparedness. These

themes were then analyzed and compared with responses from emergency management personnel.

Phase II

*Aim 2***:** Investigate the association between preparedness and threat perception.

*Aim 3: Examine whether income score, education, language or race have a moderating effect on threat perception and preparedness.*

Next, Phase II incorporated qualitative focus group data into previously developed survey measures to develop preparedness behavior scores and perceived susceptibility and perceived severity (threat). The literature provides little in the way of validated surveys that measure preparedness and threat with this population; therefore, this survey adapted measures from two sources.

This adapted survey was administered with the assistance of the three health districts' community councils on aging senior centers. The councils on aging provided assistance with survey dissemination through listservs and face to face collection at events. To incentivize partnership with the councils on aging, they were given the opportunity for preparedness training to be provided to their communities.

*Participants*

In all, there were 283 participants that filled out the survey. Participants were predominantly female (89%). Racially, 63% participants chose White as their racial category with 38% choosing African American. The remaining respondents identified as Hispanic or Asian.

The age range was 21 to 93 years of age. Though original exclusion criteria placed the age cut off at 65, there were participants in the online survey who were younger than this cut off. However, 86 percent of all respondents were age 50 and older. Therefore, the additional category of 50-64 was added and the analysis was adjusted to include only the participants age 50 and older. Of those participants, 39 % were age 50-64, 13% were age 65 to 69, 40% were age 70-79 and 8% were older than 80.

Participants were distributed fairly evenly across low to middle income categories. Twenty-five percent reported making less than $20,000 per year. Twenty-six percent of participants reported an annual income of $20,000 to $39,000. The largest percentage (30.7) of participants made $40,000 to $99,999 per year. Finally, 17.32% of participants earned over $100,000 per year.

In terms of education, a majority of participants completed an under graduate or graduate degree (54%). However, 37% had some a high school education or some college. Only 8.3% report not completing high school.

*Recruitment*

Aligning with the aims of the study, participants were conveniently sampled for participation from three health districts in Georgia, North Health District 2, Northeast Health District 10 and Southwest Health District 8-2 described above. The councils on aging in each of these health districts were contacted and asked to assist in dissemination of the survey to the populations they serve. Agencies provided time for survey dissemination before events on their calendars. In some cases, preparedness training was scheduled on their calendar with survey dissemination before the training.

*Preparedness and Threat Measures*

An adapted survey was developed following a review of existing literature using the Boolean search terms "preparedness" AND "susceptibility OR severity" AND (scales OR measures). This search returned several sources. The measures for preparedness score was adapted from a scale evaluating a disaster preparedness intervention targeting adults who have developmental disabilities living independently in the community. It utilizes a home preparedness indicator check list and a safety knowledge questionnaire, which was demonstrated to have good reliability ($\alpha$=0.75) (DP Eisenman et al., 2014). This scale contains 17 home preparedness indicators in a checklist format with yes/no answers. Example questions would include, "Does each person in your home have 3 gallons of water stored for emergencies?"(DP Eisenman et al., 2014). The "yes" or "no" questions were combined into a composite score, coding "yes" 1 point and "no" 0 points.

Measures for susceptibility and severity specifically for disasters were not found. Therefore, susceptibility and severity measures were adapted from scales used to measure the constructs with diseases. The Cronbach's alpha for these measures were $\alpha$=0.85 and $\alpha$=0.84 respectively. (Champion 1984 and Morris 2002). Adapted for use with hazards, susceptibility and severity questions incorporated the hazards identified by the emergency management personnel from the three health districts. The listed hazards were: snow/ice storms, severe thunderstorms, tornadoes, mass shootings, seasonal flu and a new type of flu, Zika virus and Ebola virus.

To reduce the total number of questions, questions were formatted placing the question first then the list of hazards with check boxes beside each one. The adapted susceptibility used the question "I feel at risk for_____", with each hazard listed. Adapted severity used the question, "I believe the following events would impact my life

to a great extent." Again, each hazard was listed. Participants were asked to rate how much they agreed with each statement using a five point Likert scale with strongly agree coded as a 5. Higher scores indicated a higher perception of susceptibility.

Other measures and items were included in the survey at the request of practice partners for use in future planning. These measures were confidence in preparing, supports and barriers to preparing. Finally, participants were asked age, race/ethnicity, income and education score.

Development and pre-testing procedures were accomplished in two steps. First, methodology used to assess content for the revised survey began with a content analysis of the combined instrument by expert researchers, and by community partners. Practice partners and disaster management faculty also reviewed the instrument for readability, clarity and ease of use. Next, three local seniors were recruited to complete the survey and assess for the same. The final survey incorporated all revisions and was formatted into hardcopy and online formats

*Procedure*

Surveys were administered in face to face hardcopy and online formats. IRB approval was granted through the University of Georgia. Participation in online and face to face collection methods were voluntary and each participant was provided an informed consent letter. Consent for use of aggregated data was inferred by submission of survey and contact information was provided for questions.

Hardcopy data collection was completed during agency events. Participants coming into the events were asked if they would like to participate in a voluntary survey. Those who agreed to the survey were provided informed consent forms. Facilitators

provided assistance to participants who needed assistance with reading consent forms or surveys. After data collection, preparedness training was conducted for participants at each agency. Online surveys were distributed through agency listservs. They were monitored daily on the secure University of Georgia Qualtrics platform.

After completion, hardcopy surveys were collected and housed in a locked office within the University of Georgia. Online survey data was entered into the Qualtrics platform adding them into the online survey data.

## Data Analysis

*Phase I*

*Aim 1: Qualitatively examine aging adults and emergency management personnell' perceptions of:*

a. *Preferred sources of emergency preparedness messages*
b. *Preferred channels*
c. *Risks and hazards*
d. *Barriers to preparedness*

Aim 1 qualitatively investigated the perceptions and preferences of sources of emergency preparedness messages, message channels and risks and hazards between older adults and emergency management personnel in Georgia. These data were analyzed using thematic content analysis and then compared for differences and overlaps.

The use of qualitative interview data to inform the development of quantitative surveys is supported within symbolic interactionism theory. This theory describes the processes by which action, objects, people and collective groups interact upon each other to interpret meaning (Blumer, 1986). In this instance, assessing how emergency

management interacts with older adults in preparedness planning sheds light on the appropriateness of current communication strategies as well as informing survey questions. They provide local disaster scenarios for threat perception comparisons in the survey. Finally, they inform the types of appropriate preparedness planning behaviors for older adults.

## Phase II

*Aims 2 and 3*

All quantitative analyses were completed using SAS (Version 9.4). Initially, raw data were prepared for analysis by coding the individual preparedness, susceptibility and severity scores along with demographic data. Preparedness scores used a "yes or no" response, with yes given a score of 1 and no being given a score of 0. Scoring for susceptibility and severity used five-point Lichert scale responses of strongly agree, agree, neither agree nor disagree, disagree and strongly disagree.

Due to lower than expected literacy scores, high numbers of visually impaired respondents and lack of adequate ability to assist with reading surveys, there were many missing data points. To mitigate these during analysis, new summed and averaged scores were created. Each average score for the questions represents an average score for the questions each participant answered. A combined perceived threat score was then created using the susceptibility and severity average scores.

Demographic variables included age, gender, income, education and race. Age categories were originally broken down into four scores which were younger than 65, 65-69, 70-79, and older than 80. However, due to many participants younger than 65

responding through the online surveys, an additional category of 50 to 64 was added and data were analyzed that included participants 50 and older.

Education was a write in response with responses falling and coded into 4 categories. These categories were "some high-school" (1) , "high school graduate or some college"(2), "undergraduate degree" (3) and "graduate degree" (4). Income scores were coded into categories that denoted those who made "less than $20,000 per year" (1) , those who made "$20,000-39,000 per year" (2), "$40,000-$99,000" (3) per year and those who made "$100,000 or more (4) . Finally, race was broken down into two groups, white and minority. Other minority races included African American, Hispanic, Asian, American Indian or Alaskan Native, Middle Eastern, Native Hawaiian or Other Pacific Islander and Other. The final analysis utilized a complete case analysis for demographic variables leaving a total sample size of 179 respondents.

*Aim 2: Examine the relationship between susceptibility and severity (threat perception) with preparedness score.*

Aim two evaluated the relationship between susceptibility and severity (threat) with preparedness score. Preparedness score, susceptibility and severity variables were indexed. The preparedness variable listed 17 separate behaviors where the participant was asked to respond "yes" or "no". Yes was coded as one and no coded as zero. These were summed and averaged for a preparedness score. Susceptibility and severity used the ten specific hazards identified by emergency management personnel. These score was derived using the 5 point Lichert scale, with the responses of strongly agree (5), agree (4) neither agree nor disagree, disagree (2), strongly disagree (0). Each was then averaged. Finally, severity and susceptibility scores were averaged to derive the final threat score.

Four models were used to examine this aim. In the first model, the relationship between preparedness score and threat score was investigated using ANOVA linear regression analysis to predict preparedness score by threat score. Models two through four of this aim examined each of the variables of education, income and race for any association with preparedness score.

*Aim 3: Examine whether income score, education, language or race have a moderating effect on threat perception and preparedness.*

Last, Aim 3 investigated whether income score, education, language or race had any moderating effect on threat and preparedness. The analysis was completed with three interaction models for each demographic variable at each score with preparedness and threat score scores.

# CHAPTER 4

## Results

### Phase I

In Phase I, the perceptions of hazards, barriers and communication strategies of both emergency management personnel and older adults were investigated qualitatively. Data were collected in two parts. Part one collected data through key partner interviews with emergency management personnell and part two utilized focus groups with older adults.

*Aim 1: Qualitatively examine aging adults and emergency management personnel's perceptions of:*

*Preferred sources of emergency preparedness messages*

*Preferred channels*

*Risks and hazards*

*Barriers to preparedness*

Parts one and two compared and contrasted responses by themes from emergency management personnel and older adults. Responses were coded as themes and responses related to specific hazards perceived, communication strategy, barriers to preparedness. Emergency management personnel were also asked about populations they perceived as vulnerable.

Overall, data from the qualitative phase I interviews and focus groups yielded diverse responses from both older adults and emergency manager participants. However, they also provided overlapping themes around preparedness, communication preferences and perceived barriers.

*Perceived Hazards*

As noted previously, four key partner interviews with emergency management personnel about their HVAs were completed in 2016 with IRB approval. Data from the EMA perspective indicated that they were consistent between agencies in the threats they perceived severe enough to formally plan for. These hazards perceived in their hazard analyses encompassed "severe weather, to include tornadoes, winds and flooding." EMA respondents indicate that these are weather related hazards that are assessed to cause the most damage to populations, critical infrastructures and cause the most financial damage locally.

The EMA participants went on to say their jurisdictions plan for man-made events. These include any kind of "active threat" (shooting, violence and technological), terrorist incident and special event planning in a mass fatality mass causality context. One EMA director added that terrorism is "not necessarily identified, but to me it is a risk."

In the public health realm, hazard vulnerability focused on hazards that have, as one participant voices, "health, medical and sheltering contexts." Local public health emergency preparedness directors indicated first and foremost their vulnerability assessment includes novel influenza and it is a matter of "not if, but when". One emergency preparedness director stated that "one reason that influenza is a priority in

public health hazard assessment is its ability to make strides in prevention. It is actionable". Others included were emerging diseases like Zika and Ebola viral disease (EVD).

Another public health respondent added that priority hazards for their agency included "Centers for Disease Control and Prevention (CDC) category A agents." This participant related that "planning priorities are operations related to medical dispensing of medications for these man-made disasters termed bio-terrorism." They went on to say that, "of special concern are those that are easy to manufacture and weaponized. The emphasis here is on the ability to get medications into people within a prescribed period." An example given by these participants was anthrax events. In this type of event, public health is required to "dispense medications into their populations within 48 hours." This 48 hours includes the 12 hours it takes for federal assets to arrive. See chart 1.

Chart 1: Overlaps and Gaps for Perceived Hazards by Group

*Sources and Channels*

When asked about communication strategies, both EMA, and public health preparedness and response directors described their communication strategies as relying on "print, visual and voice media" and that "standard disaster preparedness campaigns involved the use of brochures, leaflets, radio ads, TV spots and billboards." Some respondents also used "websites and social media." Beyond those types of campaigns, respondents indicated a reliance "on partnerships with local community leaders." Pointing to lack of resources preventing them from reaching out to vulnerable

individuals, they note that "these leaders are already trusted so that we can disseminate (information) through them." See Chart 2.

Chart 2: Overlap and Gaps for Preferred Communication Strategies by Group

*Barriers*

Barriers to preparedness were addressed by emergency management personnel in terms of vulnerable populations. Specific populations included in vulnerability assessments are older adults, those with" hearing, vision or mobility impairments, medically home-bound and those with mental health issues."

One participant voiced that it was especially important to plan for these populations due to" a basic assumption that all residents are middle age, healthy adults". One went on to say that (when planning under this assumption), "those who are mobility impaired, visually impaired or live at home with supports may be left out of plans." Importantly, (this planning assumption) "leaves out a large part of the population of older adults." These vulnerabilities were seen as barriers for preparedness in these vulnerable populations.

Phase I, Part Two

The second part of Phase I used focus groups with older adults in Northwest, North, Northeast and Southwest Georgia health districts. These groups consisted of 12 older adults in all, living in the community. Three participants participated from North Health District 2. The focus group in Northeast Health district had six participants and Southwest Health District had three participants. Participants were predominately female and with half identifying racially as white and half as African American.

Their responses mirrored weather hazards planned for by emergency management personnel; however they were diverse in respect to preferred communication strategies.

*Perceived Hazards*

Responses from Question one, "What disasters do you feel at risk for and why?" indicate that older adults in all three health districts planned for severe weather such as tornadoes, snow storms, high winds and flooding. With Hurricane Irma still fresh in their minds, many participants indicated they felt at continued risk for high winds and severe storms. Particularly, participants in the Southwest health district, voiced concerns about impacts of events such as flooding and power outages related to these events. One participant felt they were at risk because their home had a tree fall on it. Another Southwest respondent replied that she felt at risk for "trees falling on my home and when it rains a lot and the water just starts coming up."

When asked about hazards such as pandemic flu, Zika and, responses related more to seasonal flu, such as "I get a flu shot." However, participants related little knowledge about Zika or EVD, asking, "What is that?" or stating, "I don't know what that is."

*Sources and Channels*

When asked about the sources and channels they prefer to receive information from, participants responded with diverse answers and these tended to be geographically diverse by health district. In the North Health District, all but one participant voiced that they, "owned a smartphone" and preferred to receive information via "Facebook and other social media" platforms. In addition to social media, one participant stated, "I own a scanner and listen to that" for information. As a group, they stated voiced a preference

for "government" and community agencies, like "our council on aging" as sources of information.

In contrast, participants in the Southwest Health District did not use social media and most did not use computers. They preferred to receive information from their church homes and their public health emergency manager, as well as the radio. Of particular note, they responded that the community has tornado sirens, but they were concerned that they would not be able to hear it and it may not be reliable. One participant stated that after one storm, "about an hour after it the storm passed the horn went off."

The majority of participants in the Northeast Health District related that they used the radio to get their information. Additionally, they relied on community agencies such as their senior center, phone alerts and their family and friends. This group also voiced concerns about hearing tornado sirens during and event saying that they had not heard them in the past.

*Types of Information*

In discussing the types of information they felt they needed in order to prepare for disasters, responses differed again according to health district. One particular participant from the North Health District stood out. When asked about information needs, he stated, "We've lived long enough that we know what to do." Their main concern with information was to have it available for visitors. These participants related that they feared that visitors and younger adults did not know how to take care of themselves. Another respondent referenced "lost knowledge" from one generation to the next in terms of being able to shelter in place for long periods of time. He stated that they did not

know things like how to preserve meat or keep fresh water. However, as a group, they voiced the need to know where shelters and evacuation routes were ahead of time.

Another information need they referred to rose out of the tornadoes they had experienced earlier that year. Participants related that these tornadoes devastated their community, felling many trees into homes and on power lines. One participant said that "people were walking the neighborhoods to check on others." They related that non-governmental agencies such as Samaritans Purse and the faith-based communities were vital resources in their community. However, they also voiced that they faced a huge issue of seniors being scammed over repair work. One participant stated in terms of information needs, "We need a list of persons who are reputable to do (repairs). Chamber of Commerce would not give you definite information would only say they had not had any complaints on this company."

Information needs expressed by older adults overlapped geographically. All respondents related a need for education and information on "evacuation routes and shelter locations." Additionally, they voiced the need for basic planning education to include information on "financial preparedness."

Participants in the Southwest District related that they would like more information on planning and most voiced that they did not have plans. Several participants said they needed information on "the medicines to take with me" and agreed to the prompt on how to plan financially. When prompted, the information most of these participants related needing included type of event, how long it was expected to last and how they would be affected. They expressed that they would like to see this in "print" materials, saying they would prefer "a booklet with check lists." Their predominant issue

with information was that most of the information was on the computer and "we don't download." Their suggestions would be to have these materials available in places such as "the community senior centers and our churches." One innovative suggestion was to provide information at community businesses that have senior day specials such as "Senior Day at Belk's" or "Senior Tuesday at Harvey's."

*Barriers*

In asking about their barriers to prepare for disasters, participants were more homogeneous in their responses. The barrier related by a majority of the participants was being able to buy and keep supplies on hand. The second most related barrier was education and knowing what to do before-hand. Related to this was the availability of information in print version in places that are frequented by older adults. Finally, other participants related the barrier of age and not being physically able to do what they needed to do, such as evacuate.

The final question asked participants about any information they would like to add or preparedness information they need. Their responses reiterated points they felt were of significant importance. Several participants reiterated the need for aging adult specific education. They also talked more about the need to educate younger generations because, "[the younger generation] thinks someone is going to rescue them." They also wanted to know of alternate ways to contact family and loved ones after a disaster, as well as what resources are available to them. Charts 1, 2 and 3 illustrate these results.

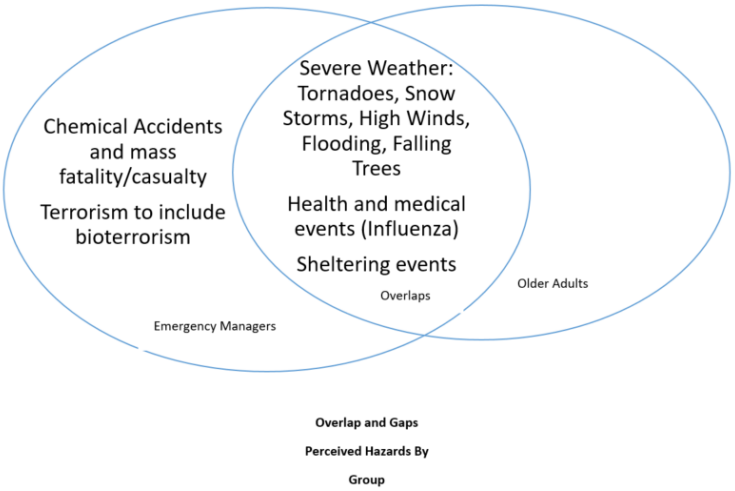


Chart 1: Overlaps and Gaps for Perceived Hazards

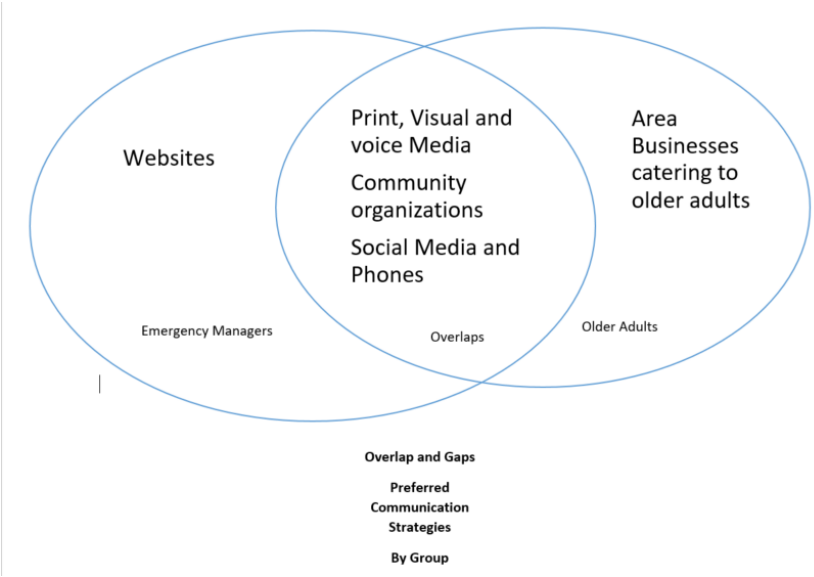


Chart 2: Preferred Communication Strategies by Group

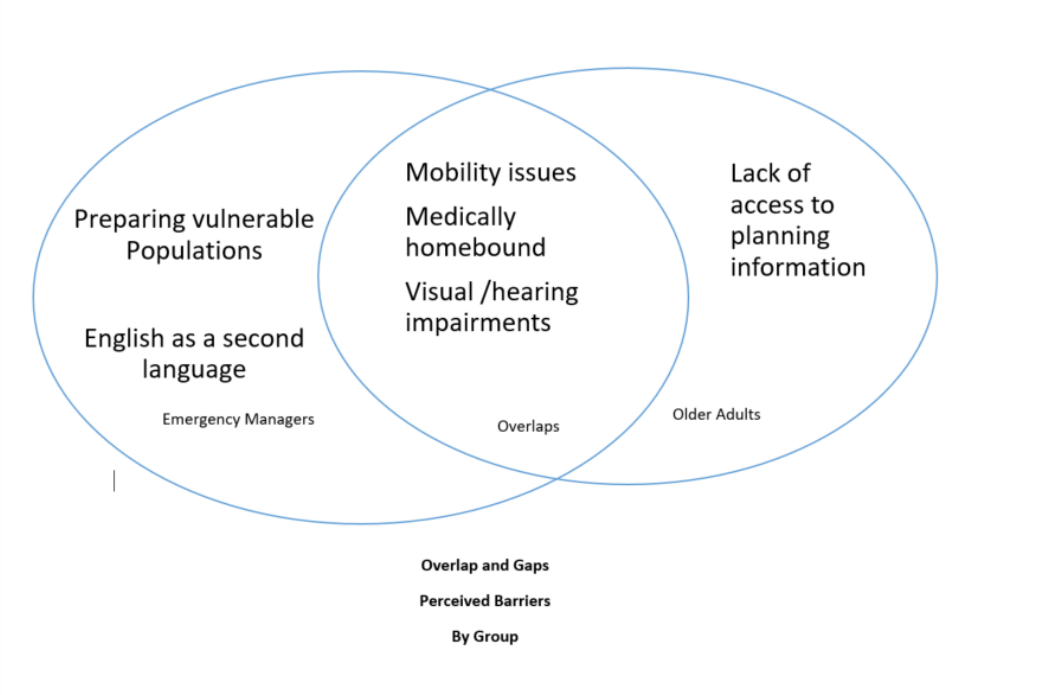


Chart 3: Overlaps and Gaps for Perceived Barriers by Group

## Phase II

Phase II included two aims through the collection of survey data. In Aim 2, data were analyzed to investigate the association between preparedness score and perception of threat scores as well as associations between preparedness score and income, education or race. Aim 3 investigated the effects of income, education and race on the relationship between preparedness scores and perceive threat scores. There were a total of 283 surveys collected. Of these surveys, 154 complete cases were analyzed.

*Aim 2: Investigate the association between preparedness score and threat perception score.*

Aim two investigated the association between preparedness score and threat scores well as associations between preparedness score, education, income and race. These associations were completed in 4 models.

*Model 1*

Model one looked at the correlation between preparedness levels and perceive threat scores. However, there was no significant association between preparedness score and threat score $X^2(1) = 0.12$, $p = 0.7326$.

*Model 2*

This model used an analysis of variance (ANOVA) to examine the association between the four levels of education and preparedness level. This model did not significantly explain the association between education and preparedness level score $X^2(3)=4.97$, $p=0.1737$ at the 0.05 significance level.

*Model 3*

The ANOVA analysis in model three examined the associations between 4 levels of income and preparedness level score. Levels of income were referenced to those who made more than 100,000 per year. Again, this model does not explain the variance significantly $X^2(3) =1.59$, $p=0.66$.

*Model 4*

Lastly, model four looked at the pairwise association between race and preparedness score. This model did not significantly predict an association between race and average preparedness level $X^2(1) =1.56$, $p=0.2115$ at the 0.05 significance level.

| Variable | DF | Estimate | Wald 95% Confidence Limits | | P Value |
|---|---|---|---|---|---|
| *Threat* | 1 | 0.008 | -0.0377 | 0.0537 | 0.7326 |
| | | | | | |
| *Education* | | | | | |
| High school or less | 1 | -0.0184 | *-0.1316 | 0.0948 | 0.7502 |
| High school or some College | 1 | 0.0719 | 0 | 0.1458 | 0.0564 |
| Undergraduate Degree | 1 | 0.0502 | *-0.0392 | 0.1396 | 0.2709 |
| Graduate Degree | 0 | 0 | 0 | 0 | |
| *Income Per Year* | | | | | |
| Less than 20K | 1 | -0.0258 | *-0.1207 | 0.069 | 0.5935 |
| 20K-39,999 | 1 | 0.0299 | -0.0655 | 0.1253 | 0.5392 |
| 40K-99,999 | 1 | -0.0021 | -0.094 | 0.0898 | 0.9642 |
| Over 100K | 0 | 0 | 0 | 0 | |
| *Race* | | | | | |
| White | 1 | -0.0402 | -0.1032 | 0.0227 | 0.2103 |
| Minority | 0 | 0 | 0 | 0 | |

Table 1: Univariate Analysis: Associations of Threat, Education, Income and Race with Preparedness Score.

*Aim 3: Examine whether income score, education, language or race have a moderating effect on threat perception and preparedness.*

Aim Three investigated the effects of education, income and race on the relationship between average preparedness score and threat perception. The first three models analyzed effects of education, income and race by adjusting for threat perception score. The last 3 models performed an interaction analysis between the preparedness and threat

scores association and education, income and race overall. This analysis included 6 models.

*Model 1*

Model one examined the four levels of education with those having a graduate level of education and higher as reference. After adjusting for threat score, the effect of education on the association between preparedness score and threat score was not significant $X^2$ (1) =4.88, p=0.1810

*Model 2*

Model two examined four levels of income with reference to those who made over $100,000 per year adjusting for threat score. When adjusting for threat score, income did not significantly affect the association between preparedness score and threat score $X^2$ (3) =1.58, p=0.6643.

*Model 3*

In this model, the effects of race on preparedness score was examined, adjusting for threat score. This model found no significant effect from race on preparedness level when adjusting for threat score $X^2$ (1) =1.44, p=0.2294

| **Variable** | DF | Estimate | Wald 95% | Confidence Limits | P-value |
|---|---|---|---|---|---|
| Education | | | | | |
| Some High school or less | 1 | -0.017 | -0.1319 | 0.0978 | 0.8896 |
| High school or some College | 1 | 0.0735 | -0.0038 | 0.1509 | 0.7714 |
| Undergraduate Degree | 1 | 0.0508 | -0.039 | 0.1406 | 0.2673 |
| Graduate Degree | 0 | 0 | 0 | 0 | |
| Income Per Year | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Less than 20K | 1 | -0.029 | -0.1258 | 0.0678 | 0.557 |
| 20K-39,999 | 1 | 0.0266 | -0.0707 | 0.124 | 0.5919 |
| 40K-99,999 | 1 | -0.0021 | -0.094 | 0.0898 | 0.9645 |
| Over 100K | 0 | 0 | 0 | 0 | |
| Race | | | | | |
| White | 1 | -0.0403 | -0.1059 | 0.0253 | 0.2283 |
| Minority | 1 | 0 | 0 | 0 | |

Table 2: Education, Income and race adjusting for Threat

*Model 4, 5 and 6*

These last three models examined the interaction between the three moderating variables, education, income and race on the preparedness and threat scores association. First, model four looked at the interaction between the four levels of education with preparedness score and risk score. Education does not significantly moderate the relationship between preparedness and threat scores p= 0.94.

Model 5 examined the interaction between the four levels of education the preparedness and risk scores. This analysis indicated that income per year does not significantly moderate the relationship between preparedness and threat scores p=0.75. Finally, model six examined the interaction of race with preparedness and threat scores. Again, race did not significantly moderate the relationship between preparedness and threat scores p=0.37.

| Moderating Variable | Chi-Square | Pr> ChiSq |
|---|---|---|
| Education | 0.41 | 0.94 |
| Income Per Year | 1.21 | 0.75 |
| Race | 0.82 | 0.37 |

Table 4: Interaction Analysis: Education, Income, Race with Preparedness and Threat.

# CHAPTER 5

## Discussion

This study investigated preparedness with older adults in three rural Georgia Health Districts. The study used a mixed method design in two phases. Phase I investigated perceptions of hazard, perception of barriers, preferred communication strategies and information needs of local emergency management personnel and older adults in rural Georgia public health district managers. Part I gathered data through key partner interviews with emergency management personnel. Part II did so utilizing small focus groups with older adults within the three health districts through local community councils on aging. These data were then compared and contrasted thematically between the two groups.

Phase II quantitatively investigated preparedness and threat in two aims. Aim 2 investigated the association between preparedness score scores and threat perception score scores with older adult participants. Aim 3 investigated the effects of education, income and race on the association between preparedness and perceived threat. Data was gathered through surveys distributed through local councils on aging in the health districts.

## Phase I

### *Aim 1: qualitatively investigated older adults and emergency manager's perception of preferred sources and channels of messages, hazards and barriers to preparedness.*

#### *Overlaps*

Qualitatively comparing the responses of emergency management personnel and older adults in Georgia, there are several themes that stand out. First, comparing hazards

planned for and those perceived by older adult's shows that there is overlap in perception. These older adult populations feel at risk for the weather related events that are planned for locally. Emergency management personnel plan for weather events such as thunderstorms, tornadoes, and winter storms all of which were voiced by older adults in the area. Another overlap between the two groups indicates that both are focusing more on the impacts of these events rather than just the event itself. Several aging adult participants noted that they felt at risk for the "flooding" that comes with heavy rains and "the power going out" that comes with high winds or snow and ice. This is mirrored in the planning described by emergency management personnel reflective of a move by the National Weather Service (NWS) to provide information about impacts in their weather advisories.

Comparing barriers perceived by older adults and emergency management personnel, both groups voiced concerns around age related issues. Emergency management personnel voiced that they need to plan for those with mobility issues, those who are home bound, those for whom English is a second language and those with hearing or visual impairments. These are all vulnerabilities that aging adult participants voiced as barriers to preparedness. An additional barrier all aging adult participants voiced was the ability to buy and keep supplies on hand.

Finally, preferred communication strategies used by the two groups overlap in some areas. However, there are gaps in the strategies employed by local emergency management personnel. When asked about communication strategies with vulnerable populations, emergency management personnel described use of population appropriate "print materials" such as billboards, pamphlets and booklets. They also voiced the use of

websites, social media and broadcast media such as radio and TV. These dissemination channels were also used by the local older adult community but more so in some health districts than others.

*Gaps*

Though older adult and emergency management participant's responses overlapped in regards to weather related perception of threat, communication strategy preference and perception of barriers did not. First, while largely overlapping in perception of hazards, it is important to note that older adults view threats more through their effects than the hazard itself, such as" winds and flooding" over "severe weather."

Another important gap identified in these data are the preferred communication strategies. Though older adults do use all of the strategies employed by emergency management personnel, all older adults do not use all of them, or do not use them equally. For instance, older adults in Northeast and North Health Districts relied heavily on websites and social media, but those in the Southwest Health District did not.

Finally, responses to barriers identified a couple of gaps. First, emergency management personnel viewed barriers through the lens of vulnerability in mobility, sight, hearing and language. While older adults noted this as well, a recurring theme related to barriers was financial. Being able to prepare on a budget was voiced by almost all older adults in each district, but was not mentioned by emergency management personnel. Second, older adults in all districts indicated that lack of information and education was a barrier. This perception indicates a lack of reach with education and informational materials.

*Implications for Practice*

The identification of overlaps and gaps can greatly enhance current communication strategies, making them more relevant to rural Georgians. For hazards, our emergency management personnel may want to incorporate low socio-economic status (SES) in their HVAs as a vulnerability in and of itself. When considering low SES as a vulnerability, communication strategies need to utilize channels and materials that target this segment as well. In addition, materials need to emphasize planning for the effects of hazards rather than just the hazards themselves. Planning for effects would make these hazards more relevant personally.

Additionally, communications strategies may want to utilize a more broad approach, going beyond traditional channels and sources. Strategies should incorporate all channels from print and broadcast media, to social media with the use of smart phones. Other channels should include local agencies and businesses that cater to older adults.

Addressing financial preparedness in these materials is important as well for decreasing recovery time for older adults after a disaster. There are print materials available currently that include specific information on financial items to have in a go kit. Yet, having these checklists available in alternative places such as banks, financial service agencies and councils on aging would increase the reach of this information.

Phase II

*Aim 2: Investigate the association between preparedness score and threat perception score. While there was not a significant association between preparedness score and threat score.*

*AIM 3: Examine whether income score, education, language or race have a moderating effect on threat perception and preparedness.*

The lack of significance in the relationship between preparedness and threat perception may be explained by the missing data and low number of complete cases available for analysis. Use of the average scores may have underestimated the association between the two; therefore, not capturing the association. However, this lack of association between the two is supported in other studies with other populations. These data with older adults seems to uphold these earlier findings (Wachinger, et.al. 2012).

The same can be said of the interaction effects of income, education and race on the association between preparedness and risk perception. These relationships and effects will require further investigation using validated measures for the older adult population.

*Implications for Preparedness with Older adults*

Incorporating the qualitative and quantitative findings, it is evident preparedness initiatives with older adults cannot take a one size fits all approach. These findings identify three important themes to consider in developing messaging strategies in order to cue this population into action. First, older adults in rural Georgia are individually and geographically diverse and any preparedness initiatives by emergency management personnel need to reflect this. It is important to develop materials and use channels that

reach those in lower socio-economic strata differing literacy levels. Cultural sensitivity will also be of importance.

Second, to reach older adults more effectively, preparedness communications should use a broad brush approach, to include print materials, social media, TV and radio. Along with these, it is vitally important that emergency management personnel partner with community, businesses and agencies that are close to the older adults in their communities. They can be vital assistance in strategy development. Being trusted sources, they are able to recommend strategies that are reflective of the diversity among the older adults they work with.

Third, to compliment the basic preparedness planning information already available, there needs to be additions to content emphasizing alternative ways to reunify with family or friends. Along with these additions, content on planning should stress the financial preparedness and recovery phase planning that includes specific information about avoiding scams. One possibility for intervention that incorporates these components is the development of train the trainers for community agencies and or faith based organizations that work with older adults in Georgia communities. As these data support, these agencies are preferred, trusted sources for information. Trainings they assist in developing and deliver would reflect the information needs and cultural diversity of the communities they serve. These types of trainers for agency staff and volunteers would insure the continuation of preparedness within the senior community, serving as cues to preparedness behavior.

*Limitations*

There are several limitations related to this study. First, in the qualitative portion, there were a small number of participants in both groups. Therefore, the depth and breadth of data is somewhat limited. However, respondents were representative of northern, middle and southern Georgia.

Quantitatively there are two limitations with these findings. First, the use of average preparedness score and average threat perception score may have under estimated or overestimated relationship between the two variables. However, the literature support a lack of relationship between preparedness and threat with other populations.

Second, with the use of complete case analysis in the final analysis decreasing the final sample size to 154 respondents, the interaction between variables may have been underestimated. Therefore this may have underestimated any moderating effects of education, income and race on the relationship between preparedness and perceived threat.

*Conclusion*

Increasing individual preparedness has proven to be challenging at best. Even with the resources that have been developed and provided at the federal level, trends in preparedness have remained flat with all individuals, including older adults. Yet, these results indicate ways to address this issue with older adults in Georgia. By tailoring message strategies specifically for their local older adults and using local agencies for dissemination, emergency management personnel can cue this population to action in preparedness behavior. Given the limitations of this study, further investigation will be

needed to examine a few things. First, further investigation into relationship between preparedness behavior and risk needs to be completed. Specifically, other influences on preparedness need to be identified. Finally, the effectiveness of such messaging strategies with older adults need to be evaluated given all of the funding that has been allocated to different campaigns.

References

106th Congress. (2000). *Public Law 106-390Disaster Mitigation Act of 2000*. https://www.fema.gov/media-library-data/20130726-1524-20490-1790/dma2000.pdf.

109th Congress (2005-2006). (2005). *S. 3721-Post-Katrina Emergency Management Reform Act of 2006*. https://www.congress.gov/bill/109th-congress/senate-bill/3721.

Abara, W., Wilson, S., Vena, J., Sanders, L., Bevington, T., Culley, J. M., . . . Svendsen, E. (2014). Engaging a chemical disaster community: lessons from Graniteville. *International Journal of Environmental Research and Public Health, 11*(6), 5684-5697. doi:10.3390/ijerph110605684

Al-rousan, T. M., Rubenstein, L. M., & Wallace, R. B. (2014). Preparedness for Natural Disasters Among Older US Adults: A Nationwide Survey. *American Journal of Public Health, 104*(3), 506-511. doi:10.2105/AJPH.2013.301559

Ashida, S., Robinson, E. L., Gay, J., & Ramirez, M. (2016). Motivating rural older residents to prepare for disasters: moving beyond personal benefits. *Ageing & Society, 36*(10), 2117-2140. doi:10.1017/S0144686X15000914

Ashida, S., Robinson, E. L., Gay, J., Slagel, L. E., & Ramirez, M. R. (2017). Personal Disaster and Emergency Support Networks of Older Adults in a Rural Community: Changes After Participation in a Preparedness Program. *Disaster Medicine and Public Health Preparedness, 11*(1), 110-119. doi:10.1017/dmp.2016.197

Baker, M. D., Baker, L. R., & Flagg, L. A. (2012). Preparing Families of Children With Special Health Care Needs for Disasters: An Education Intervention. *Social Work in Health Care, 51*(5), 417-429. doi:10.1080/00981389.2012.659837

Ballen, D. (2009). Vulnerable Populations. *The Institute of Business and Home Safety*.

Bandura, A. (2004). Health promotion by social cognitive means. *Health Education and Behavior, 31*(2), 143-164.

Banks, L. (2013). Caring for elderly adults during disasters: improving health outcomes and recovery. *Southern Medical Journal, 106*(1), 94-98. doi:10.1097/SMJ.0b013e31827c5157

Baseman, J., Revere, D., Painter, I., Oberle, M., Duchin, J., Thiede, H., . . . Stergachis, A. (2016). A Randomized Controlled Trial of the Effectiveness of Traditional and

Mobile Public Health Communications With Health Care Providers. *Disaster Medicine and Public Health Preparedness, 10*(1), 98-107. doi:10.1017/dmp.2015.139

Baseman, J. G., Revere, D., Painter, I., Mariko, T., Thiede, H., & Duchin, J. (2013). Public health communications and alert fatigue. *BMC Health Services Research, 13*(1), 1-8. Doi:101186/1472-6963-13-295

Bauerle Bass, S., Gordon, T. F., Gordon, R., Parvanta, C., & Bass, S. B. (2016). Using eye tracking and gaze pattern analysis to test a "dirty bomb" decision aid in a pilot RCT in urban adults with limited literacy. *BMC Medical Informatics and Decision Making, 16*, 1-13. doi:10.1186/s12911-016-0304-5

Blumer, H. (1986). Symbolic interactionism: perspective and method (pp. 1-2 and 7-8).

Burgess, B. (2014, September 30, 2014) Emergency Management Director Athens/Clarke County Georgia/Interviewer: N. Cleveland.

Cameo. (2015). Aloha Version 5.4.5.

Centers for Disease Control and Prevention. (2015a). Get at Kit/Make a Plan. http://emergency.cdc.gov/preparedness/plan/Index.asp.

Centers for Disease Control and Prevention. (2015b). Office of Public Health Preparedness and Response. Funding, Guidance, and Technical Assistance to States, Localities and Territories. *Funding and Guidance for Local Health Departments.*

Centers for Disease Control and Prevention. (2016a). Office of Public Health Preparedness and Response. http://www.cdc.gov/phpr/coopagreement.htm.

Centers for Disease Control and Prevention. (2016b). Older Adult Health and Medical Concerns. http://www.ced.gov/aging/emergency/conerns.htm.

Centers for Disease Control and Prevention. (2017a). Epidemic Intelligence Service (EIS): Boots on the Ground disease detectives. https://www.cdc.gov/eis/history.html.

Centers for Disease Control and Prevention. (2017b). Final Rule for Control of Communicable Diseases: Interstate and Foreign. https://www.cdc.gov/quarantine/fnal-rule-communicable-diseases.html.

Centers for Disease Control and Prevention Division of Global Migration and Quarantine. (2014). U.S. Quarantine Stations. https//www.cdc.gov/quarantine/quarantine-stations-us.html.

Champion, V.L. (1984). Instrument development for health belief model constructs. *Advances in Nursing Science, 6*(3), 73-85.

Committee for the Study of the Future of Public Health. (1988). *The Future of Public Health*. Washington, D.C: National Academy Press.

Committee on Homeland Security and Governmental Affairs (2006). *Hurricane Katrina: A Nation Still Unprepared*. https://www.hsgac.senate.gov/search/?q=katrina&start=15&as_sitesearch=&page=2.

Department of Health and Human Services office of the Assistant Secretary for Preparedness and Response (2018). *Saving lives and Protecting Americans from 1st Century Health Security Threats.* https://www.phe.gov/about/aspr/Pages/default.aspx

Department of Homeland Security. (2008). *Overview: ESF and Support Annexes: Coordinating Federal Assistance in Support of the National Response Framework*. https://www.fema.gov/media-library-data/20130726-1825-25045-8535/overview_esf___support_annexes_2008.pdf:

Department of Homeland Security. (2017). History: Creation of the Department of Homeland Security.

Eisenman, D., Bazzano, A., Koniak-Griffin, D., Tseng, C., Lewis, M., Lamb, K., & Lehrer, D. (2014). Peer-Mentored Preparedness (PM-Prep): A New Disaster Preparedness Program for Adults Living Independently in the Community. *Amercian Association of Intellectual Developmental Disabilities, 51*(1), 49-55. doi:10.1352/1934-9556-52.1.49

Eisenman, D., Chandra, A., Fogleman, S., Magana, A., Hendricks, A., Wells, K., Plough, A. (2014). The Los Angeles County Community Disaster Resilience Project - a community-level, public health initiative to build community disaster resilience. *International Journal of Environmental Research and Public Health, 11*(8), 8475-8490. doi:10.3390/ijerph110808475

Eisenman, D. P., Glik, D., Gonzalez, L., Maranon, R., Zhou, Q., Tseng, C.-H., & Asch, S. M. (2009). Research article: Improving Latino Disaster Preparedness Using Social Networks. *American Journal of Preventive Medicine, 37*, 512-517.

Eisenman, D., Zhou, Q., Ong, M., Asch, S., Glik, D., & Long, A. (2009). Variations in Disaster Preparedness by Mental Health, Perceived General Health, and Disability Status. *Disaster Medicine and Public Health Preparedness, 3*(1), 33-41. doi:10.1097/DMP.0b013e318193be89

Emergency Management Key Informant Interview (2016). Key Partner Interview: GEMA Area One Hazard Vulnerability.

Federal Emergency Management Agency. (2011). *A Whole Community Approach to Emergency Management: Principles, Themes, and Pathways for Action*.

https://www.fema.gov/media-library-data/20130726-1813-25045-0649/whole_community_dec2011__2_.pdf.

Federal Emergency Management Agency (2012). FEMA National Survey Report.

Federal Emergency Management Agency (2014). Stronger, Safer, Protected Homes and Communities. www.fema.gov/safer-stronger-protected-homes-communities.

Federal Emergency Management Agency (2015a). 2015 Preparedness Goal. https://www.fema.gov/media-library-data/1443624338930-32e9ed3ac6cf8e95d7d463ed9685df/NationalPreparednessGoal_InformationShee_2015.pdf.

Federal Emergency Management Agency (2015b). Ready Campaign. www.ready.gov.

Federal Emergency Management Agency. (2015c). State Mitigation Plan Review Guide. www.fema.gov/media-library-data/1425915380555-aba3a873bc5f1140f7320d1ebebd18c6/State-Mitigation_Plan_Review_Guide_2015.pdf.

Federal Emergency Management Agency. (2016a). Hazard Mitigation Planning. www.fema.gov/hazard-mitigation-planning.

Federal Emergency Management Agency. (2016b). The National Response Framework. www.fema.gov/media-library-data/1466014682-9bcf8245ba4c60c120aa915abe74e15d/National_Response_Framework3rd.pdf.

Federal Emergency Management Agency. (2016c). National Response Framework. 3rd.

Federal Emergency Management Agency. (2017a). About the Agency. www.fema.gov/about-agency.

Federal Emergency Management Agency. (2017b). Emergency Support Function Annexes. www.fema.gov/media-library/assets/documents/25512.

Fox, M. H., White, G. W., Rooney, C., & Rowland, J. L. (2007). Disaster Preparedness and Response for Persons with Mobility Impairments. *Journal of Disability Policy Studies, 17*(4), 196-205.

Gamboa-Maldonado, T., Marshak, H. Sinclaire, R., Montgomery, S. & Dyjack, D. (2015). Building capacity for community disaster preparedness: A call for collaboration between public environmental health and emergency preparedness and response programs. *Journal of Environmental Health, 75(2):24-29.*

Georgia District Public Health (2016). Key Partner Interview: Public Health Hazard Vulnerability.

Georgia Emergency Management Agency (2018). *Local Emergency Planning Committees. http://www.gema.ga.gov/PlanPrepare/Pages/LEPC.aspx*.

Glik, D. C., Eisenman, D. P., Zhou, Q., Tseng, C.-H., & Asch, S. M. (2014). Using the Precaution Adoption Process model to describe a disaster preparedness intervention among low-income Latinos. *Health Education Research, 29*(2), 272-283. doi:10.1093/her/cyt109.

Haddow, G. D., Bullock, J. A., & Coppola, D. P. (2014). *Introduction to emergency management* (5th ed.): Amsterdam; Boston: Elsevier/Butterworth-Heinemann, c2014.5th ed.

Hayden, J. (2014). *Introduction to health behavior theory* (2nd ed. ed.). Jones & Bartlett Learning: Burlington, MA.

Headquarters of the US Army Corps of Engineers. (2017). The U.S. Army Corps of Engineers: A Brief History.

Heath, R. L., Lee, J., & Ni, L. (2009). Crisis and risk approaches to emergency management planning and communication: The role of similarity and sensitivity. *Journal of Public Relations Research, 21*(2), 123-141. doi:10.1080/10627260802557415

Hutchins, S. S., Fiscella, K., Levine, R. S., Ompad, D. C., & McDonald, M. (2009). Protection of racial/ethnic minority populations during an influenza pandemic. *American Journal of Public Health, 99 Suppl 2*, S261-S270. doi:10.2105/AJPH.2009.161505

Jassempour, K., Shirazi, K. K., Fararooei, M., Shams, M., & Shirazi, A. R. (2014). The impact of educational intervention for providing disaster survival kit: Applying precaution adoption process model. *International Journal of Disaster Risk Reduction, 10*(Part A), 374-380. doi:10.1016/j.ijdrr.2014.10.012

Klaiman, T., Higdon, M., & Galarce, E. (2013). Coordinating Research and Practice: Challenges Testing Messages to Increase Medical Reserve Corps Participation in Local Health Department Activities. *Journal of Community Health, 38*(2), 392-396. doi:10.1007/s10900-012-9629-x

Kosa, K. M., Cates, S. C., Karns, S., Godwin, S. L., & Coppings, R. J. (2012). Are Older Adults Prepared to Ensure Food Safety During Extended Power Outages and Other Emergencies?: Findings from a National Survey. *Educational Gerontology, 38*(11), 763-775. doi:10.1080/03601277.2011.645436

Kruvand, M., & Bryant, F. B. (2015). Zombie Apocalypse: Can the Undead Teach the Living How to Survive an Emergency? *Public Health Reports, 130*(6), 655-663.

Levac, J., Toal-Sulivan, D., & O'Sullivan, T., (2012). Household Emergency Preparedness: A Literature Review. *Journal of Community Health, 37(3), 725-733.*

Lindell, M. K., Prater, Carla S. and Perry, Ronald W. (2007). The Role of the Emergency Manager. In L. Town (Ed.), *Introduction to Emergency Management* (pp. 1-18). Hoboken, NJ: John Wiley and Sons, Inc.

MacQueen, K. M., McLellan, E., Metzger, D. S., Kegeles, S., Strauss, R. P., Scotti, R., Trotter, R. T. (2001). What Is Community? An Evidence-Based Definition for Participatory Public Health.

McCabe, O. L., Semon, N. L., Lating, J. M., Everly, G. S., Jr., Perry, C. J., Moore, S. S., Links, J. M. (2014). An academic-government-faith partnership to build disaster mental health preparedness and community resilience. *Public Health Reports (Washington, D.C.: 1974), 129 Suppl 4*, 96-106.

Mhatre, S., Artani, S., & Sansgiry, S. (2011). Influence of Benefits, Barriers and Cues to Action for Complementary and Alternative Medicine Use among University Students. *Journal of Complementary & Integrative Medicine, 8*(1), 1-16.

Moss-Morris, R., Weinman, J., Petrie, K. J., Horne, R., Cameron, L. D. & Buick, D. (2002). The revised illness perception questionnaire (IPQ-R). *Psychology and Health 17*, 1-16.

Nadeau, K. (2015). Decreases in RCH funding over the years. Presentation at Regional Coordinating Hospital Meeting.

North Carolina Preparedness and Emergency Response Research Center. (2014). Social Vulnerability Index. Available from University of North Carolina Chapel Hill Retrieved December 3 2014.

O'Brien, N. (2003). *Emergency preparedness for older people*. http://vcaaa.org/wp-content/uploads/Emergency_Preparedness_for_Older_Adults.pdf: International Longevity Center-USA New York.

Office of the Assistant Secretary for Preparedness and Response. (2017a). Emergency Support Function. *Public Health Emergency*.

Office of the Assistant Secretary for Preparedness and Response. (2017b). Medical Assistance. *Public Health Emergency*.

Palen, M. (2014, October 2, 2014) Emergency Preparedness Director North Health District 2 Georgia/Interviewer: N. Cleveland.

Preparedness for Natural Disasters among Older US Adults: A Nationwide Survey. (2015). Preparación de los adultos mayores en los Estados Unidos para hacer frente a los desastres naturales: encuesta a escala nacional, 105, S614-S626. doi:10.2105/AJPH.2013.301559.

Ripberger, J. T., Silva, C. L., Jenkins-Smith, H. C., & James, M. (2015). The Influence of Consequence-Based Messages on Public Responses to Tornado Warnings (Vol. 96, pp. 577-590): American Meteorological Society.

Stephanie Zaza, M., MPH, Linda K. Wright-De Aguero, P., MPH, Peter A. Briss, MD, Benedict I. Truman, M., MPH, David P. Hopkins, MD, MPH, Michael H. Hennessy, PhD, MPH,, Daniel M. Sosin, M., MPH, Laurie Anderson, PhD, Vilma G. Carande-Kulis, PhD,, & Steven M. Teutsch, M., MPH, Marguerite Pappaioanou, DVM, PhD,. (2000). Data Collection Instrument. Procedure for Systematic Reviews in the Guide to Community Preventive Services. *American Journal of Preventive Medicine, 18*(1S), 44-74.

Thornberry, M. R. (2002). *H.R. 1158 National Homeland Security Agency Act*. United States of America.

Tognotti, E. (2013). Lessons from the History of Quarantine, from Plague to Influenza A. *Emerging Infectious Diseases, 19*(2), 254-259.

Tuohy, R., Stephens, C., & Johnston, D., (2014). Qualitative Research Can Improve Understandings About Disaster Preparedness for Independent Older Adults in the Community. *Disaster Prevention and Management, 23(3), 296.*

United States Census Bureau. (2016). American Fact Finder. *Georgia.*

United States Department of Commerce. (2015). U.S. Census Bureau. *American Fact Finder.*

Wallenstein, N. (2008). Chapter15 Improving Health through Community Engagement Community. In B. K. R. Karen Glanz, K. Viswanath (Ed.), Health Behavior Theory Research and Practice (5th ed., pp. 271-300). One Montgomery Street, Suite 1000, San Fransico, CA Jossey-Bass.

Wallerstein, N., Minkler, M., Carter-Edwards, L., Avila, M., & Sánchez, V. (2015). Improving health through community engagement, community organization, and community building. In K. Glanz, B. K. Rimer, K. V. Viswanath, K. Glanz, B. K. Rimer, & K. V. Viswanath (Eds.), *Health behavior: Theory, research, and practice (5th ed.).* (pp. 277-300). San Francisco, CA, US: Jossey-Bass.

Weinstein, N. D., Sandman, P. M., & Blalock, S. J. (2008). The precaution adoption process model. In K. Glanz, B. K. Rimer, K. Viswanath, K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practice, 4th ed.* (pp. 123-147). San Francisco, CA, US: Jossey-Bass.

Whitney, E., Visker, J., Haithcox-Dennis, M. J., & DeWeese, A. (2012). Independently Living Rural Seniors and Emergency Preparedness: A Pilot Study in Southern Illinois. *Health Educator, 44*(1), 21-27.

Appendix A

Legislative Timeline

| Legislation | Decade | Provision |
|---|---|---|
| Quarantine Stations | Late 1700s | States with sea ports able to quarantine from incoming ships |
| Epidemiolgical Investigative Service | Late 1700s | supported disease outbreak response |
| New Hampshire Fire Funding | 1800 | Local funding provisions |
| | | |
| Reconstruction Finance Corporation | 1930 | Disaster Loans |
| Bureau of Public Roads | 1930 | Disaster Loans |
| Tennessee Valley Authority | 1930 | Flooding Reduction |
| Flood Control Act | 1930 | Development of flood disaster plans |
| Office of Defense Mobilization | 1950 | Federal mobilization and stockpiling of resources |
| National Flood Insurance Program | 1970 | Voluntary buy-in to flood insurance |
| Federal Emergency Management Agency (FEMA) | 1970 | Disaster response streamlined within the federal government |
| Office of Homeland Security | 2000 | Moved FEMA under this new office and introduced a focus on terrorism planning and response. This included disease outbreak and bioterrorism response |

# Appendix B

## Emergency Support Functions

| Emergency Support Function | Description |
|---|---|
| 1. Transportation | Aviation/airspace management and control<br>Transportation safety<br>Restoration/recovery of transportation infrastructure<br>Movement restrictions<br>Damage and impact assessment |
| 2. Communication | Coordination with telecommunications and information technology industries<br>Restoration and repair of telecommunications infrastructure<br>Protection, restoration, and sustainment of national cyber and information technology resources<br>Oversight of communications within the Federal incident management and response structures |
| 3. Public Works and Engineering | Infrastructure protection and emergency repair<br>Infrastructure restoration, engineering services and construction management, emergency contracting support for life-saving and life-sustaining services |
| 4. Firefighting | Coordination of Federal firefighting activities, support to wildland, rural, and urban firefighting operations |
| 5. Information and Planning | Coordination of incident management and response efforts<br>Issuance of mission assignments<br>Resource and human capital<br>Incident action planning<br>Financial management |
| 6. Mass Care, Emergency Assistance, Temporary Housing, Human Services | Mass care<br>Emergency assistance<br>Disaster housing<br>Human services |
| 7. Logistics | Comprehensive, national incident logistics planning, management, and sustainment capability<br>Resource support (facility space, office equipment and supplies, contracting services, etc.) |
| 8. Public Health and Medical | Public health<br>Medical<br>Mental health services<br>Mass fatality management |

| | |
|---|---|
| Emergency Support Functions Continued: | |
| 9. Search and Rescue | Life-saving assistance<br>Search and rescue operations |
| 10. Oil and Hazardous Materials | Oil and hazardous materials (chemical, biological, radiological, etc.) response<br>Environmental short- and long-term cleanup |
| 11. Agricultural and Natural Resources | Nutrition assistance<br>Animal and plant disease and pest response<br>Food safety and security<br>Natural and cultural resources and historic properties protection and restoration<br>Safety and well-being of household pets |
| 12. Energy | Energy infrastructure assessment, repair, and restoration<br>Energy industry utilities coordination<br>Energy forecast |
| 13. Public Safety | Facility and resource security<br>Security planning and technical resource assistance<br>Public safety and security support<br>Support to access, traffic, and crowd control |
| 14. Long term Recovery | Social and economic community impact assessment<br>Long-term community recovery assistance to States, local governments, and the private sector<br>Analysis and review of mitigation program implementation |
| 15. External Affairs | Emergency public information and protective action guidance<br>Media and community relations<br>Congressional and international affairs<br>Tribal and insular affairs |

Appendix C

Quality Coding Criteria for Review Articles

| Quality code | Criteria |
|---|---|
| 1 | Non-comparative study: e.g., case-series, focus group, case-study, descriptive epidemiology |
| 2 | Exposure and outcome determined in the same population at the same time |
| 3 | More than one group studied defined by outcome or exposure either prospective or retrospective or those with concurrent comparison groups. Or RTCs with methodological issues and/or small sample sizes and Pilot studies |
| 4 | Investigators assign exposure and exposure assigned randomly. Without major methodological issues and having a sample size greater than 200. |