FRAMING MATTERS: SITUATING THE EXPERIENCES AND PERCEPTIONS OF DISASTER SHELTERING AND EVACUATION FOR PEOPLE WITH DISABILITIES

by

Rochelle M. Brittingham

A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Urban Affairs and Public Policy

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Rochelle M. Brittingham

Approved:

Leland Ware, J.D.
Interim Director of the School of Public Policy and Administration

Approved:

George H. Watson, Ph.D.
Dean of the College of Arts and Sciences

Approved:

James G. Richards, Ph.D.
Vice Provost for Graduate and Professional Education
I certify that I have read this dissertation and that in my opinion it meets the academic and professional standard required by the University as a dissertation for the degree of Doctor of Philosophy.

Signed:

Tricia Wachtendorf, Ph.D.
Professor in charge of dissertation

I certify that I have read this dissertation and that in my opinion it meets the academic and professional standard required by the University as a dissertation for the degree of Doctor of Philosophy.

Signed:

James Kendra, Ph.D.
Member of dissertation committee

I certify that I have read this dissertation and that in my opinion it meets the academic and professional standard required by the University as a dissertation for the degree of Doctor of Philosophy.

Signed:

Joseph E. Trainor, Ph.D.
Member of dissertation committee

I certify that I have read this dissertation and that in my opinion it meets the academic and professional standard required by the University as a dissertation for the degree of Doctor of Philosophy.

Signed:

Nicole Dash, Ph.D.
Member of dissertation committee
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This research focuses on the experiences of people with disabilities (PWD) in disaster evacuation and sheltering. Areas of exploration include disability policy, disaster policies, and plans in the U.S. that address disaster mitigation, preparedness, response, and recovery; what households plan to do and what health and access concerns are present in a household in the event of a hurricane; and a case study of PWD in Japan after the Tohoku earthquake and tsunami.

The first exploration uses the theories of framing and social construction to analyze four federal disaster policies and three state emergency operations plans. A qualitative textual analysis of all seven documents using focused coding was undertaken to determine the presence of disability frames. Analysis indicated the predominant model differed greatly in each document. Each state identified people who fall under a disability classification or access and functional need (AFN) classification differently, and made different assumptions regarding PWD or AFN. Discussion includes potential ramifications and experiences for PWD and others with AFN in disasters based on different disability models and terminology applied by states in their emergency operation plans.

The second exploration is a quantitative analysis of a telephone survey of household residents in North Carolina focused specifically on respondents who indicated they, or a member of their household, had a health or access concern. A total of 424 landline and cellphone participants took part in the survey representing four areas of North Carolina. Relationships with significance varied between health or
access concerns and potential shelter locations. Moreover, several significant relationships appeared when variables of sexual identity, income, and race were included. Discussion is based on a number of points: analysis of survey results, where people plan to seek shelter, what these primary shelter locations mean for shelter planners, and the degree of understanding of people’s rights when they seek a public shelter. Suggestions for planning strategies emerged from the data.

The third exploration introduces the term situated access and discusses it within a Japanese context after the March 11, 2011 tsunami. Data were gathered by three different field visits to Iwate and Miyagi prefectures. The first trip occurred in June 2011, the second took place January 2012, and the final trip occurred August 2012. Informal interviews were conducted with officials, response personnel, volunteers, and survivors through the reconnaissance fieldwork, often with the assistance of an interpreter. We visited and observed activity at four sites still in use as temporary shelters, supply warehouses, temporary housing locations, debris-processing sites, and multiple areas heavily impacted by the catastrophe. During a second visit, interviews were conducted with ten key stakeholders representing government officials, non-governmental organizations, and volunteer groups. Site observation took place at such locations as temporary houses, a hospital, a non-profit organization, and government buildings. Three areas emerged as creating disparate experiences for PWD: information, resources, and services. The research concludes with a discussion of the access differences PWD faced in those three areas, compared to the general population, that subsequently led to differential experiences of the disaster.
Chapter 1
INTRODUCTION

Defining the Problem

There is limited research on disability issues in the context of evacuation and sheltering strategies (Van Willigen, Edwards, Edwards, & Hessee, 2002). When disability issues have arisen in previous research, researchers generally have not systematically analyzed data associated with those issues (for example, see Riad, Norris, & Ruback, 1999). The lack of research affects planning. People with disabilities are considered within a single category of vulnerability, which is an inappropriate approach to comprehensive planning (Kailes and Enders, 2007). People with disabilities (PWD) may face challenges that differ from the challenges faced by those vulnerable to disaster due to gender, race, income, age, or other demographic characteristics. Moreover, the disability community is highly heterogeneous. The needs of people with disabilities vary considerably, and there is no one-size-fits-all solution of improving disaster evacuation and sheltering planning (Kailes & Enders, 2007; Parsons & Fulmer, 2007). Consequently, a concentrated research effort is needed to better understand what, if any, disparate evacuation and sheltering conditions PWD face in disaster situations, why disparate situations may exist, and what consequence those disparate conditions might have on safety and well-being. Therefore, this dissertation will focus on the following important research questions:
1. How does the framing and policy process involving disabilities and access and functional needs affect people with disabilities in disasters, if at all?

2. Does having a disability or access or functional need affect where people plan to seek shelter during high category hurricanes?

3. In an international context, to what degree do evacuees with disabilities have differential access to services, information, and resources after disasters, and what implications do the observed conditions have for the United States?

Policy Process

Laws and policies affect and guide the daily lives of individuals in the United States, and should ensure each citizen equal rights (Parsons & Fulmer, 2007). Many laws are applicable to all people, while a subset of laws and policies protect or promote the rights of a specific group. One such landmark policy that targets a group is the Americans with Disabilities Act of 1990 (ADA) that protects the rights of PWD. The ADA guarantees equal rights to participation and accessibility to individuals who document a disability. The law further prohibits discrimination based on disability status. Certain federal policies have limitations in scope and relevancy that applies only with respect to disaster-related activities, but include the ADA specifically to protect the rights of PWD in disasters (see, for example, Robert T. Stafford Emergency Relief and Assistance Act of 1988). State plans and those created by other local jurisdictions use federal disaster policies to ensure compliance with federal
regulations. The creation of federal policies and the implementation of plans based on policy have the potential to influence the disaster experiences of PWD.

Until 1990, no legal protection from discrimination existed for PWD. In many cases, the impetus for denying employment was a person’s disability status, which generated enough attention inside and outside of the disability community to identify discrimination as a problem. The placement of a problem on the agenda is, according to Birkland (2011), the start of the policy process. Prior to the passage of the ADA, disability rights advocates lobbied for discrimination protection for individuals with disabilities. Multiple attempts by interest groups to move discrimination protection to the decision agenda were not successful until the late 1980s. The ADA’s passage into law in 1990 aimed to protect PWD from discrimination in the same way other federal policies protect people based on race, sex, and religion.

Nonetheless, while legal protection for PWD happened, policy changes occur in only some instances. Kingdon (2011) describes streams theory as a process whereby there is a "window of opportunity" for potential policy change, although change in policy is not guaranteed. Three different "streams" meet up – two or more at a time – containing institutions, agencies, groups, and individuals within the policy process. The first stream is the problem stream, which carries with it the problem and its characteristics. While it is possible for identification of a problem to arise from longstanding situations, the problem can also come to the public’s attention via a focusing event. These focusing events grip the attention of the public and policymakers and can motivate changes in policy (Birkland, 1998). During one such focusing event in recent memory, Hurricane Katrina, individuals with disabilities became part of the public’s attention. Scenes displayed in the media depicted PWD in
wheelchairs trapped in inaccessible locations or waiting in long queues for buses, many of which were not equipped to transport personal equipment. Additional pictures showed overturned wheelchairs and belongings left at evacuation staging areas. Stories unfolded about degrading and unhygienic conditions at makeshift shelters. Problems associated with separating people from the equipment they needed to remain independent rose to the fore. The most troubling stories involved the number of deaths in the disability community; PWD unable to evacuate or move above the rising water perished. People relocated to new cities and towns, far from their support networks or resources. Suddenly, for many PWD, everything imperative to retain independence – like wheelchairs – needed replacement. The stories regarding the experiences of PWD in evacuating and sheltering for Hurricane Katrina focused the public’s attention on the problems surrounding PWD in disasters. Although the ADA prohibits discrimination and assures equal access, the need arose for disaster specific policies to address PWD.

The second stream, the policy stream, has within it the possible solutions for the identified problem (Kingdon, 2011). After Hurricane Katrina and the problems associated with disaster evacuation and sheltering, amended policies, such as The Stafford Act, or new policies in the case of the Post-Katrina Emergency Management Reform Act, addressed PWD in the disaster planning process. These disaster policies address the need for inclusion of PWD in the planning process, as well as greater acknowledgement of the need to plan for PWD and other AFN. This reflects recognition of the lack of equal access to services and resources that differentially affected PWD compared to the rest of the population.
The third stream, called the politics stream, is the current state of public opinion and politics at the time policy change may occur. Both the passage of the ADA and the emergency management policy reforms following Hurricane Katrina occurred at times of political feasibility. It is through a change in understanding of the problem or perhaps a focusing event that two or more of these streams no longer run parallel but instead overlap. In essence, the crossing of two or more streams puts a potential policy change on the agenda (Kingdon, 2011). An added caveat to the policy process is the way the elites, either individuals or agencies, with enough power influence the policy process. Although the policy creation process should be inclusive of everyone, the elites can ultimately decide which policies to advance to the agenda (Druckman, 2001) and how to propel the policy process.

Nevertheless, the policy process takes place because the identified issue has gathered enough support from stakeholders and government entities to create the impetus for policy change. A key tool needed for the policy process is knowledge about the target population (Birkland, 2011). That is, understanding the behavioral assumptions about the population that is to be most affected by the policy creation or change (Schneider & Ingram, 1988). As it pertains to disaster disability policy, knowing the target population becomes critical. Given the heterogeneity of the disability community, creating policies becomes difficult because of the varying number of, type of, and degree to which people may need policies to help safeguard their rights.

For disability policy and terminology, this means throughout multiple iterations of policy, there have been changes made to make policies more relevant and to protect people who fall under the domain of the policies. The design of these
policies is to safeguard the civil rights of PWD, as well as to increase access to services and resources that promote safety in disaster situations. Moreover, these policies should be the basis for disaster planning. The plans should follow policies concerning anti-discrimination, and provide equal and accessible services and resources for PWD in disaster mitigation, planning, preparedness, and response. It is nearly impossible to know before a disaster the exact number of people who identify with a disability, but with effective planning strategies, the needs of people will be better met.

Terminology

The disability community greatly affects the terminology used in the policy process. Often, this terminology is what the disability community feels would be most appropriate for everyone - both inside and outside the community - to use to be both respectful and accurate in describing situations, people, and issues. For instance, mental retardation is a medical condition and an official diagnosis applicable under particular conditions to specific people. Nevertheless, based on common usage, the terminology has been used to categorize people who have impairments and disabilities outside the official diagnosis. Many people feel strongly that it is inappropriate to consider everyone with a developmental or intellectual impairment "mentally retarded" simply because it is convenient to do so. Today in the United States, this is deemed a derogatory term that minimizes the needs of those who legitimately identify with the diagnosis (Price, 2010).

When and which terms and meanings are considered appropriate is an evolving process, as is the case with the word ‘handicapped.’ The word handicapped is now considered inappropriate by many in the disability community because the framing of
the word has changed. Handicapped now identifies with accessibility, wherein people need to have access created for them because they cannot do tasks on their own. People are described as needing actions done ‘to’ or ‘for’ them rather than ‘with’ them. Instead, using the word ‘disability’ invokes the disability as a phenomenon that does not impede on a person's ability to engage in chosen activities (Devlieger, 1999). It is the shift in framing a person who identifies with a disability from being helpless to having abilities that may help emergency managers create more inclusive planning.

More recently, the evolution of terminology for those who identify with a disability or impairment has become focused on ‘people first’ language. This terminology, such as ‘a person who has diabetes’ not ‘a diabetic,’ is intended to create a shift to recognizing people as individuals rather than with the disability itself. This approach holds that when we do not use people first language, the disability becomes the defining characteristic that objectifies the person. Defining someone only by their disability implicitly limits them in what they can or cannot do within their societal roles (Tierney, Petak, & Hahn, 1988). Even the media has been encouraged to use people first language by disability organizations (Lynch, Thuli, & Groombridge, 1994). The media can have extensive reach with respect to viewership and conveying particular messages. Indeed, the media has the potential to help more accepted terminology come into wider use. Yet, Haller, Dorries, and Rahn (2006) argue that U.S. disability community’s approach to the media in the mid-1990's has gone largely ignored. Since that time, outreach has not proven as successful in wiping out the remaining terms that may limit people and perpetuate stereotypes.

The agreement of a term or definition at a single moment in time does not assume a terminology change will never occur in the future. According to Weiss
(1989), there is no way to definitively settle on a term for the duration of policy creation and implementation because of the power struggles throughout the policy process that shifts legitimacy to different actors at various points in time. As these changes occur in the policy process, different groups advocate for new terminology, and thereby strategies and solutions, because of a shift in thinking or discourse.

As such, the problems surrounding framing what the disability community needs in disaster plans vary with each institutional actor. To create inclusive disaster plans understanding the terminology that differs between people and even organizations can present opportunities for people with disabilities to become part of the process. It is better to have those with the disabilities and impairments help plan for what they need than allow emergency management professionals to lead without input and buy-in from the community at large (Barnes & Mercer, 2006).

A growing concern and challenge is how to assure individuals who identify with having access or functional need concerns are adequately addressed in shelter provision. The term ‘special needs’ was previously used by both emergency management practitioners and within academic literature to describe an array of issues (Buckle, Mars, & Smale, 2000; Parsons & Fulmer, 2007). This term encompassed individuals of low income, those who have limited, if any, English proficiency, the young, seniors, and, among many other concerns, having a disability. As a result, ‘special needs’ described over 50 percent of the population (Kailes & Enders, 2007). To move away from focusing on a person’s disability and their ‘special needs’ status, the term ‘functional needs’ was proposed to focus on the issue a person may live with and their ability to live independently (Kailes & Enders, 2007). This change in terminology changed the framework of disaster planning for people who fit outside of
mainstream planning considerations. The framework uses the phrases 'functional needs' or 'access and functional needs' to recognize that people have varying degrees of needs to be met, even in a disaster, and incorporation of those needs into disaster planning protects against civil rights violations during disasters. The Federal Emergency Management Agency (FEMA) (2010) recognizes this shift in terminology as key in the decisive need to focus on the abilities people have to prepare for and be independent after disasters.

Definitions

Terminology differs in different communities and different cultures, and is ever changing in an attempt to be sensitive and specific to the way the disability community interacts with society (Jette, 2006). The terminology in this document was chosen in collaboration with individuals who work with, and in, the disability community. This author respectfully puts forth the following terminology as outlined by Nagi (1991). A disability is “…an inability or limitation in performing socially defined roles and tasks expected of an individual within a sociocultural and physical environment” (Nagi, 1991, pp. 315), while an impairment “…indicates a loss or abnormality of an anatomical, physiological, mental or emotional nature” (Nagi, 1991, pp. 314). The ADA provides the legal definition of disability as “(A) a physical or mental impairment that substantially limits one or more major life activities of such individual; (B) a record of such an impairment; or (C) being regarded as having such an impairment (as described in paragraph (3))” (ADA, 2009). The two definitions of disability differ, as the disability emphasis lies in separate places. Nagi defines disability within the context of performing roles; a person’s disability status hinges on fulfilling what society believes a person’s ability is. If a person does not meet
expectations, they may have a disability. The ADA’s definition suggests the impairment causes a person’s inability to take part fully in societal roles.

The most recent shift in terminology undertaken is by the current FEMA administration in order to include PWD in emergency planning. In an effort that realizes not everyone has a disability, and that the phrase 'special needs' does not adequately represent the population, an additional phrase is necessary. Using the framework describing functional needs by Kailes and Enders (2007), the phrase access and *functional needs* (AFN) for the purpose of this document is defined as the requirements by a person for resources or services to maintain a level of independent living.

The phrase 'access and functional needs' encompasses more individuals than just those who have disabilities. Using the phrase 'access and functional needs' can refer to conditions or situations that are unrelated to disabilities. For example, people who identify with an AFN may do so because they are unable to speak or understand English or perhaps do not have access to personal transportation.

Finally, there is a distinction between disabilities and AFN. Identifying with a disability enables someone protection from discrimination under the ADA, while someone with an AFN does not necessarily have legal protection based on his or her needs. There are different dialogs in the disability community regarding whether a person who identifies with a disability automatically has an AFN or not. For some members of the disability community, there is assumption that if you have a disability, there is automatically an AFN. However, other people take the approach that even if a person has a disability, they do not have an AFN unless they have unmet needs. Therefore, for the purposes of this document, both phrases, people with *disabilities*
and access and function needs, appear at different points in text to describe the above defined concepts.

Organization of subsequent chapters

Difficulties arise and must be navigated during times of disaster by those who have disabilities and those individuals who care for people with disabilities. The possible exclusion of people with disabilities from the planning process violates their civil rights with regard to equal access. As such, sheltering must be inclusive for all individuals irrespective of the physical or mental limitations a person may have. In order to have a more robust understanding of these issues, subsequent chapters discuss experiences people with disabilities and access and functional needs face during evacuation and sheltering during disasters.

The first chapter uses the theories of framing and social construction to qualitatively analyze four key federal disaster policies and three state emergency operations plans. The four selected policies were the American’s with Disabilities Act of 1990, the Robert T. Stafford Emergency Relief and Assistance Act of 1988, the National Disaster Recovery Framework, and Executive Order 13347. The selection of Delaware, Florida, and North Carolina’s state emergency plans occurred based on their coastal locations. A textual analysis of all seven documents was undertaken to determine the presence of disability frames (i.e., medical model, charity model, social model, and functional model) with focused coding. Analysis indicated the predominant model differed greatly in each document. Each state identified PWD and others with AFN differently, used different – often outdated – terminology, and made different assumptions regarding PWD or AFN. Discussion of what implementation of
different disability models and terminology means in state plans suggests potential ramifications and experiences for PWD and others with AFN in disasters.

The second chapter is a quantitative analysis of data collected through a telephone survey of household residents in North Carolina. The study focused broadly on issues related to evacuation and sheltering decision-making and behavior, while this chapter focuses specifically on respondents who indicated they, or a member of their family, had a health or access concern. A total of 424 landline and cellphone participants took part in the survey from four areas of North Carolina during the spring of 2011 and summer of 2012. Sixty-two respondents identified themselves, or a member of their household, as having a health or access concern that would affect their well-being in a public shelter, and 153 respondents indicated a member of their household had one of the listed health or access considerations. Significant relationships varied between health or access concerns and potential shelter locations. Further, some significant relationships were found when including sexual identity, income, and race. Discussion is based around a number of points: analysis of survey results, where people plan to seek shelter, what these primary shelter locations mean for shelter planners, and is there an understanding of people’s rights when they seek a public shelter.

The third chapter introduces a new term, situated access, and discusses it within a Japanese context after the March 11, 2011 tsunami. Situated access is defined here as the ability to acquire and utilize information, material resources, or services based both on the physical location of the individual or group and the social standpoint or circumstances of the individual or group within that physical location. Data were gathered by three different field visits to Iwate and Miyagi prefectures. The
first trip occurred in June 2011, the second took place January 2012, and the final trip occurred in August 2012. A total of 16 days were spent in the field. Informal interviews were conducted with officials, response personnel, volunteers, and survivors through the reconnaissance fieldwork, often with the assistance of an interpreter. We visited and observed activity at four sites still in use as temporary shelters, multiple sites currently in use as temporary housing, warehouse facilities for supplies, debris processing sites, and multiple areas heavily impacted by the catastrophe. During a second visit, interviews were conducted with ten key stakeholders representing government officials, non-governmental organizations, and volunteer groups. Site observation took place at such locations as temporary houses, a hospital, a non-profit organization, and government buildings. Three areas emerged as creating disparate access experiences for PWD: information, resources, and services. The differences PWD faced in those three areas, compared to the general population, led to differential experiences of the disaster.
Chapter 2

DISABILITY POLICY AND EMERGENCY MANAGEMENT: THE INTERSECTION OF POLICY AND PLANS FOR INDIVIDUALS WITH DISABILITIES AND ACCESS AND FUNCTIONAL NEEDS

Introduction

Disaster policies can affect millions of individuals. The 2000 U.S. Census documents 257.2 million non-institutionalized people over the age of five living in the United States. Of the total number, 19.3 percent, or one person in five, identify with a disability (National Organization on Disability, 2005). This ratio, however, relies on self-reported data. Because of the possible stigmatizing nature of disabilities, the true number of people with disabilities (PWD) may go underreported (Bickenbach, Chatterji, Badley, & Ustun, 1999). People with disabilities who are institutionalized and children under five years old are not included in these calculations. In addition, the definition of a disability does not take into account temporary impairments lasting shorter than six months (Roth, 2013). Impairment “indicates a loss or abnormality of an anatomical, physiological, mental or emotional nature” (Nagi, 1991). Only when an impairment’s duration is factored in with an adverse effect on a person’s behavior, range of activities or a limitation in activities (Bickenbach et al., 1999) does the impairment qualify as a disability. Over the course of their entire lives, very few individuals qualify as completely able-bodied (Bickenbach et al., 1999). Disabilities together with impairments affect a large portion of the population.
Organizations working on issues related to disability and disaster have suggested that the phrase “access and functional needs” (AFN) is more inclusive language than phrases previously used. AFN is intended to emphasize the capabilities individuals have to be independent and a desire to eliminate the practice of identifying someone solely by their disability. The term AFN refers also to individuals without health conditions otherwise associated with a disability but who rather require accessible structures: for instance, this term may refer to caregivers to minors in baby carriages who use a ramp to access public buildings, individuals without personal vehicles who rely on public transportation in order to evacuate, or individuals whose first language is not of the majority (e.g. English in the United States) and need disaster information in a format or language they can understand. Combined, people with disabilities and people with AFN comprise a larger number of the population than the total number of PWD reported by the U.S. Census.

Reliance on disaster plans that do not sufficiently account for AFN may result in situations where certain members of the population may not have necessary resources and services. Planning inaccuracies are often a result of the exclusion of the disability community from the planning process (Parsons & Fulmer, 2007). Disaster events like Hurricane Katrina highlighted how emergency planning often assumes transportation for evacuation is equally accessible to all community members and overlooks how functional limitations can pose challenges for many in the community (National Council on Disability, 2005). Katrina made clear how failure to adequately plan for the numbers of community members without transportation – or transportation that accommodated mobility needs – can prove fatal. It is important, therefore, to understand the design of disaster policies and plans that include
individuals with disabilities and AFN. These policies may have critical and far-reaching effects during times of disasters. This paper uses a focus coding approach to examine several U.S. policies and state emergency plans. Documents are examined for the extent to which they use various disability conceptual models to frame their discussion of disabilities, AFN, and disasters.

**Framing and the Policy Process**

The changes in disaster preparedness and response policies for the disability community and those with AFN are closely associated with framing by different entities: how they have defined, accepted, or rejected various terminology and associated discourse. Framing is a process people use to conceptualize or reorient their thinking around a particular issue (Chong & Druckman, 2007). This process is used by citizens and organizations alike to gain support for issues and movements. Policy debates are routinely mediated by the frames presented by practitioners of public relations, both inside and outside organizations (Knight, 1999). What frames the public is exposed to impacts the opinions a person has on policy discussions and debates. These opinions – and corresponding frames – can lead to changes in the policy discourse. For the disability community, particular terminology invokes particular frames. These frames orient how society in general and planners in particular view people with disabilities, consequently affecting their emergency preparedness activities.

It is impossible to immediately change the frames that influence a person’s thinking regarding an issue. Entman (1993) and Knight (1999) describe the framing process as having four attributes that are used to take a perceived reality and make the reality more relevant in communicating an issue. The first is defining a problem. The
second is identifying the causes of the problem. The third and fourth steps differ slightly between the two researchers. Entman (1993) believes that one should predict likely outcomes by making moral judgments as the third step and the final step is to suggest solutions and treatments that have their likely effects predicted. Alternatively Knight (1999) is of the opinion a solution or treatment should be the third step and the forth step is to make a moral evaluation regarding the causal agent to the problem and what impact the agent has on the defined policy problem. Although the researchers differ in their belief of the actions taken in steps three and four, there is still a solution proposed based on the perceived causal agent of the problem. A moral judgment is also made on the part of the entity creating a new frame. It is the entity’s moral compass that is used to determine if a proposed solution would work, address the causal agent to the problem, and determine what implications of the solution.

Nonetheless, of all of the steps, the first - wherein the problem is identified - is the most important (Knight, 1999). The consensus needed to identify a problem takes a vocal group of stakeholders, regardless of the entity they represent, to bring a problem to light.

Framing key issues that describe the problems surrounding and impacting disability policy and discourse must gain new momentum each time terminology changes. That is, each time a problem is identified in the disability community, the framing process must begin again. These new frames must be agreed upon with buy-in from diverse interest groups in a process that begins conversations and withstands scrutiny (Benford & Snow, 2000). Only when processes are interactive are people able to connect with the way a problem is framed (Coburn, 2006).
Each time a frame shifts, or new terminology is added, institutional actors must act on the new information. This shift causes conflicts within systems of adaptive governance, as institutions (i.e. governments) must use appropriate terminology that does not harm their constituents (Andrew & Kendra, 2012). This negotiation of terminology and action is achieved through a process of public learning, where each actor works with stakeholders and entities in the framing process to understand concerns and work with interest groups. The problem with this type of institutional governance lies in the fact that the decision mechanisms enacted do not always satisfy multiple stakeholders (Andrew & Kendra, 2012). For instance, agreed upon terminology from institutional actors may come from a large group of stakeholders and advocates. But the decision to make everyone use a specific term or phrase may become problematic. Some terms that are acceptable to one group of people are not to another group, or the semantics of a particular expression differ (Fernald, 1995). For example, in the 1990s the medical term ‘mental retardation’ was not yet considered inappropriate for use in the United States while in the United Kingdom such a phrase was already considered offensive (Fernald, 1995).

Much of the shaping of policy hinges on the view of PWD or AFN. The interpretation of what is reality for a PWD or AFN depends on the social construction of the disability or impairment (Patton, 2002). As described by Wendell, a self-advocate,

I believe that discussion of how disability should be defined is essential for clarifying our understanding of disability and, ultimately, for formulating policies, but defining disability and identifying individuals as disabled are also social practices that involve the unequal exercise of power and have major
economic, social, and psychological consequences in some people’s lives (1996, pp. 23).

Specifically, the views or assumptions of society about people with a disability or impairment shape reality and in turn influence the treatment of PWD or AFN (Ingram, Schneider & deLeon, 2006). As socially constructed, a disability or impairment ascribes certain characteristics to people who are perceived to have impairments by others.

Utilizing social constructionism to delve into society’s view of disabilities is not the first time the theory has explored a specific group. For instance, theoretical explorations of gender (see, for example, J. Lorber) and race (see, for example M. Omi) has been undertaken, and Wendell (1996) describes her disability within social construction viewpoint. Living as a member of a group that society endows with particular traits affects resources and services. The codified laws governing the protection and accessibility of PWD create an institution (Searle, 1995). This institutional arrangement, in turn, provides information on what society believes regarding disabilities, because the construction of the social reality is done for specific purposes (Searle, 1995). For people with disabilities, society believes what are accepted as facts regarding necessary services and resources, resulting in specific treatment and access to society. Policy designed to affect change in a particular subset of the population uses a socially constructed "target population." Perceptions of target populations exist on a continuum of positive to negative. Dependent upon social construction, a target population’s placement moves along the continuum, which means the target population is viewed in different ways. The perception of a target population as positive and negative affects actions taken on, or for, the population.
Both disaster policy and disaster plans include provisions for PWD and AFN. Individuals who identify with a disability or AFN become a target population for policies and plans. The same disability and AFN community is also a target group that yields differing amounts of power (Ingram et al., 2006).

When a group of individuals organize, the power the group holds may increase (Birkland, 2006). This is especially true when organizing aims at policy change. The change in policy might be to change the terminology used, or suggest new models for disability policy. The models used have varying types of repercussions and ramifications for PWD or AFN and those who have to implement policies through planning. For instance, the plan to provide disaster related services may be limited in scope to only address medical related needs. This is a narrow view of disabilities and AFN. More broadly, policies may require plans change the nature of a public shelter in order to remove environmental barriers - such as inaccessible steps or showers that do not accommodate wheelchairs - in order to allow everyone equal access to services and resources.

There are four prevailing approaches to viewing disability that are also applicable for access and functional needs (AFN): the medical model, charity model, social model and functional model. These four models illustrate the social constructions held of people with disabilities and AFN. These assumptions subsequently influence the treatment people with disabilities receive from others. The models shifts focus between a medical problem requiring treatment to the provision of appropriate support and resources to manage a disability or AFN during disasters. The models are not mutually exclusive, nor is there an explicit linear progression between each model. Through the evolution of social constructions of disabilities, these models
formed at different times. However, more than one model can be present in a policy or plan at a time.

The first approach is the medical model. This model frames the disabilities themselves as a primary cause of limitation or vulnerability (Tierney, Petak, & Hahn, 1988). Moreover, the medical model considers a disability a treatable condition, provided both a treatment is available and responders attend to the need. In other words, the framing of disability is an individual problem with a medical solution. Indeed, the medical model approaches PWD as individuals who need “fixing” (Kett, Lang, & Trani, 2009). Social construction through this model leaves PWD with little power to dictate the level or type of care they require.

The charity model, a second frame that has a slightly different approach than the medical model, encompasses frames of pity and the necessity of aid provision. That is, people without disabilities feel badly for those with disabilities. There is a sense that people who have either a disability or an access or functional need require help doing activities because they are unable to do them on their own (Yeo, 2005). This reasoning may be faulty in that a person may live on their own, requiring only minimal assistance to perform certain activities and be completely independent in performing others. There are other people who require no assistance at all in daily living because they are in no way hindered by their overall health requirements. Therefore, both the medical and charity models are problematic in their discriminatory practices (Twigg, Kett, Bottomley, Tan, & Nasreddin, 2011). These models do not address the needs of people with disabilities by asking them what they may or may not require, or supply services people use in order to retain their independence.
To move beyond characterizing a person by their disability, a *social model*, the third approach, may be more appropriate in describing people with disabilities or access and functional needs (Twigg et al., 2011). The social model explains the disability as a social construction within society. Social construction influences the individual roles people take part in or are assigned to carry out in everyday life (Tierney et al., 1988). The role assigned to someone with a disability can be as a non-functioning member of society, if the perception of disability is as a hindrance. Identities determined by society, however, can also prove incorrect. A person with a disability may have complete independence at home, but have accessibility issues noticeable to others in a new location; for instance, when people evacuate their homes and seek shelter elsewhere. Locations of items in the home may be in specific, easy-to-reach locations or there may be a designated alarm to remind the person to take medication. The new location’s structure fails to accommodate the needs a person has. The status quo is designed for people without AFN who do not require items be placed lower and within easy reach or who require medications administered at specific times. When people with disabilities or AFN request help with these acts, others may perceive this in light of stereotypes that PWD or AFN cannot take care of himself or herself. Not having items or reminders that facilitate living independently at home are obstructions created by society for people who attempt to retain their independence. The focus of the social model is not on individual impediments but rather with the social structures, such as lack of access or opportunities, that cause disablement (Baylie, 2002).

A fourth approach is the *functional model*. Clive, Davis, Hansen, and Mincin (2010) describe this as the most recent movement to recognize disabilities as
heterogeneous and to discard the paradigm that views illness as the crux of disabilities. Instead, the functional model recognizes everyone’s specific capacities that may - but not always - require emergency managers to provide different levels of care in disaster-related responses. Plans to take into account disaster-related needs and provide practical solutions and appropriate resources for individuals with disabilities and AFN involve PWD and AFN in creation and implementation.

Of note, there is a fifth and final frame of disability, referred to as the sociopolitical model (SPM). This model is also called the rights-based approach, as the frame is concerned with the ways society and policy define disability (Davis, Hansen, Kett, Mincin, and Twigg, 2013). This perspective sees disability emerging from the way society oppresses the individual with the disability (Shakespeare and Watson, 2002). The discrimination that exists in society creates a situation where PWD face prejudice that affects their treatment, and, in turn, infringes on their civil-rights (Hubbard, 2004). Within the SPM, barriers in society and the society itself affect a person with disabilities - the disability itself does not get blamed (Hubbard, 2004). The sociopolitical model goes further to connect AFN as a civil rights issue for PWD. At the time of analysis, data that indicated the SPM was grouped with the functional model as the paradigms overlapped to the extent that they could not be adequately differentiated in the policies and plans. However, the SPM is continuing to develop as a model in its own right based on legal obligations.

**Research Questions**

There are laws to afford those with disabilities protection from discrimination. There are still other policies specifically designed for times of disaster to make
provisions for those who identify with a disability or AFN. Plans are a result of implementing policies into actions. This research seeks to address:

1. What models of disabilities are federal disaster policies using?

2. What models of disabilities are states using in disaster plans?

**Methodology**

The focus of this research is to determine the disability frames used in select federal emergency management policies and state-level emergency management plans. The frame is important because it represents how PWD or AFN are viewed and subsequently how treatment of individuals may be influenced based on the message the frame sends. This research analyzes four federal policies and three state plans through focused coding. The creation of operational definitions for each of the four models of disabilities aids the analysis of content.

The selection of federal policies was informed by a guidance document created by Parson and Fuller (2007). Although there are a number of emergency management policies, the focus on federal policies was to assure all states fell under their purview. That is, all states are required to follow federal emergency management policies in their own planning and response. If the state requests federal funds during or after a disaster for reimbursement, proof must be available to show there has been no discrimination based on disability status. However, as each state is responsible for creating state-level emergency management policies, no two states policies are the same. The similarities and differences in states’ policies would influence the creation of plans and the language found in the emergency management plans for each respective state. Many states lean towards the federal policies when planning,
therefore state policies lack detailed or specific information. For this reason, federal policies provided a more stable baseline from which to start analysis.

Parsons and Fuller (2007) document the Americans with Disabilities Act of 1990, Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (herein referred to as the “Stafford Act”), the National Disaster Recovery Framework (herein referred to as “the Framework”) and Executive Order 13347 on Preparedness and Disability as key pieces of disaster policy for individuals with disabilities. The design of federal policy documents aims to protect individuals from discrimination based on protected groups, such as disability, sex, age, and race. Policies are recognized by Birkland (2011) as “[a] statement by government of what it intends to do such as a law, regulation, ruling, decision, order or a combination of these. The lack of such statements may also be an implicit statement of policy” (pp. 9).

The Americans with Disabilities Act (ADA) of 1990 is a powerful piece of policy written with public input that demonstrated the public was ready to support disability policy (Scotch, 2001) by providing the “most comprehensive civil rights protection for people with disabilities in American history” (Bickenbach, 2012). The ADA sets groundwork for appropriate treatment of individuals with disabilities. Federal disaster policies reference the ADA when accounting for services and resources for people with disabilities.

A key federal disaster policy is the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, which is an all-hazards approach to disaster planning, invoked in times of disaster ("Robert T. Stafford Disaster Relief and Emergency Assistance Act," 2006). This law governs what the federal government does (e.g. how support is provided to states, local governments and qualified non-
profit entities), what the states are charged with doing, and the responsibilities of local
governments (Nicholson, 2007). For instance, one of the responsibilities of the federal
government after Hurricane Katrina was to fill the position of a Disability Coordinator
under FEMA (McCarthy, 2011). The Stafford Act also describes how disaster
response starts at the local level and escalates to the federal level as capabilities and
resources become overwhelmed and unable to handle the size of the disaster.

The National Disaster Recovery Framework is part of the larger federal dialog
of planning for disasters (FEMA, 2008). The September 2011 version was utilized in
this project. During the time of this analysis, there have been multiple iterations of the
Framework with different names and terminology before the most current 2013
edition. However, data analysis began before the 2013 edition was released.

Finally, Executive Order 13347 on Preparedness and Disability signed by
President George W. Bush specifically addresses individuals with disabilities in
emergency preparedness (Executive Order 13347, 2004). It describes how policy, a
council, and general guidance should facilitate emergency preparedness for
individuals who may require additional or accessible services and resources.

These policies and legislative mandates lead to the creation of emergency plans
that vary state-to-state, in their language, consideration of the issues, and,
consequently, their implementation. Each state and outlying U.S. territory uses a
disaster plan when necessary. In order to facilitate data analysis on plans, three state
plans in the continental U.S. were selected: Delaware, North Carolina and Florida. The
states became part of a purposeful sample, as their selection was deliberate to elicit
specific information (Berg and Lune, 2012; Padgett, 2008) on disaster planning. The
risk of a hurricane was a key factor that informed selection. Unlike other disasters (e.g.
tornados, floods), hurricanes are predicted before they make landfall, enabling evacuation warnings and shelter suggestions to be provided to the population. Each state has a history of hurricanes due to their position along the eastern coast and must be prepared during the hurricane season.

Delaware’s small, three county size makes it ideal for comparison to a state with more counties (i.e. a larger jurisdiction area) and a significantly larger population size. Hurricanes do not often threaten the state, but, within the last two years, two hurricanes caused the state to issue evacuation orders and open shelters. Preparing for a hurricane is not a frequent occurrence during hurricane season for this state. North Carolina’s location in the middle of the Atlantic coastline means it is at frequent risk for hurricanes. Additionally, the main interstates and highways running through the state could result in residents of other states traveling through North Carolina during their evacuation. Moreover, the large influx of visitors during hurricane season influences disaster planning activities. The third state, Florida, is surrounded mainly by water and has experience with serious and costly hurricanes (e.g. Hurricane Andrew). Floridians can evacuate to the north and to a limited extent to the west. There is an aging population in both North Carolina and Florida because both are popular retirement locations. Each of the three states’ characteristics may affect the ways in which policies are interpreted or implemented.

These states’ plans range in size. Delaware’s plan is arranged in three sections that incorporate a base plan, responsibilities, and hazard specific annexes. The base plan alone is 163 pages long, with the remaining 1,091 pages deals with the responsibilities of organizations and agencies and specific hazard information. In all, Delaware has a 1,254 page planning document. This is the longest of any of the three
plans. Florida’s planning document is 884 pages, of which only 59 pages is dedicated to a base plan. The remaining 825 pages explain functional annexes and incident specific annexes. Finally, North Carolina’s plan has a total of 678 pages. The base plan is only 24 pages long, and the remaining 654 pages discuss functions and responsibilities, event specific plans, and supplemental information. Of the total page length for each plan, there are pages without information. Some pages are blank as they are dividing pages and others are simply title pages. Nonetheless, even without blank pages, the plans are large documents.

A focused coding effort was undertaken to determine which of the four frames (i.e. medical, charity, social, or functional) appeared in the policies and plans. The four preselected frames were operationalized in order for the researcher to define what information was being sought in the data. It was possible to go directly to focused coding using these preselected, larger categories without first doing a line by line analysis of first creating the codes, as a line by line first is not always necessary (Hesse-Biber, Howling, Leavy, and Lovejoy, 2004). Focused coding is ideal when a researcher must go between observations and compare interpretations and actions (Charmaz, 2006). As the documents are so large, reading for predetermined categories allowed for a more robust analysis because the original design of the documents was for emergency planning. An analysis for frames surrounding PWD or AFN was not why the documents were written.

The policies and plans were analyzed for the four frames. Each document was read thoroughly, line by line. Data was documented in phrases, sentences, and complete paragraphs when appropriate. Data was copied out of the original policies and plans and placed in an excel file. If there was a phrase that was indicative of one
of the frames, the whole sentence was selected to keep the meaning of the phrase clear in context. When documenting the phrases, sentences, and paragraphs that referred to one of the four frames, the location in-text was recorded. The section where the data was found was recorded in order to be available to inform the analysis on whether the section was recording the responsibilities of an agency or person or assumptions being made about the AFN population. Additional data on locations in documents were collected. Specifically, the documents’ internal page number (i.e. Base Plan page 4 was noted as BP-4) and the page number of the master pdf file copy were recorded. This was to enable other researchers to find the data recorded were they to go back to the original texts.

The phrase or sentence was coded for the extent to which PWD were framed as constituting one of the four models (i.e. medical, charity, social, or functional) using operational definitions. This occurred by the researcher re-reading the selected passages recorded in the excel sheet, assigning a model based on operational definitions to the data in the excel sheet, and then going back to the original plan to re-read the passage in-text to assure the model was the best fit within the context of the plan. Further, for each coded data point, an explanation was listed in the excel sheet. This was done to explain the rationale of picking a particular model. Notations also served to discuss mismatches in the data or other interesting intra-text and inter-text connections.

Limitations

As the selection of all of the documents for analysis was purposeful, a limitation of this study is the lack of larger generalizability (Berg, 1995; Berg and Lune, 2012). That is, the findings from this study may not apply to other states or
other federal policies. The selection of plans to analyze is limited. The states selected are in a similar geographic region and may not reflect other states’ planning. Geographic location and population statistics may influence how states plan, which means other states’ assessments of risk and needs may vary drastically. There is no way to know if other states use the same models or have a different way of interpreting federal level policies. It is also unclear the extent to which the states’ planners actively reference federal policy. To understand if the inclusion of federal policies in planning is done purposefully, more in-depth qualitative interviews should be conducted. The documents may not be the best fit for emergency planning and response for PWD and AFN.

**Operational Definitions**

**Medical model**

The medical model was identified through the appearance of medical treatment discussions in conjunction with PWD or AFN. The language refers to “treatment” when referring to a possible medical intervention or “patients” when referring to PWD or AFN. Identification of an individual with a particular impairment (i.e. an asthmatic, a diabetic) qualifies as a medical model characteristic. A phrase that qualifies as a medical model expression would be similar to the following: “SMAT teams and other medical response assets to care for trauma victims and other patients displaced from hospitals and long-term care facilities” (North Carolina, 2012, pp. 543). The sentence identifies people explicitly as patients, while implicitly disclosing AFN concerns. That is, the presence of someone at a hospital or long-term care facility means a person has a health or access concern. These health concerns may be acute and found in a hospital
setting, or chronic, which categorizes a permanent or long lasting condition, typically associated with residence at a long-term care facility. Another instance of the medical model is an automatic medical intervention on a person that is not due to an acute care situation, such as an injury sustained during a disaster. This may include providing medical assistance for an AFN that the person might otherwise handle independently without first checking with the person.

Charity model

The charity model was identified by studying when actions are performed on behalf of someone with a disability or AFN, an action is performed for a person with a disability or AFN, or the referred to person or group has the title “special needs.” The model does not include the person with an AFN in the action other than being the object of the action. An assumption of the model is that people with AFN cannot do the action on their own and require someone else to do it on their behalf. “Special needs” is a term that denotes the charity model, as the description of a person is limited to that phrase. The term is used as to encompass everyone who may have a disability or AFN. The word “special” has the potential to stand alone as an indicator of the charity model. For instance, “transportation for people with special evacuation needs” (State of Florida, 2012, pp. I-5) qualifies as the charity model. The phrase denotes evacuation requirements that are ‘special’ and are for an unspecified group of people. The phrase only constitutes the charity model when language that involves stakeholders in deciding upon the actions to take towards – or for - them is absent. It is important to note, however, the evacuation needs of people without AFN but with a lack of personal transportation options. Some individuals may rely on public transportation because they do not own a personal vehicle or have access to one
through a family member or friend. In such instances, the phrase is coded for the extent to which it deals with AFN or PWD.

Social model

In instances where the social model is apparent, the focus is on the discussion of roles people can fulfill and whether “people first” language is evident. People with disabilities or AFN have assumptions made about their abilities by other members of society. These assumptions are not necessarily representative of what a PWD or AFN can or cannot do. The social model moves towards recognizing people are in a situation where they may not fit ordinarily defined roles. People first language is a second feature of the model. Language that fits the social model uses a description such as “a person with a disability” (e.g. a person with cystic fibrosis) rather than a “disabled person” to avoid objectifying the person based on their disability. The term “individuals with disabilities” is people first language that illustrates people are not defined solely by their disability. A phrase that demonstrates the social model is the discussion of sites for housing assistance that meet “…the physical accessibility requirements for individuals with disabilities” ("Robert T. Stafford Disaster Relief and Emergency Assistance Act," 2006). Meeting requirements for physical accessibility indicates acknowledgment that not everyone can live without structural modifications.

Functional model

The identification of the functional model features the inclusion of people with disabilities and access and functional needs by involving them in what they need to be self-sufficient and independent outside of their home during a time of disaster. Key terminology in this model is the phrase “access and functional needs.” The model
recognizes people have different levels and types of access and functional need requirements. People are not in a single “special” category. Planners consult with individuals with disabilities or AFN. People with access and function needs are in the best position to understand their needs and abilities. “Inclusiveness in the recovery process includes individuals with disabilities and others with access and functional needs…” (FEMA, 2008, pp. 10). The language identifies inclusion of people in the recovery process and further demonstrates access and functional needs terminology.

**Analysis**

**Policies**

Within the four policy documents analyzed, references to the four models occurred 66 times. The medical frame did not appear in any of the policies. There are no instances of the charity frame in the ADA or E.O. 13347, but it appears six times in the Stafford Act and once in the Framework. The social frame is apparent in the ADA three times, seven times in the Stafford Act, four times in the Framework, and once in E.O. 13347. Finally, the functional frame does not appear in the ADA, but the Stafford Act has 12 instances of the functional frame, the Framework has 30, and E.O. 13347 has two (see Table 2.1).
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There are no specific sections within the ADA to describe planning for, and responding to, disasters for people with disabilities (PWD). However, the original design of the ADA protects civil rights, and the issue of civil rights still applies during disaster situations. That is, PWD should still be afforded the same rights as those without disabilities regardless of the situation and possible displacement from their homes. The official definition of a disability within the ADA is the guiding definition for subsequent disaster policies. As found in the ADA, “[t]he term ‘disability’ means, with respect to an individual a physical or mental impairment that substantially limits one or more major life activities of such individual; a record of such an impairment; or being regarded as having such an impairment…” (ADA, 1990, pp. 7). Although protecting the civil rights of PWD, the ADA incorporated the social model within text to describe the built environment’s inaccessibility to individuals with mobility impairments. A society with physical and structural obstacles that cause difficulties for PWD or AFN can result in serious repercussions for some individuals during disasters, particularly when the structural limitations combine with possible disruption from a
disaster to exacerbate difficulties facing PWD or AFN. One goal of the policy is to enforce the provision that reasonable accommodations are made for PWD. If the policy were fulfilled correctly, PWD would face fewer disparities during disaster times in a society structured for people who do not identify with a disability.

The ADA’s inception arose in response to discrimination against PWD. The discrimination of PWD manifested itself in employment, housing, and structural impediments among many others. In the identification of a public problem among the myriad of problems that require attention, the support given to ADA policy is noteworthy. Any number of other public policy activities could have received support at the time, but the public chose to specifically support the disability rights movement to assure the ADA’s passage (Scotch, 2001). People held particular thoughts and feelings about PWD and, in turn, those affected the treatment of PWD. In order to work towards non-discrimination of PWD, the ADA provides legal definitions of disability as well as legal protection. In protecting PWD, there is a moral judgment made that PWD should have legal recourse towards people who would still discriminate against them.

Within disaster policy planning, the Stafford Act draws upon two models within its text. The social model features prominently in some of the wording, especially when describing the group of people for which specific help is destined. For instance, when describing the dissemination of disaster related material, the Stafford Act says “ensure that information made available to individuals affected by a major disaster or emergency is made available in formats that can be understood by…individuals with disabilities or other special needs…” (Stafford Act, 1990, pp. 63). Although the charity model is apparent with the phrase ‘special needs’, the overall
message in the passage is that there is a group of people, those with disabilities, who need information given to them. Rather than making use of functional model approaches of providing accessible communication, stipulating “formats that can be understood” as though PWD all require a specific type of information or other ‘special needs’ groups require the same information does not move beyond the social and charity models. This illustrates the arrangement in society for people to have help getting the services they require. The Stafford Act describes instances where society makes allowances to provide those with disabilities the resources and services they need, without actually taking into account the people themselves. However, a terminology shift within the Stafford Act indicates use of the functional model under section 689 for Individuals with Disabilities and section 513 entitled Disability Coordinator (6 U.S. C. 321b). Within 90 days of enactment, the Administrator should have begun coordinating with the National Council on Disability, The National Advisory Council, the Disability Coordinator established under the Homeland Security Act of 2002, and the Interagency Coordinating Council on Preparedness and Individuals with Disabilities established under Executive Order 13347 (Stafford Act, 1990, pp. 79). These entities should work together to provide guidelines to accommodate PWD, specifying involvement in assuring “(1) the accessibility of, and communications and programs in, shelters, recovery centers, and other facilities” (Stafford Act, 1990, pp. 79) and “(2) devices used in connection with disaster operations, including first aid stations, mass feeding areas, portable payphone stations, portable toilets, and temporary housing” (Stafford Act, 1990, pp. 79) Descriptions of individuals with AFN as part of emergency preparedness planning and dialog encourages inclusion. Additionally, the language specifies available space is
accessible for PWD. Here, the inclusion of people with AFN in policy assists emergency managers in providing appropriate resources and services during disasters, which is a direct reference to the functional model.

The charge of the disability coordinator is to work with different disability agencies and report to the Administrator to “ensure that the needs of individuals with disabilities are being properly addressed in emergency preparedness and disaster relief” (Stafford Act, 1990, pp. 108). The coordinator’s charge is to address issues solely related to PWD including best practices for evacuation and shelter for PWD, training materials on PWD for government officials, and encourage the use of accessible telephone hotlines. A specific example of the coordinator’s responsibilities is to ensure “the availability of accessible transportation options for individuals with disabilities in the event of an evacuation” (Stafford Act, 1990, pp. 109). However, the section addressing the responsibilities of the disability coordinator only utilizes the functional model in describing particular actions to be undertaken for and with PWD. These directed actions aid PWD rather than anyone who has an AFN. Using the transportation example, the transportation is supposed to be accessible for PWD. However, there are people in cities who are without personal vehicles and would therefore have an AFN. The policy leaves states responsible for evacuation transportation planning for PWD or ‘special needs’; people who may have difficulty in obtaining transportation information; and individuals with limited English proficiency.

The rationale behind the Stafford Act is that disasters affect normal access to services and resources, which was the identified problem. The impediments to normal functioning after disaster is the loss of life, income, and property disasters cause. To deal with the problem and its causes, proposed solutions in the Stafford Act include
“revising and broadening the scope of existing disaster relief programs” (Stafford Act, 1990, pp. 1), as well as others. These additional solutions include: encouraging local and state governments to develop disaster preparedness plans; moving towards better coordination and response for disaster preparedness and relief; strengthening hazard mitigation; providing federal assistance to public and private entities for disaster losses; and encouraging local and state governments as well as individuals to obtain appropriate insurance that will take the place of post-disaster government assistance (Stafford Act, 1990, pp. 1). The aim of the Act is to decrease possible disaster losses and ensure people are more self-sufficient after disasters.

The Framework’s intent is to guide disaster planning. “The guidance included here is specific to issues related to children and adults with physical, mental, cognitive, intellectual and sensory disabilities as well as others with access and functional needs” (The Framework, 2011, pp. 71). It references terminology that describes individuals with AFN and uses the functional model in describing tasks to be performed by community partners, government agencies, and non-governmental organizations. The Framework specifies the necessary involvement of community, cultural and disability organizations, such as independent living organizations, protection and advocacy agencies and disability agencies in recovery planning efforts and all recovery committee types. Integrate disability and access and functional needs considerations into housing, economic and workplace development, health care, child care, transportation and infrastructure strategies (The Framework, 2011, pp. 72).

There is acknowledgment that people may require additional or accessible services or resources, but that emergency managers should include them in the planning process
(FEMA, 2008). Furthermore, the Framework acknowledges “…best practices are not to be confused with legal obligations to engage in recovery activities that are fully inclusive of individuals with disabilities and other individual with access and functional needs” (the Framework, 2011, pp. 71). Much of the language within the Framework discusses how people with disabilities can become part of the planning process. It takes the functional model and operationalizes it by describing how people must be included in planning and preparedness activities, rather than simply being the object of planning.

The inception of the Framework began with the recognition that PWD and AFN could not access the disaster planning process. Lack of inclusion meant resources and services were not available as needed during disaster. Organizations involved in disability advocacy or self-advocates were not consulted to assist in disaster planning. In response, the Framework states that “[c]are must be taken to assure that actions, both intentional and unintentional, do not exclude groups of people based on race, color, national origin (including limited English proficiency), religion, sex, age or disability (The Framework, 2011, pp. 9). Moreover, “[c]are must be taken to eradicate social and institutional barriers that hinder or preclude individuals with disabilities and others in the community historically subjected to unequal treatment from full and equal enjoyment of the programs, goods, services, activities, facilities, privileges, advantages and accommodations provided (The Framework, 2011, pp. 9).

Involvement in the planning process, as well as more detailed and specific planning, enables more accessible resources and services for PWD and AFN.

The basis of Executive Order 13347 is the functional model. The executive order recognizes people must take a part in preparing for disasters and the best way to
help them prepare is inclusion in the preparations and planning process (Executive Order [E.O.] 13347, 2004). For instance, the E.O.’s language specifies cooperation should be facilitated “among Federal, State, local and tribal governments and private organizations and individuals in the implementation of emergency preparedness plans as they relate to the individuals with disabilities” (E.O. 13347, 2004, pp. 44573). Inclusion of individuals in addition to other agencies and organizations enables planning based on personal experiences. Added specificity of services and resources for emergency preparedness can benefit PWD and AFN as well as members of the general population.

The rationale behind E.O. 13347 was that emergency preparedness for individuals with disabilities lagged behind standard emergency planning. Disasters often put PWD at disproportionate risk compared to other individuals. To address the need to support safety for PWD, E.O. 13347 establishes a council that reports annually to the President. The report presented by the council should discuss policy achievements of federal agencies in the previous year, best practices in emergency preparedness planning, and recommendations for furthering the policy in the upcoming year. The first report published in 2005 in fulfillment of E. O. 13347 enumerates the specific agencies charged with emergency preparedness for PWD, as well as accomplishments and recommendations of emergency planning (U.S. Department of Homeland Security, 2005).

Plans

The four frames occurred 162 times in the three state plans. The medical frame appeared 16 times in Delaware’s plan, 21 times in Florida’s plan, and 20 times in North Carolina’s plan. Data supports the charity frame 6 times in Delaware’s plan, 31
times in Florida’s plan, and 9 times in North Carolina’s plan. The social frame occurred 3 times in Delaware’s plan, 16 times in Florida’s plan, and one time in North Carolina’s plan. Finally, the functional frame appeared in Delaware’s plan eight times, 25 times in Florida’s plan, and six times in the plan for North Carolina (see Table 2.2).

The manner in which PWD or AFN are established in plans has implications on the tasks and language associated with addressing needs and services for PWD or AFN.

**Delaware plan**

The state of Delaware plan first creates operational priorities and then establishes two groups: vulnerable populations and at-risk populations. Operational priorities in emergency response during times of disaster supersede normal operations. The care of vulnerable populations constituted the fourth of nine operational priorities. People categorized as a vulnerable population includes those “with physical or mental challenges, or who lack assets that would enable them to remove themselves from

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harm’s way” (State of Delaware, 2009, pp. BP-18) because they “are more vulnerable to harm both during and following an emergency or disaster” (State of Delaware, 2009, pg. BP-18). Although there is operational prioritization given to planning for people who fit in the vulnerable population category, the definition of a vulnerable population as a priority does not coincide with the definition given when identifying stakeholders and their roles and responsibilities. The category of vulnerable, whereby people are included based on a pre-existing condition, is a reference to the charity model. There is an assumption based solely on the pre-existing condition that people in this category are more vulnerable before and after a disaster.

Delaware’s categorization of people into a vulnerable population assumes people who fit into the category have an increased vulnerability to harm during and after disasters. Incorporating a wide range of people into a single category illustrates the charity model, as the planning assumption is that people in this category may not have the capability to care for themselves. For instance, everyone with ‘physical or mental challenges’ automatically fit into the vulnerable category. The description of the vulnerable population falls under statewide emergency management, which means, within Delaware, the vulnerable population should be included throughout planning at the state level. Incorporating the vulnerable population’s description within statewide planning may be easier for Delaware compared to other states. Delaware does not operate the same way as other, larger states in that there are only three counties. Due to its small size, Delaware’s state government plays a large role in what is ordinarily assigned to specific counties. For instance,

…the state Department of Transportation (DelDOT) is responsible for almost 90% of all of the roads in the state; whereas in most other states, that figure is
less than 30%. Therefore, in many cases, the closest "appropriate" responder may be a state official (State of Delaware, 2009, BP-17).

State government working closely with county governments to define specific parts of the population based in the charity model allows for the possibility of negatively influencing state-wide planning towards individuals with AFN or disabilities.

Within Delaware’s inclusion of stakeholder groups for planning purposes, having a disability or AFN does not appear in the list of vulnerable population. Vulnerable populations in Delaware include, but are not limited to: people without telephone access or transportation, the homeless, individuals who have not been in contact with a television or radio to get action messages, visitors or temporary residents, those who are culturally or geographically isolated, individuals out of community alert siren hearing range, individuals without knowledge of resources for emergency response and recovery, and those who have limited understanding of English (State of Delaware, 2009). Delaware plans deem vulnerable groups those whose needs may not be addressed fully by typical service providers or feel their needs or access to such services and resources are not fully supported. The only subset of this group that met criteria of AFN is the category of individuals with limited English understanding.

Instead of one group defined broadly, Delaware chose to include everyone who is medically fragile, people with disabilities, and the elderly under a separate at-risk category. The planners use this category for people whose needs they deem as complex. The people who fall into the three groups are heterogeneous and included, according to the Delaware Emergency Operation Plan (DEOP), individuals with mobility impairments, other physical and mental impairments, cognitive disorders, and
sensory impairments. Practitioners and planners are to take the functional needs of each of these groups into consideration in order to provide accessible communication and evacuation strategies. Moreover, planning is to address individuals with these needs to facilitate sheltering in general population shelters. The planning for these requirements should “integrate disability elements and resources into all aspects of emergency management systems” (State of Delaware, 2009, pp. BP-22).

The description of the at-risk population is the first example of the functional model in Delaware’s plan. The plan documents necessary steps to create plans that appropriately address evacuation and sheltering strategies for PWD and people with mobility limitations. The actions described to aid people who may need additional supports indicate an understanding that not everyone is able to take actions or seek shelter using the basic support structures in place. Integrating all types of needs and access considerations into emergency management systems highlights actions state and local agencies must conduct. Further, there are other at-risk groups whose identification will create needs for different emergency management arrangements.

Of the three states’ plans, Delaware has the most encompassing definition of individuals who may fit into an ‘at-risk’ category. However, the responsibility of defining this category falls to the state, which means it is at the discretion of the state to increase or decrease the number of people who fit in the category as the definition changes. As such, the definition suggests both charity and functional model approaches. The definition assumes individuals who are medically fragile, elderly or PWD need - and require - special considerations. The ‘at risk’ terminology assumes, perhaps correctly, that people need help above what is generally available. The functional model emerges through the inclusion of people in general population
shelters regardless of their categorization. Not suggesting that people should to go to different shelters based on which defined category they fit into draws on a functional model where everyone’s needs are attended to in the same location, regardless of what those needs are.

The discussion of who is part of the population that may require assistance vacillates between a special population as defined by a school or other institutionalized population (e.g. hospital, jail) and individuals who have hearing or vision impairments and non-English speaking populations. It is unsurprising that institutionalized populations are viewed as special, as they are a subset of the larger population that moves as a single unit. That is, if a prison or jail evacuates, everyone moves together on buses under particular protocols to keep the inmates incarcerated. Likewise, if a school evacuates, the whole population of the building will try to leave together, as most pupils are minors and therefore require supervision. However, in other groups of people are also referred to as having access and functional needs. The Delaware plan reverts to the idea of a ‘special’ group, where it denotes the Developmental Disabilities (DD) Council as the responsible party to “[e]nsure prepared educational and information material appropriate for the state’s special needs population” (State of Delaware, 2009, MGT/EAG-20). Planning assumes that the collection and dissemination of educational and informative material should stem from a single agency. Typically, anyone who turns to a specific agency requires assistance unique to that agency. Therefore, a potential may be created that people who do not fall under the ‘disability’ heading will not receive the information they require. The charity model is evident through the phrase ‘special needs’ and a single, disability specific agency tasked with information dissemination information.
Considered within the category of a vulnerable population, Delaware does make plans for non-English speakers. A clear reference to the social model within the state’s plan is to make provisions for non-English speakers, including American Sign Language (ASL). The plan specifically includes two references within the Mass Migration annex to provide translators as needed. Additionally, the Department of Health and Social Services is charged with providing bi-lingual translators to support press conferences and write necessary non-English press release when requested by the Delaware Emergency Management Agency (DEMA). These services provide valuable communication assistance to members of the population who might otherwise be overlooked. Although the United States does not have an official language, English is the predominant language spoken. Therefore, evidence of the social model exists because individuals who do not speak English face societal barriers to obtaining disaster information.

Additional agencies and organizations are noted to provide added services fitting with the functional model services in times of disaster. DEMA works with the DD Council to provide for emergency preparedness and response after disasters. Development of the DEOP has been coordinated with the Delaware Developmental Disabilities Council to ensure that sufficient provisions are made for emergency preparedness and response services for individuals with non-typical functional needs. This includes provisions to meet the unique requirements related to notification and warning, transportation, and sheltering of those populations (State of Delaware, 2009, BP-103).
A key indication of the functional model is the incorporation of people with an access or functional need into planning. Interesting to note is the inclusion of an organization, rather than specific groups of individuals based on functional needs, in the Delaware plan. However, the involvement of the DD Council should incorporate people with disabilities and access and functional needs, as the council involves individuals in the disability community. The plan states that the private and non-profit sectors provide advice to DEMA on integrating members of the community in preparing for disasters. Volunteer organizations, both community and faith based, are listed as providing assistance to members and recipients of their organizations. Integrating legislation and inclusion is paramount in the functional model. An individual is the best source of advice for what services and resources he or she requires.

In some instances, the person with an AFN provides their own needed services or resources, especially when seeking a general population shelter. To illustrate this aspect of the functional model, a person overcoming societal barriers may bring along a service animal. A service animal is

[a]ny guide dog, signal dog or other animal individually trained to provide assistance to an individual with a disability including, but not limited to, guiding individuals with impaired vision, alerting individuals with impaired hearing to intruders to sounds, providing minimal protection or rescue work, pulling a wheelchair, or fetching dropped items (State of Delaware, 2009, BP-155).

Under Delaware’s plan, any animal trained to aid a person with a disability is considered a service animal. The plan allows these animals in general population shelters. By having a trained service animal in the shelter, PWD or AFN are able to
continue to live with independence. Indeed, there is no reason for a person to seek specialized accommodations.

In examining Delaware’s plan, a specific type of medical shelter comes to the fore, fitting the medical model.

Medical Needs Shelters are designed to serve as transitional areas, with capability for a short-term stay (up to 96 hours), with all patients then being returned to their homes or moved to long-term care facilities. Medical Needs Shelters may be operated as stand-alone facilities or as components of the Community Shelter whereby the Shelter Operations Group would provide support to the MNS (State of Delaware, 2009, OPS/HSB/PHM-6).

The medical shelter is to receive personnel for registration, food preparation, and crowd and traffic control, among other tasks from the shelter operations group. These medical shelters are considered acute care centers. According to the plan, medical shelters provide medical services to individuals who would otherwise not be able to stay in a general population shelters because there is no way for them to live independently, yet normally would not have a condition that would require hospitalization. Given the medical shelters’ tasks of providing medical care, it appears they might be opened as a transition space for someone in a general population shelter who has a sudden acute care such as a heart attack. The medical shelter provides personnel and resources to handle an acute medical need before transferring the person to a hospital for more intensive care, or back to their home because there is no longer a need to be in the MNS.

Interestingly, there are certain annexes that describe medical services in the event of specific incidents. The mass migration and repatriation annex incorporates the
medical model to provide treatment through the Division of Public Health (DPH) for people who come to Delaware. Many of DPH’s responsibilities while taking response actions are to “[p]rovide screening and medical evaluation for incoming evacuees/refugees” (State of Delaware, 2009, pp. HS71-5) and “[c]oordinate triage, treatment, and transportation of injured or sick parties” (State of Delaware, 2009, pp. HS71-5) as necessary to healthcare providers. DPH also provides emergency workers who encounter repatriated individuals or migrants guidance on possible health-related exposures. Individuals coming to Delaware may have illnesses to which they expose emergency workers to in the course of the workers’ duties. For a mass casualty or repatriation incident, medical services are available to transport patients if they are injured or sick and provide screenings and treatment. The medical model is apparent in the rendering of these services because the aim is to reduce exposure to illness.

A social model data point appears under the mass migration and repatriation annex. Planners are aware that people may speak limited, if any, English. Therefore, the Human Resources Group will “[a]ssist in locating language translators as needed” (State of Delaware, 2009, pp. HS71-6). The annex acknowledges that people without English language skills who seek shelter in the state may face social barriers due to language that may prohibit some individuals from full access. That is, difficulty with communications will arise if the language barrier is not overcome via translators or other language services.

Delaware involves fire and rescue groups in overcoming acute structural barriers during emergencies, which again is part of the social model. People in their homes who rely on electricity to power life-saving medical equipment are in danger if a disaster cuts off the power supply. Fire and rescue groups monitor residences that
require life-support activities and coordinate the participation of fire departments to provide generator support to these households.

The state of Delaware defines the problem of emergency planning and response for PWD and AFN as groups of people who will need help because they are either more vulnerable or more at-risk to a disaster than the rest of the population. The two categories, vulnerable and at-risk, attempt to be so all encompassing that these groups one almost as broad as the former ‘special needs’ category once was. That is, the two groups include so many people that they may encompass 50 percent of the population, as did the ‘special needs’ terminology. This inclusion of so many different individuals may indicate the state has difficulty defining how PWD and AFN should fit into categories and who these people might be. The assumption people fit into particular categories because of an AFN that makes them vulnerable or at-risk is difficult to determine in times of normal operation because there are so many different views.

Nonetheless, to address the needs of people who may need additional assistance means the state identified the causes of the problems. For Delaware, all individuals with disabilities and AFN have life circumstances that mean they need help or assistance. The people fit into these groups because they are not like the rest of the general population. Not fitting in with the general population means the person is part of a group recognized as requiring specialized planning. However, even after defining people who need help because they fit into another group, the solutions are more concrete. General issues such as community shelters are offered in the plan as including everyone regardless of AFN. There is a general aim to work with the DD Council’s stakeholders to inform planning, but the most concrete treatments are just
that – treatments. The medical treatments have clear problems and solutions while other solutions for planning and responding to emergency for PWD and AFN are generalized.

Florida plan

Florida does not explicitly describe members of the population who have either, or both, a disability or AFN. The Florida plan references the ADA to address people with disabilities. The original 2010 plan utilized general wording regarding individuals with disabilities. The revisions to the 2012 plan refer to the ADA and provisions needed in emergency shelters. The 2012 plan acknowledges, “shelters will offer individuals with functional needs the same benefits provided to those without functional needs” (State of Florida, 2012, pp. BP-12). Given that people are not immediately put into a category of individuals ‘needing help’ or people who might be ‘vulnerable,’ the creation of a category whereby people fit based on a legal definition of disability or self-identify with an AFN means people may have the chance to determine their level of assistance, which falls in line with the functional model.

Throughout the Florida plan, the phrase ‘special needs’ is regularly used, a phrase indicative of the charity model. There is no indication that between the current 2012 plan and the previous 2010 plan changes were recorded to the ‘special needs’ verbiage. The Department of Elder Affairs is responsible for providing “…special needs registration information to all of their special needs clients and to all persons with special needs who receive services” (State of Florida, 2012, pp. ESF 8 Appendix – Page 16). There is no discussion of what special registration entails (e.g. which shelters, does this afford individuals additional services or resources). The Department of Elder Affairs is also responsible for assessing facilities that house elderly
individuals in order to ensure they receive appropriate care during disasters. This department also coordinates shelter teams and establishes and maintains discharge planning teams. The Department of Children and Families also has the responsibility to “[p]rovide special needs registration information to all their special needs clients and to all persons with special needs who receive services” (State of Florida, 2012, pp. ESF 8 Appendix – Page 16). In both departments, the intended audience is people who receive services from their departments. There is no assurance people who are not connected to the departments would be eligible for the same sort of care or resources. However, it may be possible the shelter teams and discharge planning teams aid people who are leaving shelters who are not otherwise receiving assistance from those departments.

Although Florida regularly confronts hurricane threats, it is the radiological annex where descriptions of specific counties that have responsibility towards what the plan calls ‘special needs evacuees’ or people who ‘require special evacuation assistance’ are presented. The counties enumerated in the plan either have nuclear reactors or are adjacent to counties that do. Of the three counties discussed in detail in the plan, the following excerpt most clearly illustrates the charity model:

The St. Lucie County Division of Emergency Management keeps a current listing of all special needs evacuees. During an evacuation Emergency Management Officials will inform people with special needs of the evacuation and dispatch appropriate transportation as needed. In St. Lucie County, special needs evacuees who are not evacuated by private vehicles will be evacuated by ambulance, school buses and the Council on Aging Community Transit. The Martin County Emergency Management Agency keeps a current listing of all
special needs evacuees. During an evacuation, emergency management personnel will inform the special needs population and dispatch appropriate transportation. In Martin County, special needs evacuees who are not evacuated by private vehicles will be evacuated by ambulance, school buses and the Council on Aging Community Transit” (State of Florida, 2009, pp. Appendix III, III-38).

Evacuation help is specifically available for people who registered with the counties for evacuation assistance. If people require specialized assistance and are not otherwise on a list for mobility assistance, instructions involve people calling the local emergency management office. Further, only one county explicitly discloses it maintains a registry. The registry, updated annually, deals with specific medical and health needs. ‘Special needs’ individuals will have transportation and shelter provided by the county following established procedures. The plan presents no discussion of people who have disabilities or AFN but who are not on the list. Moreover, there is no arrangement in the annex regarding how other counties may gain access to the registry. For instance, if ‘special needs evacuees’ are moved beyond the boundaries of the county that tracks medical and health needs, there may not be an established way to share information on these evacuees with receiving counties. Although the information on the registry is to be updated annually, the information appears to reflect established, chronic health issues. There is no discussion of keeping track of people with acute health issues, such as injuries requiring crutches for mobility. The annex’s language illustrates the charity model as its focus is on people who need ‘special’ help.
By and large, two thirds of the charity model references in the Florida plan are for ESF 8 in the radiological annex. Not only are special needs shelters described, there are special needs shelter teams to “augment functions for special needs shelters” (State of Florida, 2012, pp. ESF 8 Appendix – Page 7) and special needs shelter discharge planning teams designed to coordinate the discharge of special needs clients to facilities designated as appropriate. From the moment people need to seek public shelter, to the time they depart the shelter for a more permanent housing location, people are in a special category. Although ESF 8 is designed to handle medical issues, there is no guarantee individuals with acute medical needs will not be included in specialized discharge planning. If a person who has a medically related functional need is directed to an institutionalized care system (i.e. a hospital), there may be difficulties getting out. For instance, someone may live at home with a functional need during non-disaster time. During an event, admission to a hospital causes a person to become a patient. There are protocols associated with discharge that involve social workers and other check-in procedures. The person loses some of their independence when they return home, as protocols may include step-down facilities such as going first to a nursing home or having staff come to the home before being cleared to live with the original household. Having teams to handle individuals the plan defines as a special needs category and associated sheltering and discharge tasks denotes the charity model.

This frame may be due in large part to Florida retaining special needs shelters for use during disaster. Under emergency support function (ESF) 8, Public Health and Medical Services, these shelters are to be supported with supplies, equipment and staff. These shelters appear in the plan for people with medical and functional needs.
However, there is no mention of how individuals learn of these shelters. That is, do staff at general population shelters direct people believed to have medical or functional needs to a special needs shelter or if people self-identify and seek these shelters on their own. The presence of special needs shelters that creates a separate ‘special’ environment for people is a clear illustration of the charity model.

The repatriation annex is another annex within the Florida plan that fits the charity model in the discussion of “special care for those with functional needs” (Florida, 2012, pp. Reparation Annex – Page 2-9). Describing the needs people have as ‘functional’ is part of the functional model, but the action of providing a ‘special’ type of care fits the charity model. Specific groups the plan outlines as requiring special care are: unaccompanied children, the elderly, and individuals with functional needs. Ironically, the language to describe people with AFN (i.e. those with functional needs) fits with the functional model but the planned actions taken on behalf of those people fit the charity model. Except unaccompanied children, there is no guarantee specialized care will be needed of the other groups highlighted in the annex.

During tropical and non-tropical severe weather, Florida makes provisions for people in areas prone to flooding and unsafe buildings and considers them part of the vulnerable population, which corresponds with the charity model. In addition to people who live in geographic areas and structures that may render them more vulnerable to severe weather, tsunami and floods, people with special needs are listed specifically as a vulnerable population within the annex. Of note, the charity model does not necessarily have negative connotations when describing vulnerable geographic areas or structures. Particular low lying area have the potential for flooding because of ground water saturation levels and some structures, such as mobile homes,
cannot withstand high wind speeds as well as shelters built on-site. The inclusion of the ‘special needs’ individuals is the focus of the charity model whereby people are put into a homogenous group. Additionally, Florida reserves the right to override local decision making if people who fit into the special needs category are vulnerable. However, there is no discussion of who the special needs individuals are, if the locations of these people are known, or if institutionalized populations fall into the special needs category. It is likely the state knows of institutionalized populations and plans for their transportation assistance needs or locations to go to in host communities during a disaster, so may consider the needs of these populations different from the needs of other individuals.

Florida also notes that language may be a barrier under the base plan’s demographic assumptions. "Florida residents speak numerous languages, including, but not limited to: English, Spanish, French, French Creole, and American Sign Language. The ability to communicate with non-English speaking persons may pose a challenge during disasters."

Planners know language barriers are problematic and alternative formats might be needed to facilitate disaster communication. Providing language assistance is part of the social model, as languages other than English require alternate assistance. Commonly accepted primary language in the US is English, although not the country’s official language, which means that the environment does not provide easy access for non-English speakers.

One of the larger concerns within the social model for Florida is ADA based. ESF 6 will provide - without discrimination based on disability – mass care. Ironically, this leads to discussion of special needs shelters. ESF 6 has the Department of Elders
Affairs help staff general population and special needs shelters to support operations and conduct discharge planning. The Department of Elder Affairs can target their known population to ensure elderly individuals receive appropriate services and resources. Does this miss the people who do not get services from the department? It is unclear. However, keeping shelters staffed with personnel and filled with resources should aid people in receiving what they need, as they are no longer in their own home.

Among the references to the medical model in the Florida plan, the most commonly held under ESF 8, Public Health and Medical Services. ESF 8 includes moving patients from hospital to hospital or out of evacuation zones, keeping track of medication and medical supplies throughout the state, and tracking patients and medical equipment. There is a risk associated with evacuating patients, so the benefits of moving someone to a safer location need to outweigh the medical risks. As some people are more medically fragile than others, a move to an evacuation site has the potential to be stressful enough to cause loss of life. Medical staff, therefore, weigh the risks of staying in a threatened location and sheltering-in-place versus evacuating. If evacuation is chosen, people will be kept as close to their origin as possible. The selection of the type of transportation for a patient will be based on the distance needed to travel to “mitigate the risk of adverse health outcomes” (State of Florida, 2012, pp. 120), level of monitoring needed during transport, and level of acuity. Ambulance strike teams within the state have the capability to “provide emergency medical capability including patient triage and transport” (State of Florida, 2012, pp. 125). If finding space for patients becomes problematic, Florida has the capability to
deploy mobile medical field units. These units provide space to triage patients and provide treatment as necessary.

If patients have evacuated due to necessity, patient tracking becomes paramount. Florida plans to use EMTrack in order to monitor where patients go. Only discussed with regard to medical components, it is unclear if there are plans to replicate this and use it within general population shelters. The EMTrack software “supports the tracking of evacuees, patients, pets, and associated property and equipment using triage tags and disposable bar-coded wristbands” (State of Florida, 2012, pp. ESF 8 Appendix – Page 10). Disposable color-coded wristbands attach to people and equipment to keep necessary resources with the person to whom it belongs. Valuable information is also provided via the wristband to healthcare workers using the software as it provides data for patient care while minimizing time needed to recollect information if the person is evacuated. Florida uses this software to track patient movement through the transport, treatment, and discharge process. As evacuation of facilities can occur with very little notice, healthcare professionals are responsible for evacuating everything a person needs to leave the facility. This means equipment and medication as well as medical records and treatment protocols must follow the person to their final destination. This type of tracking should reduce the number of instances wherein emergency management personnel must find equipment for a person that may be specialized or specially fitted to a particular person.

Finding proper equipment or supplies for individuals during a disaster is not a simple task. Due to some individuals’ needs for specialized equipment, the lack of this equipment, or a specific medication in some instances, causes severe health risks. Within the construct of the medical model, the plan addresses the ability to tap into
caches of supplies and equipment throughout the state that would provide to patients and other evacuees medical supplies, prescriptions, and ventilators. In the event of a large-scale disaster, there is a Receive, Stage, and Store management team available to receive supplies and equipment from the Strategic National Stockpile to push them out to the affected area. The provision of these resources and supplies are for evacuees as well as patients. Although there is a medical component because providing these services is medical in nature, people who would otherwise not reside in a care facility (i.e. hospital, nursing home) may need help replacing damaged or lost equipment or medication. The ability to have medical supplies stored or procured in a timely fashion means better continuity of care.

ESF 6 for Florida incorporates actions that are in-line with the functional model through services in evacuation and sheltering. Executive Order 13347 directs different levels of government to work together and in conjunction with private organizations to “appropriately address the safety and security needs of people with disabilities” (State of Florida, 2012, pp. Basic Plan, Page 50). “These services include support to evacuations (including registration and tracking of evacuees); reunification of families; functional needs support services; and non-conventional shelter management” (State of Florida, 2012, pp. ESF 6 Appendix – Page 2). Sheltering accommodations should include resources for individuals to retain their independence. Deciding upon buildings to be used as shelters should take into account accessibility considerations. Facilities in the general population shelters must meet AFN requirements. Planning should also include people who bring service animals. That is, service animals are to be included in general population shelters because the actions they take assist people to retain their independence.
Nonetheless, there are situations where people remaining at home and retaining their independence is preferable to a larger scale evacuation, such as in a radiological event. Moving individuals with medical requirements is a large undertaking. ESF 8 is charged with aiding communities to support these individuals in order to reduce the need to transport people with AFN to host communities, thereby taxing the host communities’ resources. If evacuating people with medical requirements is not necessary because plans are in place to help people shelter-in-place independently at home, fewer people will seek public shelters and emergency resources.

The problems surrounding PWD and AFN in emergency planning are not yet honed in onto specific issues by the state of Florida. Florida acknowledges PWD and AFN should receive the same benefits in general population shelters as the general populations. However, this does not identify the needs of people adequately. The general statement that everyone needs to be together in shelters leaves out situations where people should shelter-in-place, evacuate, or be able to find appropriate resources and services. Moreover, the state cites the ADA as the terminology they use only for PWD. Not creating an explicit statement regarding people who may need assistance or technically fall into the AFN category means people may assume they are not eligible for helpful services and resources. Using the ADA exclusively for the legal definitions but not applying broader terminology leads to a lack of adequate emergency planning.

The state’s definition of what the problem is is ambiguous, which leads to nebulous emergency planning and response. Florida routinely uses ‘special needs’ as the phrase to describe people who do not fit into the general population, but this phrase automatically assumes people in the category need help. The cause of the
problem is that some people who are ‘special’ need assistance because they would not otherwise be able to handle a disaster on their own. Therefore, Florida has specific teams to help individuals with special needs during shelter discharge planning, ‘special needs’ shelters for ‘special’ individuals, and special needs registries in some select counties.

North Carolina plan

The North Carolina state plan references a ‘vulnerable population’ a single time in the base plan. Under the base plan planning assumptions, certain parts of the NC population are identified as vulnerable populations. For purposes of this plan, as well as procedures and other documents supporting this plan, those vulnerable populations include, but are not necessarily limited to: the deaf and hard-of-hearing, non-English (mainly Spanish) speakers, people in fragile health, and the coastal population for purposes of hurricane evacuation. Other vulnerable populations may be identified as circumstances require. All planning decisions and actions to implement this plan, particularly those relating to communications and warning, will be taken with appropriate consideration for identified vulnerable populations (State of North Carolina, 2012, pp. Base Plan 22).

Identification of these specific groups as vulnerable may create and foster incorrect assumptions of the group. Simply because someone fits into the vulnerable population as determined by North Carolina does not mean the person is, in fact, vulnerable. These individuals, according to the plan, require appropriate consideration in planning especially as it pertains to warnings and communication. This is a serious undertaking, as warning messages must not only be clear and timely, but communicated in a
medium or channel understood and trusted by the community for whom it is intended. Certainly if a person is more vulnerable than someone else is, finding appropriate communication and warning strategies should not be the only actions to taken by the state to decrease the group’s potential vulnerability.

Moreover, people who are deaf are the only group of people who legally meet the criteria for a recognized disability and appear singled out within the identification of vulnerable populations. Not mentioned are other people who may have disabilities or other types of AFN, but these groups may be included as circumstances require.

North Carolina makes few references to PWD or AFN that fit the charity model. One of the instances in which they do is within the mass care annex. Local government agencies will “identify facilities to be used as shelters and special needs shelters” (State of North Carolina, 2012, pp. Mass Care and Human Services - Tab E 2). Special needs shelters are a manifestation of the charity model, as people who need unspecified assistance are to report to a shelter that is different than the general population. Selecting shelters has far-reaching implications, as different buildings have various types of accommodations to enable easier accessibility. Selecting specific buildings as ‘special needs’ shelters suggests easier accessibility and perhaps the buildings do, in fact, support accommodations to help people who have a disability or AFN. Nonetheless, the state plan suggests there are two different type of shelter – those for the general population and those for everyone else. The official definition of special needs shelters for the state of North Carolina are “designated shelters provided by local government to meet the needs of special population groups, such as the physically disabled” (State of North Carolina, 2012, pp. Glossary 14). Providing alternative shelters sends an implicit message that people who need a ‘special needs’
shelter cannot be provided for or shelter comfortably because their needs will not be met in a general population shelter.

Another assumption is “people who are care dependent have requirements that will differ from those of other citizens…” (State of North Carolina, 2012, pp. Mass Care and Human Services – Tab E 4). Implications of differing requirements fit with the charity model, as the language suggests people who require caregivers are immediately different from other members of the community. The differences in the type of resources or services depend on the actual disability or AFN. A range of care dependencies may exist, some of which may benefit from universal design – whereby accessibility is made easier for everyone in the community even if a person does not identify with an AFN – but it unclear if that is the type of care dependency to which the plan refers.

Care dependent individuals who rely totally on caregivers are found in places North Carolina terms “special needs facilities” (North Carolina, 2012, pp. Hurricane Checklist 2). These facilities house a 'special needs' population that may require help during response and recovery, as is found in the checklist for hurricanes and earthquakes. No doubt there are facilities such as nursing homes with non-ambulatory clients that require additional support. However, interestingly within the plan’s response and recovery checklists, people who would otherwise find themselves categorized as part of the general population are not included. That is, unless someone fits within the special needs population, there are no instructions available to them. Only on what is referred to as D-Day – the day the hurricane is due to make landfall or the day an earthquake occurs - does the plan specify Public Information, which involves letting people know of shelters, shelter locations, evacuation routes, traffic
conditions, among other information. In this instance, people who are in the designated ‘special’ group and found at particular facilities have more access to information and services because planning for the facility occurs in a different way than the general population.

North Carolina’s use of the medical model revolves around medical shelters, providing mental health and counseling services, references to daily medications, and patient transportation. The lead agencies coordinating catastrophic medical sheltering response are the Department of Health and Human Services (DHHS), the Division of Health Service Regulation (DHSR), and the Office of Emergency Medical Services (OEMS) (State of North Carolina, 2012, pp. Disaster Medical Services – Tab F 13). The state medical response team will coordinate and/or provide on short notice, mobile tasking medical facilities, some of which are medical support shelters (State of North Carolina, 2012, pp. Disaster Medical Services – Tab F 15). There are specific issues related to 'medical' shelters. The first is that people are not in a general population shelter. This sort of medical shelter may refer, as does Delaware’s, to an acute care facility to strictly provide medical care opened when other health facilities are overwhelmed. Yet, there is a lack of discussion elsewhere in the section for 'community sheltering' or 'general population sheltering' or even 'special needs shelters'. Given that medical shelters are to open quickly to fill a medical need when hospitals are inundated, this type of shelter is part of the medical model, as there seems to be an emphasis on acute healthcare needs that would otherwise go unfilled.

Mental health counseling is another service that must continue during disaster times. The Division of Mental Health, Developmental Disabilities, and Substance Abuse is to assist in continuing mental health care and crisis services. This task is to
provide personnel and mental health services, which is their task in normal operations. The need for mental health outreach may increase following a disaster because the stress imposed by the disaster may exacerbate pre-existing conditions. It is unclear if the plan also seeks to address mental health issues that result from the disaster or previously diagnosed mental health issues for which people were already seeking treatment.

Among medical needs that prompt people to seek medical help is replacement of medications. People might evacuate their residence and not bring along their medication, due to an oversight or a belief that a quick return likely. Other reasons a person may not have their medication is if they evacuated and used up their supply or the medication was lost in transit. North Carolina recognizes people taking medication daily may have difficulties obtaining them after a disaster. However, there is no discussion of how people might get their medications or the provision of medication. North Carolina’s plan acknowledges healthcare facilities might face such severe interruption that the small quantity of in-house medications will deplete quickly. Dependent upon the disruption to the transportation and communication networks, medications will not reach the facilities in order to make it out to intended recipients.

A source of consternation for authorities is transportation issues arising from a disaster. In North Carolina, local authorities have the responsibility of providing medical transportation. “The SERT Emergency Services Branch will request State, interstate, and Federal medical transportation assistance when County or State resources are inadequate to meet the needs” (State of North Carolina, 2012, pp. Disaster Medical Services – Tab F 10). Some individuals, due to mobility needs, are unable to ride in mass transit vehicles and therefore require medical transport. Given
that some modes of transportation such as ambulances or small paratransit buses are limited in their capacity, demand could quickly exceed supply.

However, transportation is a data reference in the North Carolina plan that meets criteria for the social model. Regular assessment of transportation needs determine transportation priorities. As not everyone has access to accessible transportation, other mechanisms must be ready to address the need in a society that does not have available public transportation.

Identified as the social model, four instances in the North Carolina annex are associated with volunteer and donation management. The social model appears when the plan references a telephone hotline staffed with bilingual Spanish speaking personnel to answer questions about donations and volunteers. The information provided by the personnel should include where people can take part in volunteer activities and provide material resources. As North Carolina has a number of Spanish speaking inhabitants, provisions for people who want to know where and how to volunteer, as well as type of donations requested encourages inclusiveness in disaster related activities, but also overcomes a language limitation.

North Carolina recognizes a functional model of shelters for people with functional needs. This acknowledgement is under the direction of mass care. American Red Cross (ARC) shelters allow service animals inside to provide assistance in essential living tasks for people with specific functional needs.

North Carolina does not appear to recognize PWD or AFN as members of the community who need to be addressed in the plan. The state’s only reference to a disability was if someone was legally deaf, which leaves out any number of other disabilities or AFN. Not having guidance that is more specific may indicate the state is
without clear guidance of what planning is appropriate or legally necessary to ensure safety for all residents.

North Carolina does not clearly acknowledge the problem of PWD and AFN as a part of the population for which planning must be done or for those groups to be part of the planning process. As the state does not at a minimum discuss legal requirements or go into developing the appearance of the AFN population in planning, general planning leads back to people’s medical requirements. North Carolina’s discussion of people who may have a disability or AFN is limited to providing uninterrupted medical assistance. Additionally, those people who may need assistance, although there is very little discussion on what that might be, will be for people who need specialized assistance and their caregivers.

**Discussion**

The translation of policy into action on state levels may have gaps that result in possible complications. Emergency preparedness is the responsibility of the states (Edwards, 2007), thus possible variation between planning and preparedness activities from state-to-state exists. During an emergency, states have some degree of protection from litigation because of sovereign immunity (Nicholson, 2007). That is, states receive protection from litigation in federal court. This means people cannot immediately begin court proceedings against a particular state if they feel their needs have not been met through disaster planning or response. The result may pose problems for individuals who have disabilities or AFN because their requirements may not be met in general disaster plans and their recourse to courts is limited. Although the design of policies and plans selected for analysis are intended to help protect people with disabilities from breaches in their civil rights during times of disaster,
inadequate implementation of the policies and plans may still subject individuals to increased risk and exposure and leave them no legislative recourse. This constitutes a key part of the planning and response process, as cities and municipalities do not have protection from litigation in the same way as the states and federal government. Cities and municipalities often do not have extensive disaster policies of their own. Instead, local governments enforce policies created at the state and federal levels of government. Lack of clarity of the intent of policy, or lack of understanding on how to pursue policy implementation, leaves smaller localities left shouldering the burden of possible lawsuits. If discrimination is prevalent, it becomes problematic for a state to gain access to federal funds (FEMA, 2011).

Certainly, no states are alike, which is why there is expected variation between state plans. However, federal policies and laws provide guidance that states should follow when creating emergency management plans. Between Delaware, Florida, and North Carolina, there are important points of divergence in plans. For instance, Delaware has three counties that work closely together, as discussed earlier with respect to the responsibility of roadways. In the event of a disaster, a state level agency may respond rather than someone at a county level (State of Delaware, 2009, pp. BP-17).

Each state plan has a base plan and hazard specific annexes. Depending upon the state, there are other sections outlining agency responsibilities. These documents end up hundreds of pages long. North Carolina has the shortest plan at 678 pages, Florida’s plan is 884 pages, and Delaware’s plan is in two sections totaling 1254 pages. There are few mentions of PWD or AFN in the plans. Discussions of PWD or AFN specifically in the base plans are scarce. In fact, North Carolina makes only one
mention in their base plan about PWD or AFN. All of the states have more mentions within the respective annexes, whether it is a hazard specific or emergency support function annex. The lack of discussion of either PWD or AFN – or both – gives the impression that there is a perspective of “we have it covered,” which is a narrow view of preparedness and response. Although deviating from the plan is necessary sometimes in order to fulfill needs, not having particular elements discussed or planned for creates planning problems. People lose access to services and resources and are without information that may assist them. People with disabilities or AFN certainly lose their independence if they have to leave their households and planning is not in place to provide adequate resources and services. Improvements to the plans are always worth doing, especially if it leads to less ambiguity.

The ADA is the guidance for people with disabilities, assuming a legally recognized disability. The original design of the ADA was to protect civil rights, not plan for disasters, but civil rights issues still apply in disaster situations. Delaware and North Carolina do not make a specific reference to the ADA when defining who may need additional assistance while Florida’s definition of who might need additional planning does follow the ADA definition more closely. Delaware has a legal affairs officer who works with the Attorney General to assure laws are followed in a disaster. Still, it is questionable as to whether not having definitions that adhere to federal statutes means it is less likely actions taken during disasters will follow the federal statute.

The Stafford Act covers what people are allowed to do, where reimbursement is applicable, and provides anti-discrimination policy. As Parsons and Fulmer (2007) state, "[d]iscrimination during presidentially declared disasters is prohibited under this
act" (pp. 3). If discrimination is found to be present, it becomes problematic for a state to gain access to federal funds (FEMA, 2011). Additionally, the Stafford Act prohibits public shelters from refusing access to those individuals who identify with having a disability during presidentially declared disasters (The Stafford Act, 2006). Individuals should not be relocated to another shelter if the shelter does not appear to be able to handle their needs. Such a forced relocation would be considered a direct violation of their civil rights (ADA, 2009). When a person identifies with a disability, their functional needs must be met by services coming to them. Simply put, regardless of the health conditions people have, if they make it to a public shelter the law requires that shelter staff allow them to stay. As a result, people with a variety of disabilities may share shelters with those without disabilities. Equally important, the framing of the law leads to a directive that one type of sheltering option should be available to all people. Separate but equal shelters are not permitted.

Delaware sends a mixed message regarding the provision of emergency shelters. It acknowledges that general population shelters include people who have special needs, companion pets, and unattended children; however, use of the term ‘special needs’ singles a subset of people out of the whole population. The term is at odds with the more functional approach to providing shelter for everyone under one roof, referred to as ‘whole community shelters’ in meetings and committees.1 Terminology selection may send conflicting messages to providers of services in the shelter: people are here, but there are different classes and different types of people so adjust the way you provide services.

1 Assertion based on attendance at meetings from 2010-2012.
Lest Delaware be singled out for ambiguity surrounding shelter terminology, Florida and North Carolina both are in their own ways equally unclear in their shelter documentation. North Carolina still utilizes, at the time of the analysis, two types of shelter: general population and special needs shelters. However, there is no discussion of how people would know which of the two types of shelter would best suit their needs. Florida also discusses both general population and special needs shelters within its plan, which is directly at odds with federal law. In contrast to providing what amounts to separate but equal shelters, emergency support function 8 (Public Health and Medical Services) plans to provide equipment and services to general population shelters for people with medical needs. If people with disabilities will receive services in a general population shelter why are there two types of shelters? Further ambiguity arises out of yet another type of shelter introduced under ESF 6 called a medical needs shelter, although there is no discussion of what that type of shelter entails.

While federal guidance is explicit in how people with disabilities or access or functional needs must be referred to or the extent to which they must have services and resources available - should they be needed, the individual states’ plans have gaps that leave questions unanswered. For example, Delaware’s plan explicitly states the fire department is to provide generators for individuals in their homes who may have a medical reason power cannot be interrupted. However, not knowing where people are who may need services or the number of generators needed, it seems unlikely there are enough generators in the state to provide power to all households with a medical condition requiring life-support. If the messaging is to evacuate, encouragement to leave is preferable to having individuals essentially trapped in their homes by their medical requirements. If sheltering-in-place is the recommended action, it is advisable
for individual households to have the necessary equipment to provide their own care until normal services are reestablished.

The medical model routinely appears in all three plans, but there is not always a negative connotation surrounding the use of medical terminology. Nor is there always a negative stigma attached to someone as a ‘patient’. Many of the medical model references within the analysis refer to the respective states’ Division of Public Health’s role in disaster planning and response or to actions taken in Emergency Support Function (ESF) 8. The plans use this language to take into account institutions (i.e. hospitals) that have individuals requiring medical interventions on their sites before disasters. People (i.e. patients) must have their care continued, regardless of the occurrence of a disaster. Other individuals may become patients as a direct result of the disaster. Medical care must be rendered to preserve health.

Within the references for PWD or AFN found, by far the majority in each plan meet the operational definition for the charity model. Language indicative of the charity model encourages an attitude that actions are taken on behalf of PWD or AFN, even while federal guidance encourages the use of phrases that meet functional model requirements and makes it illegal to discriminate based on disability status. Indeed, the diversion of PWD to special needs shelters rather than accepting PWD at general population shelters is a type of discrimination. During times of disasters, PWD and others with AFN want to maintain their independence and should be supported in doing so.

Relying on special needs registries is not the most effective way to know about the population that may require assistance during a disaster. Although registries give some idea of who may have a requirement that involves additional or specialized
assistance, the registries are by no means exhaustive. Many people do not know that registries are available, or fail to put information on the registry, preferring to keep information private. Agencies’ use of data varies between states, as some registry information is only to be used during times of disaster to help first responders locate PWD or AFN while other registries are for routine 911 purposes only, and will not be shared under any circumstances (personal communication, 2012). Confusion about sharing information and privacy issues are not limited to the US. Japan encountered barriers to sharing information on PWD after the 2011 Great East Japan earthquake, which impeded finding individuals to provide services and resources (Brittingham & Wachtendorf, 2013). Updating registries is time consuming, and many individuals may forget to amend their information on a regular basis or as needed. Florida makes one specific reference in a radiological index that a single county has a special needs registry to be used in disaster protective action. However, there is no discussion of the registry being useful to other counties to identify or assist people from the evacuated county. There are no other counties singled out as maintaining a registry, though they exist.

A final point of discussion is that institutionalized populations are often paired in plans’ discussion with the charity model’s idea of special needs populations. There are similarities between the two types of populations to be sure. For instance, a school has children who are minors, while a single child can have an AFN if they are an unattended minor. The prison population is an institutionalized population that has medical needs for some inmates. But, for all other non-incarcerated individuals, people with medical requirements will be seeking assistance independently. The former is state mandated while the latter is not.


**Conclusion**

A policy is any document created by the government that explains the government’s intent (Birkland, 2011). Disaster policies specific to PWD and AFN address the intent of the government to provide accessible and equitable services and resources were a disaster to occur. The process, however, of disaster policy creation occurs when the issue has gathered enough support from stakeholders and government entities to make it an item on the agenda (Birkland, 2011). There are times when issues are pushed into the policy process because of an entity exerting power to benefit their position (Birkland, 2006; Weiss, 1989). This is not always done with malicious intent. Rather, some coalitions or interest groups representing a cause have simply gained enough members and power to highlight a problem. The issue – or the group organizing in response to it - has attracted enough attention from citizens and elected officials to urge for a solution to address the problem. Moreover, even if the issue makes it onto the agenda, groups must continue to ensure their preferred approach and viewpoint of the issues is the one actively considered. The result of the policy process is, ostensibly, to set goals that would address the problem (Birkland, 2011). Examples of the goals of disaster policies might set include fulfilling individuals’ needs of food, water and shelter immediately following a disaster or providing housing assistance to a particular group. However, to design policy to meet the intended goals, identification of the target population is needed.

While setting a policy agenda universally aims to address a defined problem, the process of implementation introduces variation in the interpretation of the policy and how quickly it is implemented. Federal policies surrounding PWD and disasters are interpreted by states one-at-a-time. While some states have already taken into consideration policies that legally require particular resources and services in their
emergency plans, other states have implemented policies in a more limited way. Analyzing state plans sheds light on differing discussion of language used to describe what can and will be done for PWD in disasters. The date of writing of these plans differs by as much as three years. The newer plans follow in a limited capacity the directives set out by newer policies, while the older plan make more provisions regarding language and written tasks associated with PWD and AFN. Not fully addressing the current policies leaves states or their jurisdictions open to legal liability where there is basis for an argument that policies have not been implemented in a timely way, or implemented in a way that would fulfill the requirements of the law. Implementation of the law is seriously affected by the framework with which planners and implementers view PWD and AFN. The personal assumptions a person may have regarding PWD can meld with interpretation of law to result in implementation strategies that may not fit the goal of the policy. Hence, the ways in which people with a disability or AFN are treated during a disaster is directly affected by a state’s interpretation of the policies and subsequent implementation. If PWD or AFN remain viewed as people who require actions be done for them, rather than with them, policies to protect rights and civil liberties have not been fully successful.

Knowledge about the target population can serve as an important policy creation tool. That is, understanding the explicit or implicit behavioral assumptions about the population affected by policy creation or change (Schneider & Ingram, 1988). As it pertains to disaster disability policy in particular, knowing the target population becomes critical. With the heterogeneity of the disability community, creating policies designed to address issues within the community becomes complex. The belief PWD require specialized planning that incurs costly financial obligations in
addition to the belief no one routinely interacts with PWD is inaccurate (Kett et al., 2009). These two assumptions result in the exclusion of a target population that should be included in disaster policies.

Creation of realistic plans from policies remains a daunting task. Although policies enumerate actions and stances the government finds appropriate for the population, there is no assurance full implementation of policy occurs. Rather, real-life tasks during disaster events enable states to identify potential problems in their planning, implementation, and assumptions. Certainly, disconnects exists in current plans in comparison to what policy dictates is appropriate action. Only through learning and feedback from stakeholders in the disability and access and functional need community can plans be strengthened to truly serve the whole community.
Chapter 3
LIVING WITH A DISABILITY IN THE MIDST OF A DISASTER: SHELTER
AND RESOURCE CONSIDERATION FOR PEOPLE WITH ACCESS AND
FUNCTIONAL NEEDS

Introduction

The disability community is a group often neglected in disaster planning. As
the disability community is regularly planned for without gaining buy-in from the
group at large (Parsons and Fulmer, 2007), there may be negative consequences for
those whose needs or abilities do not fit in with mainstream emergency planning. This
type of imprecise planning becomes problematic when catastrophic disaster events
occur, as current plans generalize the needs of the disability community by creating
one-size-fits-all plans (Kailes and Enders, 2007). If an individual has a disability and
the access or functional need (AFN) associated with the disability is not part of
disaster plans, the incomplete planning places the person in a situation which could
become more life threatening compared to situations facing the rest of the population.

Society is heterogeneous, and, despite that it is comprised of people living in a
community who share many norms and values, it includes many segments that
participate in and contribute to that society in many different ways. The same holds
ture for those individual segments of society. The disability community – as a segment
of society in its own right – is heterogeneous (Lindell et al., 1985). People who
identify as having a disability comprise a very diverse group (Kailes & Enders, 2007).
This group may comprise individuals who identify with a physical or cognitive
disability, vision impairment or hearing impairment, among many others, or identify with multiple disabilities, each with different needs or requirements. Consequently, the need for specific resources, information, or methods of service delivery may make those with disabilities uniquely vulnerable in both non-disaster and disaster times, but in very different ways.

A growing concern and challenge is adequately addressing individuals who identify with AFN in disaster plans, especially shelter provision. As noted in Kailes’ and Enders’ (2007) research, the term ‘special needs’ was previously used by both emergency management practitioners and within academic literature to describe the array of issues a person may face that would increase their vulnerability to a disaster. This term describes a myriad of issues including those of low income, those who have limited, if any, English proficiency, the young, seniors, and, among many other concerns, those having a disability. To move the focus from a person’s disability and their status as “special,” the proposed term of “functional needs” acknowledges that people may live independently if their needs are appropriately met (Kailes & Enders, 2007). The Federal Emergency Management Agency (FEMA) recognized this shift in terminology as a key step in addressing the need to focus on the abilities people have to be independent after disasters. Brought to bear under FEMA’s Functional Needs Support Services (FNSS) guidance, the document outlines steps required to allow all people access to general population shelters. The intention of the guidance is to support existing obligations to people with AFN (Robinson, Gerber, Eller, & Gall, 2013). The document describes the provision of appropriate medical goods and services and the reasonable modifications to structures to allow people to maintain their independence (FEMA, 2010). Even if modifications are made to a public
building for those who have access or functional needs, the general population is also able to benefit.

Public buildings built after 1990 must be compliant with the Americans with Disability Act of 1990 ("Americans with Disabilities Act of 1990, As Amended" [ADA], 2009). On March 15, 2012, new standards went into effect that guide alterations to existing public facilities and that new construction that will accommodate those with disabilities (Department of Justice, 2010). Modifications benefit those with AFN who seek out public shelters during disaster. These disaster shelters are not exclusively shelters, but rather are used as such in times of disaster, deviating from their normal operations as a school or other community building (Kar & Hodgens, 2008). This means these locations may not, during times of normal operation, be a place primarily used for individuals with disabilities or access and functional needs. Shelters are chosen because they are considered safe (Pine, Marx, Levitan, & Wilkins, 2003), not always because of their accessibility or suitability. For instance, schools that serve as shelters typically do not have back-up generators hardwired into their power system, nor do they have the correct connectors to make it possible. Generators are an important requirement for people who have a disability or AFN in order to charge battery operated wheelchairs or utilize durable medical equipment during a power outage. Oftentimes directions for people with disabilities refer them to ‘special needs’ shelters. These shelters may have the needed accommodations for people with disabilities. However, the special needs shelters may be inconveniently located or not known to the people who may best be served by the services and resources inside (Clive, Davis, Hansen, & Mincin, 2010). If a person with a disability evacuates and is directed away from a general population shelter, the time
wasted going to a separate, “specialized” shelter may increase a person’s risk from the disaster. It may also separate them from other extended support networks, such as family and friends who are in the general population shelter. Based on such deficiencies, and especially in light of the legal ramifications involved with separate but equal shelters, there have been reasons to rethink public sheltering in order to be more inclusive of the disability community. Indeed, even during this writing period, change was underway. Public shelters have been moving towards a whole community approach. Each general population shelter was to accommodate all members of the community – including individuals with AFN – when they are otherwise able to live independently in their own homes. It is important to keep that evolving context in mind in the discussion of the work presented here.

Although efforts are underway to update language and terminology, ensure modifications to structures, and select appropriate shelter buildings, research is still lacking on the extent to which people with a disability or AFN may seek out a public shelter during a disaster event. This research seeks to address the questions of who self-identifies with an AFN or disability, the type of AFN or disability, and where the person or their household plans to seek shelter in the event of a disaster. Better knowledge of this information helps planners address the needs of their communities.

**Literature Review**

Large-scale disaster events may necessitate the need for public shelters. The larger the disaster area, the more likely people will be in an impact zone that requires evacuation or sheltering. The need for public shelters caused by a sudden, severe event – like an earthquake – or an event predictable in advance - such as a hurricane - prompts emergency managers to open public shelters. This may be of particular
concern as disasters continue to occur with increasing frequency (McEntire, 2006). Depending upon the population density of the area, a very large number of people may be affected. Coastal areas of the United States are increasing in population density (Crossett, Culliton, Wiley, & Goodspeed, 2004), which leaves many of the residents of coastal areas at risk for a hurricane. Residents in areas that may be affected by an impending hurricane need to make the decision either to: evacuate and seek alternative shelter or to shelter-in-place. For individuals with disabilities or AFN, the AFN may be a factor in whether they seek out a public shelter.

Disability

When a household includes a person with a disability, the household is less likely to evacuate (van Willigen, Edwards, Edwards, & Hessee, 2002), and research has documented disability status of a household member as the primary reason some households did not evacuate during Hurricanes Hugo and Andrew (Riad, Norris, & Ruback, 1999). Still a pervasive issue 13 years after research on these two hurricane, Brodie, Weltzien, Altman, Blendon, and Benson (2006) and Eisenman, Cordasco, Asch, Golden, and Glik (2007) found some Hurricane Katrina shelter evacuees indicated they did not evacuate before the storm made landfall because they, or a family member for whom they cared, had a physical disability that made it impossible for them to leave. Caregivers also make decisions not to evacuate family members with disabilities from their homes because of the perception a shelter would deny the individual admittance due to the AFN and that a hospital is too high a level of care for the AFN a person has (Gladwin, Gladwin, & Peacock, 2001). Not evacuating when there is a household member with a disability results from the perception, as opposed to necessarily the reality, there would be a lack of resources or access to assistance or
services (Van Willigen et al., 2002) at a new location (e.g. public shelter or hotel). If lack of trust in disaster services poses a barrier for evacuation, questions arise regarding the extent to which remaining in the disaster impact zone introduces other risks to health and well-being. Without access to services that may be needed for potential life threatening problems, there is the risk of an elevated loss of life during disasters (Weston & Tokesky, 2010) found within the disability community compared to the rest of society. Understanding which, if any, AFN are a part of the decision-making process to evacuate and seek shelter better enables planning for needs and services.

As the population ages, there is a growing category of ‘frail elderly’ (Fernandez et al., 2002). The frail elderly are older members of society who require additional equipment and services to fulfill daily living functions (Fernandez et al., 2002). According to McGuire, Ford, and Okoro (2007), unmarried, white, females are more likely to require specialized equipment. The number of people who have disabilities requiring equipment increases as the population ages. When a household decides to evacuate, it becomes necessary for the equipment to be packed up and brought to the destination location. In many cases, equipment and medication can become separated from the person to whom it belongs. Because of the specialized nature of some equipment, replacements are not always readily available (National Organization on Disability, 2005). Continuation of necessary medical services even during a disruption in daily living is crucial for those with disabilities or there may be health concerns associated with evacuating. However, not knowing what AFN exists in the population makes it difficult to have equipment available at public shelters that would benefit the largest number of people.
Demographics

The ability to access necessary resources is linked to a person’s socioeconomic status as it affects the extent to which a person may be vulnerable to a disaster. The socioeconomic status of a person with a disability is likely to be markedly lower than a household without someone with a disability (Clive et al., 2010). For example, people with disabilities who receive government assistance, such as Social Security Income (SSI) or Social Security Disability Insurance (SSDI) payments, often have restrictions placed on their ability to acquire employment - such as the number of allowable work hours - without receiving a decrease in their monthly payment. Unfortunately, the assistance they receive is often minimal and provides only as much – at most – as to keep the person’s income at or below minimum wage (Atkins & Guisti, 2003).

The income disparity between minimum wage earners and those with higher incomes has direct implications on shelter selection as evacuation and sheltering carry an economic cost to the household (Gladwin & Peacock, 1997; Stallings, 1984). This is particularly troublesome to a household of low socioeconomic income, as is often the case when someone has a disability (Clive et al., 2010), because evacuating can become cost prohibitive (Gladwin & Peacock, 1997). A household with limited economic capacity may be less inclined to seek shelter in a location where the purchase of resources and services would be required. Transportation to leave an area – which could include plane or train tickets or access to an automobile and gasoline – bring additional costs to a household (Gladwin & Peacock, 1997; Sorenson & Sorenson, 2006). Hotel lodging also introduces financial expenditures. If a household has economic constraints, members of the household may delay evacuation or rely on public shelters.
The composition of the household unit influences evacuation decisions. Households make the decision to evacuate for a hurricane with their household unit (Carter, Kendall, & Clark, 1983). The presence of either children or elderly family members motivates evacuation when the household unit is small (Carter et al., 1983). As household size increases, the presence of children decreases the likelihood of evacuation (Drabek, 1983). If there is a female head of household, the decision is more often made to take protection action and evacuate, as females tend to take into account the wellbeing of their children and families as reasons to leave (Fothergill, 1996).

People most often will go to the homes or family members or friends rather than seeking out a public shelter (Drabek & Boggs, 1968). Females especially are less likely to go to public shelters compared to males (Whitehead et al., 2000). Whitehead et al. (2000) found individuals are also more likely to not seek public shelters, or even a hotel or motel, if they are non-white or have higher levels of educational attainment. The study’s finding that non-white individuals are less likely to seek a public shelter is not always reported for shelter use. In fact, in one recent disaster, Hurricane Katrina, a disproportionate number of shelter residents were African American (97%) compared to New Orlean’s racial composition (67%) (Brodie, Weitzien, Altman, Blendon, & Benson, 2006). In Houston public shelters, African American residents cited social networks, the need to care for family members, transportation concerns, and employment concerns – among others – as reasons for not evacuating before Hurricane Katrina made landfall (Eisenman et al., 2007). These individuals remained trapped in the city and reliant on other means of transportation to seek safety. When these surveys were conducted by researchers, respondents were single individuals or with their immediate household unit. Institutionalized populations such as prisons,
hospitals and nursing homes were not accounted for in public shelters (Lindell et al., 1985).

Risk

Risk research suggests there is no single way people use to determine if a hurricane poses a threat. Simply informing people they need to evacuate because of their location (i.e. within the possible landfall area) is not enough for most households to leave. Rather, people must have information that is meaningful to them (Dash & Gladwin, 2007). For example, an evacuation order by emergency managers will be followed by seeking information from some members of the community (Gladwin, Gladwin, & Peacock, 2001). However, it is not realistic to assume everyone in an evacuation zone will evacuate. In a model created by Gladwin, Gladwin, and Peacock (2001), households weighed the costs and risk (e.g. perceived danger of the storm and the home’s safety features) as well as other decision-making factors (e.g. time to prepare for the hurricane, their age, and other family member’s reactions of whether to evacuate) associated with evacuating. In some cases in the model, once the decision was made, households discovered there was no time left to leave. Causeways were too congested with traffic or hotels and motels were reported to be full. Individual’s risk perceptions of when it is necessary for their household to evacuate and the location to which they decide to evacuate to may differ from others in their household. Public shelters must be ready to receive individuals, although it is difficult to anticipate who will arrive and when.

One of the most important measures of risk taken into account during household decision-making is storm intensity (Whitehead et al., 2000). A second motivator in hurricane evacuation is whether a household lives in an evacuation zone
(Gladwin & Peacock, 1997). The metric of a hurricane’s intensity is sustained wind speed, although additional forecasts are made to incorporate tidal surge and flooding. When deciding to evacuate, storm descriptors that motivate individuals to leave their homes are ‘category 5’ and ‘mandatory’ (Eisenman et al., 2007; Lindell et al., 2001). Key words that imply severity resonate with individuals. When officials use terminology that conveys the message a hurricane could be dangerous, households may evacuate at higher rates.

The type of housing structure an individual lives in also influences how people perceive risk. Households that live in mobile homes are at higher risk for storm damage because the housing structure is more vulnerable (Smith & McCarty, 2009). Mobile homes are less sturdy than single-family dwellings built on site, which increases the likelihood of household evacuation (Whitehead, 2003). Research conducted by Solis, Thomas, and Letson (2010) supports Whitehead (2003), as households in risky structures (i.e. mobile homes) are more likely to evacuate compared to those living in stable structures.

**Research Questions**

To address issues of inclusive planning, the accessibility requirements and functional needs of the population must be better understood. Locations people plan to go to, and what resources people might need based on their AFN once they arrive are especially important if a person’s first choice of evacuation place is a public shelter. But who, and how many people, plan to use a public shelter during times of disasters? What health and access concerns do people have? What are the possible planning implications? These planning issues lead to the following questions:
• Do health or access issues make a difference in who uses a public shelter?

• Are there difference in shelter choice depending on the type of health or access concern participating households have?

• What type of shelter will households that include someone who has a health or access concern seek in the event of a hurricane evacuation?

**Methodology**

With funding by the National Science Foundation, over the spring and summer of 2011 and the summer of 2012, households in North Carolina were contacted through their landline and cell phones, respectively, to ask about their previous hurricane evacuation experiences and what they believe they might do in the case of a future hurricane event. The four areas in North Carolina were chosen because of their proximity to coastal areas and population density and were the Outer Banks, Wilmington, New Hanover County, and Raleigh. Telephone numbers in these areas were procured from Genesus, a company that provides social scientists with working, residential and cellular phone numbers. These numbers were a stratified random sample of numbers in that each residential landline in the study area had an equal chance of selection.

There were 10,000 telephone numbers purchased from Genesus in order to obtain at least 500 eligible landline numbers in each sample area. These numbers were screened to remove numbers that: belonged to a business, was a fax line, or did not
work (i.e. disconnected). After the removal of ineligible numbers, 3,754 landline numbers and 2,446 cell phone numbers remaining in the sample.

In order to conduct the survey, each of the residential numbers were uploaded into the Computer Assisted Telephone Interviewing (CATI) system which is an accepted way of gathering information (Dash & Morrow, 2000; Lavrakas, 1993). Utilizing this system aids in monitoring the number of times a number is called and helps the interviewers administer the survey in the correct order. The CATI system makes telephone interviews easier to conduct and track because of the way it handles calls and guides an interviewer through the questions.

For this survey, eight call attempts were assigned as the maximum number of times a number could be dialed before the CATI system moved the number into the ‘unusable’ queue. These numbers were recorded as eligible call attempts where the number rang in excess of one minute or an answering machine or voicemail picked up. In instances of the latter, the same message was left on each machine identifying who was calling, what institute was represented and that another attempt would be made to reach the household at the number.

Each sample started with a number of workable, residential phone numbers. Landlines had more numbers in each sample than the corresponding cell phone samples. Landline sample A had 817 numbers, sample B had 895, sample C had 1123, and sample D had 919 numbers. After manually calling and recording call dispositions, of those total numbers, there were 418 numbers eligible in sample A, 577 numbers eligible in sample B, 464 eligible numbers in sample C, and 509 numbers eligible in sample D (see Table 3.1). For the cell phone numbers, sample AC had 622
numbers, sample BC had 630 numbers, sample CC had 631 numbers, and sample DC had 563 numbers (see Table 3.2).

Table 3.1  Landline Sample

<table>
<thead>
<tr>
<th>Sample</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Numbers</td>
<td>817</td>
<td>895</td>
<td>1123</td>
<td>919</td>
</tr>
<tr>
<td>Eligible Numbers</td>
<td>418</td>
<td>577</td>
<td>464</td>
<td>509</td>
</tr>
<tr>
<td>Response Rate</td>
<td>12.68%</td>
<td>10.99%</td>
<td>8.9%</td>
<td>12.29%</td>
</tr>
<tr>
<td>Cooperation Rate</td>
<td>21.95%</td>
<td>19.50%</td>
<td>16.00%</td>
<td>19.75%</td>
</tr>
</tbody>
</table>

Table 3.2  Cell Phones Sample

<table>
<thead>
<tr>
<th>Sample</th>
<th>AC</th>
<th>BC</th>
<th>CC</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Numbers</td>
<td>622</td>
<td>630</td>
<td>631</td>
<td>563</td>
</tr>
<tr>
<td>Eligible Numbers</td>
<td>380</td>
<td>413</td>
<td>323</td>
<td>313</td>
</tr>
<tr>
<td>Response Rate</td>
<td>9.62%</td>
<td>7.99%</td>
<td>12.10%</td>
<td>11.04%</td>
</tr>
<tr>
<td>Cooperation Rate</td>
<td>16.53%</td>
<td>14.34%</td>
<td>19.15%</td>
<td>16.16%</td>
</tr>
</tbody>
</table>

The response rate is the number of households that agreed to take the survey divided by the total number of phone numbers left after ineligible numbers are removed (American Association of Public Opinion Research [AAPOR], 2013). In landline numbers, the response rate of sample A was 12.68 percent, sample B was
10.99 percent, sample C was 8.9 percent, and sample D was 12.29 percent (see Table 3.1). For cell phone numbers, the response rates were 9.62 percent for sample AC, 7.99 percent for sample BC, 12.10 percent for sample CC, and 11.04 percent for sample DC (see Table 3.2).

The usage of verified residential numbers makes a difference for the cooperation rate. The cooperation rate is the number of households that said they would be willing to take the survey divided by the total number of residential numbers interviewers contacted and where a household member agreed or declined to participate (AAPOR, 2013). Landline numbers had a cooperation rate of 21.95 percent for sample A, 19.50 percent for sample B, 16.00 percent for sample C, and 19.75 percent for sample D. The cell phone samples had cooperation rates of 16.53 percent for sample AC, 14.34 percent for sample BC, 19.15 percent for sample CC, and 16.16 percent for sample DC (see Tables 3.1 and 3.2).

Because the researchers chose the maximum number of calls and selected dispositions, the CATI system followed programmed system rules each time. This decreases interviewer error in manually tracking call records. Each disposition was logged and calls to landline were removed from the call queue if the person answering declined to become a participant, the number was disconnected or a business, or contact was never made.

If household decision makers over the age of 18 agreed to participate in the survey, questions were asked regarding the location of their primary shelter, what health or access considerations, if any, they or a member of their household have that may influence public shelter utilization, and the concerns they have regarding using a public shelter. Also collected was demographic information on age, income, number
of individuals in the household, type of housing unit, educational attainment, and the whether the respondent is responsible for anyone outside of their immediate household under the age of 18 or over the age of 65.

Hypotheses

Using the research questions, the following hypotheses were tested:

H1: There is an association between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and staying in a public shelter.

H2: There is an association between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and staying at a friend’s house.

H3: There is an association between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and staying at a family member’s house.

H4: There is an association between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and staying at a hotel/motel.

H5: There is an association between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and sheltering-in-place.

H6: There is an association between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and staying in some other location.
H7: There is an association between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying in a public shelter.

H8: There is an association between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying at a friend’s house.

H9: There is an association between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying at a family member’s house.

H10: There is an association between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying at a hotel/motel.

H11: There is an association between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and sheltering-in-place.

H12: There is an association between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying somewhere else.

H13: There is an association between someone in the household identifying with difficulties learning, remembering, or concentrating and staying in a public shelter.

H14: There is an association between someone in the household identifying with difficulties learning, remembering, or concentrating and staying at a friend’s house.
H15: There is an association between someone in the household identifying with difficulties learning, remembering, or concentrating and staying at a family member’s house.

H16: There is an association between someone in the household identifying with difficulties learning, remembering, or concentrating and staying at a hotel/motel.

H17: There is an association between someone in the household identifying with difficulties learning, remembering, or concentrating and sheltering-in-place.

H18: There is an association between someone in the household identifying with difficulties learning, remembering, or concentrating and staying somewhere else.

H19: There is an association between someone in the household identifying with difficulty breathing and staying in a public shelter.

H20: There is an association between someone in the household identifying with difficulty breathing and staying at a friend’s house.

H21: There is an association between someone in the household identifying with difficulty breathing and staying at a family member’s house.

H22: There is an association between someone in the household identifying with difficulty breathing and staying at a hotel/motel.

H23: There is an association between someone in the household identifying with difficulty breathing and sheltering-in-place.

H24: There is an association between someone in the household identifying with difficulty breathing and staying somewhere else.
H25: There is an association between someone in the household identifying with special dietary considerations and staying in a public shelter.

H26: There is an association between someone in the household identifying with special dietary considerations and staying at a friend’s house.

H27: There is an association between someone in the household identifying with special dietary considerations and staying at a family member’s house.

H28: There is an association between someone in the household identifying with special dietary considerations and staying at a hotel/motel.

H29: There is an association between someone in the household identifying with special dietary considerations and sheltering-in-place.

H30: There is an association between someone in the household identifying with special dietary considerations and staying somewhere else.

H31: There is an association between someone in the household identifying with reliance on refrigeration for medication or special diets and staying in a public shelter.

H32: There is an association between someone in the household identifying with reliance on refrigeration for medication or special diets and staying at a friend’s house.

H33: There is an association between someone in the household identifying with reliance on refrigeration for medication or special diets and staying at a family member’s house.

H34: There is an association between someone in the household identifying with reliance on refrigeration for medication or special diets and staying in a hotel/motel.
H35: There is an association between someone in the household identifying with reliance on refrigeration for medication or special diets and sheltering-in-place.

H36: There is an association between someone in the household identifying with reliance on refrigeration for medication or special diets and staying somewhere else.

H37: There is an association between someone in the household identifying with any other health or access concerns and staying in a public shelter.

H38: There is an association between someone in the household identifying with any other health or access concerns and staying at a friend’s house.

H39: There is an association between someone in the household identifying with any other health or access concerns and staying at a family member’s house.

H40: There is an association between someone in the household identifying with any other health or access concerns and staying at a hotel/motel.

H41: There is an association between someone in the household identifying with any other health or access concerns and sheltering-in-place.

H42: There is an association between someone in the household identifying with any other health or access concerns and staying somewhere else.

H43: [landline] There is an association between people with health or access concerns that would impact their wellbeing in a public shelter and previous public shelter use.

H44: [landline] There is an association between people with health or access concerns and previous public shelter use.
H45: There is an association between someone in the household identifying with a health or access concern and evacuating for a mandatory category 3 evacuation order.

Analysis Procedures

In order to examine possible relationships between variables, chi-square was the selected analysis. Chi-square allows for an observable relationship between two variables in a cross-tabulation. The data is assessed to determine if an observed relationship in the sample is significant, meaning the relationship would likely be found in the population. Limitations of chi-square are two-fold. Chi-square does not indicate directionality of a positive or negative relationship, nor does it indicate the strength of a possible association between two variables.

Variables

The analyzed variables are a subset of questions from the total number of questions collected in the survey. Of the 90 questions asked of respondents, 18 questions were used in the analysis. After data cleaning and recoding to some questions to create new variables, there were 50 variables.

- QCellphone – The question “[i]s this a cell phone” was asked of the cell phone sample. This variable was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).
Q7exphurr – The question “[h]ave you ever experienced a hurricane” was asked of both samples. This variable was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

Q9everevac – The question “[h]ave you ever evacuated your residence for a hurricane” was asked of both samples. This variable was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

Question 13 – The question “[h]ave you ever sought shelter at any of the following places because of a hurricane threat? Please answer yes or no for each” was asked of only the landline sample, and lead into five subquestions. The variable was originally a nominal variable, and remained nominal.

  o Q13Apubshlt – The question “public shelter” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

  o Q13Bfrienshlt – The question “friend’s residence ([i]n what city and state)” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

  o Q13Cfamshlt – The question “family member’s residence ([i]n what city and state)” was originally a nominal variable (1=yes, 2=no,
0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- Q13Dhotshlt – The question “hotel/motel ([i]n what city and state)” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- Q13Eothshlt – The question “anywhere else ([i]n what city and state)” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- Question 55 – The question “[w]here you would you most likely seek shelter if a hurricane were to threaten your area in this coming year” was asked of both samples, and had six options. The question’s options were originally nominal, and each of these options were recoded into new, nominal variables.

  - Q55Apubshlt – The option “public shelter” was originally a nominal variable and coded 1=yes, 7=no, 0=missing. It remained nominal after recoding into a separate variable (1=yes, 0=no, 99=missing).

  - Q55Bfrenres – The question “friend’s residence” was originally a nominal variable and coded 2=yes, 7=no, 0=missing. It remained nominal after recoding into a separate variable (1=yes, 0=no, 99=missing).
o Q55Cfammem – The question “family member’s residence” was originally a nominal variable and coded 3=yes, 7=no, 0=missing. It remained nominal after recoding into a separate variable (1=yes, 0=no, 99=missing).

o Q55Dhotmot – The question “hotel/motel” was originally a nominal variable and coded 4=yes, 7=no, 0=missing. It remained nominal after recoding into a separate variable (1=yes, 0=no, 99=missing).

o Q55Eshltplac – The question “shelter in place at home” was originally a nominal variable and coded 5=yes, 7=no, 0=missing. It remained nominal after recoding into a separate variable (1=yes, 0=no, 99=missing).

o Q55Fothshlt – The question “other” was originally a nominal variable and coded 6=yes, 7=no, 0=missing. It remained nominal recoding into a separate variable (1=yes, 0=no, 99=missing).

- Q62sltheal – The question “[d]oes anyone in your household have health or access consideration that may impact their well-being in a public shelter” was asked of both samples. This question was originally nominal (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- Question 63 – The question “would any of the following health or access conditions impact someone in your household were they to use a public shelter? Please answer yes or no for each” was asked of both samples, and
had seven subquestions using specific health conditions. The question’s options were originally nominal, and each of these options were recoded into new, nominal variables (1=yes, 0=no, 99=missing).

- Q63Ablindeaf – The question “blindness, deafness, or severe vision or hearing impairment” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).
- Q63Bphyslmt – The question “a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).
- Q63Cmemlearn – The question “difficulties learning, remembering, or concentrating” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).
- Q63Dbreath – The question “difficulty breathing” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).
- Q63Dietary – The question “special dietary considerations” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).
- Q63Frefigmed – The question “reliance on refrigeration for medication or special diets” was originally a nominal variable (1=yes, 2=no,
o Q63Gothcond – The question “are there any other conditions” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- ReQ63FinalHATotals – This is a variable created from question 63. This variable was for any respondents who answered ‘yes’ to one or more the health or access concerns. This was a nominal variable (1=yes, 0=no, 99=missing).

- Q72housing – The question “can you describe the type of housing unit you live in” I am going to read a list. Please stop me when I note the type that best describes your home. Is it a…” was asked of both samples, and had 10 options. The question’s options were originally nominal (1=manufactured home; 2=mobile home, 3=single-family home, detached; 4=single-family home, attached; 5=unit with 2 apartments; 6=unit with 3 or 4 apartments; 7=unit with 5 to 9 apartments; 8=unit with 10 apartments; 9=assisted living facility, and 10=other), and each of the options were recoded into new, nominal variables.

  o ReQ72HousManu – The option of “manufactured home” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).
- **ReQ72HousMob** – The option of “mobile home” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- **ReQ72houssingde** – The option of “single-family home, detached from another unit” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- **ReQ72houssingatt** – The option of “single-family home, attached to another unit, like a duplex” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- **ReQ72hous2apt** – The option of “unit with 2 apartments” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- **ReQ72hous3or4apt** – The option of “unit with 3 or 4 apartments” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- **ReQ72hous5to9apt** – The option of “unit with 5 to 9 apartments” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- **ReQ72hous10apts** – The option of “unit with 10 apartments” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).
- ReQ72housassisted – The option of “assisted living facility” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- ReQ72housother – The option of “other” was originally a nominal variable (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- Q74work – The question “[a]re you working full time, working part time, looking for work, a homemaker, retired, or a student” was asked of both samples, and had seven options. The question’s options were originally nominal (1=yes, 2=no, 0=missing), and remained when each choice was recoded into new, nominal variables (1=yes, 0=no, 99=missing).

  - ReQ74workfulltime – The option “working full time” was originally nominal and coded as “1.” It remained nominal after recoding into a separate variable (1=yes, 0=no, 99=missing).

  - ReQ74workparttime – The option “working part time” was originally nominal and coded “2.” It remained nominal after recoding into a separate variable (1=yes, 0=no, 99=missing).

  - ReQ74worklooking – The option “looking for work” was originally nominal and coded “3.” It remained nominal after recoding into a separate variable (1=yes, 0=no, 99=missing).

  - ReQ74workhomemaker – The option “homemaker” was originally nominal and coded as “4.” It remained nominal after recoding into a separate variable (1=yes, 0=no, 99=missing).
- Q75educ – The question “[w]hat is the highest level of education you have completed” was asked of both samples, and had 8 possible choices (1=did not attend high school; 2=high school but not completed; 3=completed high school; 4=some college but didn’t finish; 5=2 year college degree; 6=4 year college degree; 7= completed Master’s or professional degree; 8= advanced graduate work or PhD, and 0=missing). The original variable was ordinal, but was recoded as nominal variables.

  - ReQ75educnohighsch – The choice “did not attend high school” was originally ordinal and was recoded as a nominal variable (1=yes, 0=no, 99=missing).

  - ReQ75educsomehighsch – The choice “high school but not completed” was originally ordinal and was recoded as a nominal variable (1=yes, 0=no, 99=missing).
• ReQ75educedhs – The choice “completed high school” was originally ordinal and was recoded as a nominal variable (1=yes, 0=no, 99=missing).

• ReQ75edusomecollege – The choice “some college but didn’t finish” was originally ordinal and was recoded as a nominal variable (1=yes, 0=no, 99=missing).

• ReQ75educ2yrcollege – The choice “2 year college degree” was originally ordinal and was recoded as a nominal variable (1=yes, 0=no, 99=missing).

• ReQ75educ4yrcollege – The choice “4 year college degree” was originally ordinal and was recoded as a nominal variable (1=yes, 0=no, 99=missing).

• ReQ75educmasters – The choice “completed Master’s or professional degree” was originally ordinal and was recoded as a nominal variable (1=yes, 0=no, 99=missing).

• ReQ75educadvanced – The choice “advanced graduate work or PhD” was originally ordinal and was recoded as a nominal variable (1=yes, 0=no, 99=missing).

• Question 86 – The question “I am going to read a list of racial categories. Please tell me if you identify with any of them by saying yes or no if you
do not. You may say yes to more than one category if it applies to you” was asked of both samples.

- Q86Aamerind – The option “American Indian or Alaskan Native” was originally nominal (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- Q86Basian – The option “Asian” was originally nominal (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- Q86Cblack – The option “Black or African American” was originally nominal (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- Q86Dhawaiian – The option “Native Hawaiian or other Pacific Islander” was originally nominal (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- Q86Ewhite – The option “White” was originally nominal (1=yes, 2=no, 0=missing), and remained nominal after recoding (1=yes, 0=no, 99=missing).

- Race – This nominal variable was created out of all of the race categories. Because of the majority of respondents identifying as white, the race category was coded as white and minority (1=white; 0=minority; 99=missing).
• Q89Gender – The question “[t]he survey requires that I ask you this directly. Are you male, female, or other” as asked of both samples. The original variable was nominal (1=male, 2=female, 0=missing), and remained nominal after recoding (1=male, 0=female, 99=missing).

• Question 34 – The question “[i]f local authorizes mandated that you evacuate for one of the following conditions, would you actually do so? Please answer yes or no for each” was asked of both samples. Question categories included a tropical storm, category 1 hurricane, category 2 hurricane, category 3 hurricane, category 4 hurricane, and a category 5 hurricane (for all categories: 1=yes, 2=no, 0=missing).

  o Q34Dman_cat3 – The question was asked of respondents whether their household would follow a mandatory evacuation order for a category 3 hurricane. The original variable was nominal and remained nominal after recoding (1=yes, 0=no, 99=missing).

• Q78inc50k – The question “[i]s you household’s income more or less than $50,000 a year” was asked of both samples. This original question was nominal (1=more than, 2=less than, 3=refused, 4=missing), and remained nominal after recoding (1=more than, 0=less than, 99=missing).

(See Appendix B for a summary table of the questionnaire variables and variables with literature support.)
Demographics

The survey resulted in 424 completed interviews. Of the total number, 287 were landline numbers and 137 were cellphone numbers.

Of the 424 completed interviews, 56 percent (n=239) of respondents were female, while 43 percent (n=183) were males (see Table 3.3).

Table 3.3   Sexual identity

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>239</td>
<td>56.4</td>
</tr>
<tr>
<td>Male</td>
<td>183</td>
<td>43.2</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Don't Know</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td>424</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The age of respondents were distributed from 18 years old to 95 years old. The largest age block of respondents were 61 to 65, totaling 57 individuals in this category alone (see Table 3.4).
### Table 3.4  Respondent’s Age

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>13</td>
<td>3.1</td>
</tr>
<tr>
<td>25-29</td>
<td>23</td>
<td>5.4</td>
</tr>
<tr>
<td>30-34</td>
<td>21</td>
<td>5.0</td>
</tr>
<tr>
<td>35-39</td>
<td>27</td>
<td>6.4</td>
</tr>
<tr>
<td>40-44</td>
<td>26</td>
<td>6.1</td>
</tr>
<tr>
<td>45-49</td>
<td>52</td>
<td>12.3</td>
</tr>
<tr>
<td>50-54</td>
<td>57</td>
<td>13.4</td>
</tr>
<tr>
<td>55-59</td>
<td>39</td>
<td>9.2</td>
</tr>
<tr>
<td>60-64</td>
<td>50</td>
<td>11.8</td>
</tr>
<tr>
<td>65-69</td>
<td>37</td>
<td>8.7</td>
</tr>
<tr>
<td>70-74</td>
<td>32</td>
<td>7.5</td>
</tr>
<tr>
<td>75-79</td>
<td>18</td>
<td>4.2</td>
</tr>
<tr>
<td>80-84</td>
<td>7</td>
<td>1.7</td>
</tr>
<tr>
<td>85-89</td>
<td>4</td>
<td>.9</td>
</tr>
<tr>
<td>90-94</td>
<td>3</td>
<td>.7</td>
</tr>
<tr>
<td>95+</td>
<td>1</td>
<td>.2</td>
</tr>
<tr>
<td>No Answer</td>
<td>12</td>
<td>2.8</td>
</tr>
<tr>
<td>System Missing</td>
<td>2</td>
<td>.5</td>
</tr>
<tr>
<td>Total</td>
<td>424</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Fifty-four percent of households (n=230) had two individuals aged 18 or older living in the home. One individual in the household was reported in 108 cases, while 59 cases reported three household members, 16 cases reported four household members, five cases reported five household members, two cases reported six household members, and the final remaining household reported 11 individuals (see Table 3.5).
Table 3.5  Households with individuals over 18

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>108</td>
<td>25.5</td>
</tr>
<tr>
<td>2</td>
<td>230</td>
<td>54.2</td>
</tr>
<tr>
<td>3</td>
<td>59</td>
<td>13.9</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>3.8</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>1.2</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>No Answer</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Don't Know</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Refused</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td>424</td>
<td>100.0</td>
</tr>
</tbody>
</table>

There were 297 households without anyone 65 years old or older. The remaining households had one household member over 65 years in 75 cases, and two people in households in 46 cases (see Table 3.6).

Table 3.6  Households with individuals over 65

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>297</td>
<td>70.0</td>
</tr>
<tr>
<td>1</td>
<td>75</td>
<td>17.7</td>
</tr>
<tr>
<td>2</td>
<td>46</td>
<td>10.8</td>
</tr>
<tr>
<td>No Answer</td>
<td>4</td>
<td>0.9</td>
</tr>
<tr>
<td>Don't Know</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Refused</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td>424</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The majority of respondents self-identified their race as white (n=335) while there were only 85 individuals who identified with any other racial category besides white. A total of 266 respondents were married or in a domestic partnership, 104
identified with single household status with respect to tax filing status, and interviewers recorded 54 missing or refused responses.

Household income split between households making more or less than $50,000 a year. Out of 386 responses, 134 (31.6%) households identified with making less than $50,000 a year while 252 (59.4%) households make more than $50,000. The survey included 32 (7.5%) refusals and six (1.4%) respondents who did not know household income (see Table 3.7).

<table>
<thead>
<tr>
<th>Income</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $50,000</td>
<td>134</td>
<td>31.6</td>
</tr>
<tr>
<td>More than $50,000</td>
<td>252</td>
<td>59.4</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>6</td>
<td>1.4</td>
</tr>
<tr>
<td>Refused</td>
<td>32</td>
<td>7.5</td>
</tr>
<tr>
<td>Total</td>
<td>424</td>
<td>100.0</td>
</tr>
</tbody>
</table>

With respect to employment status, 199 respondents reported working full time, 30 reported working part time, 13 reported looking for work, 24 reported themselves as homemakers, 128 as retirees, 11 as students, and 16 identified with an “other” work status (see Table 3.8).
<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working full time [35hrs/wk or more]</td>
<td>199</td>
<td>46.9</td>
</tr>
<tr>
<td>Working part time</td>
<td>30</td>
<td>7.1</td>
</tr>
<tr>
<td>Looking for work</td>
<td>13</td>
<td>3.1</td>
</tr>
<tr>
<td>Homemaker</td>
<td>24</td>
<td>5.7</td>
</tr>
<tr>
<td>Retired</td>
<td>128</td>
<td>30.2</td>
</tr>
<tr>
<td>Student</td>
<td>11</td>
<td>2.6</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
<td>3.8</td>
</tr>
<tr>
<td>Refused</td>
<td>3</td>
<td>0.7</td>
</tr>
<tr>
<td>Total</td>
<td>424</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Of the respondents, 134 completed a four year college degree. An additional 67 respondents held a Master’s or professional degree, and 20 individuals had gone on to advanced graduate work or earned a PhD. Sixty respondents had gone to college but did not complete a degree and 49 respondents held a two year college degree. Five individuals did not attend high school, while another seven respondents did not complete high school. Seventy nine respondents completed high school (see Table 3.9).
Table 3.9  Highest level of education completed

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not attend high school</td>
<td>5</td>
<td>1.2</td>
</tr>
<tr>
<td>High school but not completed</td>
<td>7</td>
<td>1.7</td>
</tr>
<tr>
<td>Completed high school</td>
<td>79</td>
<td>18.6</td>
</tr>
<tr>
<td>Some college but didn’t finish</td>
<td>60</td>
<td>14.2</td>
</tr>
<tr>
<td>2 year college degree</td>
<td>49</td>
<td>11.6</td>
</tr>
<tr>
<td>4 year college degree</td>
<td>134</td>
<td>31.6</td>
</tr>
<tr>
<td>Completed Masters or professional degree</td>
<td>67</td>
<td>15.8</td>
</tr>
<tr>
<td>Advanced graduate work or PhD</td>
<td>20</td>
<td>4.7</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Refused</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>424</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Of the 423 responses given for “can you describe the type of housing unit you live in,” the single largest category of responses was 336 (79.2%) respondents who identified living in a single-family home, detached from another unit (see Table 3.10). The next largest category was single-family home, attached to another unit with 20 (4.7%) responses. Nineteen (4.5%) respondents identified with living in a manufactured home, and 16 (3.8%) households lived in a mobile home, trailer or RV. Fourteen (3.3%) respondents disclosed the household lived in as an apartment building with ten or more units. Units with two apartments was reported by two (.5%) respondents, units with three or four apartments had five (1.2%) responses, and units with five to nine apartments had four (.9%) responses. One (.2%) person lived in an
assisted living facility, and six (1.4%) people identified with another type of housing unit. Of all respondents, one (.2%) declined to answer.

Table 3.10  Housing Unit

<table>
<thead>
<tr>
<th>Housing Unit</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufactured home</td>
<td>19</td>
<td>4.5</td>
</tr>
<tr>
<td>Mobile home, trailer, or RV</td>
<td>16</td>
<td>3.8</td>
</tr>
<tr>
<td>Single-family home, detached from another unit</td>
<td>336</td>
<td>79.2</td>
</tr>
<tr>
<td>Single-family home, attached to another unit, like a duplex</td>
<td>20</td>
<td>4.7</td>
</tr>
<tr>
<td>Unit with 2 apartments</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Unit with 3 or 4 apartments</td>
<td>5</td>
<td>1.2</td>
</tr>
<tr>
<td>Unit with 5 to 9 apartments</td>
<td>4</td>
<td>0.9</td>
</tr>
<tr>
<td>Unit with 10 or more apartments</td>
<td>14</td>
<td>3.3</td>
</tr>
<tr>
<td>Assisted living facility</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>1.4</td>
</tr>
<tr>
<td>Refused</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td>424</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Sixty-two respondents indicated that a member of household had a health or access concern that would impact well-being in a public shelter. One hundred fifty three respondents indicated that a member of their household had a physical or health condition that would impact use of a public shelter. That is, more respondents indicated this status would impact use compared to well-being. Respondents were
asked to describe the health or access condition present in their household. Categories were not mutually exclusive, that is, respondents could select more than one answer (although they were only accounted for once when calculating the 153 responses that indicated impact on shelter use). Of all the health and access concerns, a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying was identified most frequently, with 79 households (see Table 3.11). The least frequent concern was the category of someone who identified with blindness, deafness, or severe vision or hearing impairment, with 21 households.

Table 3.11  Health or access concerns

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
<th>No Answer</th>
<th>Refused</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blindness…*</td>
<td>400</td>
<td>21</td>
<td>421</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>A condition that substantially limits…†</td>
<td>338</td>
<td>79</td>
<td>417</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Difficulties Learning</td>
<td>392</td>
<td>28</td>
<td>420</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Difficulties Breathing</td>
<td>379</td>
<td>42</td>
<td>421</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Special Dietary Considerations</td>
<td>362</td>
<td>59</td>
<td>421</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Reliance on Refrigeration</td>
<td>379</td>
<td>43</td>
<td>422</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>373</td>
<td>49</td>
<td>422</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

* deafness, or severe vision or hearing impairment.
† physical activity such as walking, climbing stairs, reaching, lifting, or carrying

Findings

Respondents were asked about six different health or access concerns and a seventh ‘other’ option. Their responses were compared to six different places or types
of locations to shelter from a hurricane (see Appendix C). Analysis showed four significant relationships out of 42 possible relationships (see Table 3.12). The first significant relationship ($p=.001$) is between a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying in a public shelter. The second significant relationship ($p=.003$) is between special dietary considerations and staying in a public shelter. The third statistically significant ($p=.027$) relationship appears between reliance on refrigeration for medication or other special diets and staying with family. Finally, there is a fourth statistically significant ($p=.038$) relationship between reliance on refrigeration for medication or other special diets and staying elsewhere. In other words, for some types of disabilities, we fail to reject some, but not all, of the hypotheses.

Table 3.12  Pearson’s Chi-squared

<table>
<thead>
<tr>
<th>Health/access concern</th>
<th>Shelter type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public shelter</td>
</tr>
<tr>
<td>Blindness…*</td>
<td>.449</td>
</tr>
<tr>
<td>A condition that substantially limits…†</td>
<td>.001‡</td>
</tr>
<tr>
<td>Difficulties</td>
<td>.603</td>
</tr>
<tr>
<td>Learning</td>
<td>.425</td>
</tr>
<tr>
<td>Difficulties</td>
<td>.003‡</td>
</tr>
<tr>
<td>Breathing</td>
<td></td>
</tr>
<tr>
<td>Special Dietary</td>
<td>.053‡</td>
</tr>
<tr>
<td>Considerations</td>
<td></td>
</tr>
<tr>
<td>Reliance on</td>
<td></td>
</tr>
<tr>
<td>Refrigeration for</td>
<td></td>
</tr>
<tr>
<td>Medication or Other</td>
<td></td>
</tr>
<tr>
<td>Special Diets</td>
<td>.059</td>
</tr>
</tbody>
</table>

* deafness, or severe vision or hearing impairment.
† physical activity such as walking, climbing stairs, reaching, lifting, or carrying
‡ $\alpha=.05$
Additional demographic variables were added to the chi-squared analysis as control variables. Using the seven different health and access concerns compared to shelter places or types of locations, three variables were added to the analysis. These were whether a person was male or female, a household making more or less than $50,000, race, and the respondent’s type of housing unit (see Appendix D).

Considering health and access concerns, type of shelter, and whether the respondent identified as male or female, the first significant relationship \( (p=.009) \) is between identifying as a male, identifying with blindness, deafness, or severe vision or hearing impairment, and sheltering-in-place. The second significant relationship \( (p=.005) \) is between females who identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting or carrying, and staying in a public shelter. The third significant relationship \( (p=.002) \) is identifying as male, having a special dietary consideration, and going to a public shelter. The fourth significant relationship \( (p=.04) \) also includes both identifying as male, and having a special dietary consideration, but seeking shelter elsewhere. The fifth significant relationship \( (p=.041) \) is between males and reliance on refrigeration and seeking public shelter. The sixth significant relationship \( (p=.007) \) appears between respondents who identify as female, who have a reliance on refrigeration, and plan to seek shelter elsewhere. Finally, the seventh significant relationship \( (p=.048) \) is with males who identify with a health or access concern that fell into the ‘other’ category and seeking shelter with family. (See Appendix D for a summary table of the findings.)

Income was the second control variable added to health or access concerns and type of shelter in the chi-squared analysis. The first significant relationship \( (p=.014) \) is
between households that make more than $50,000 a year, identifying with blindness, deafness, or severe vision or hearing impairment, and sheltering-in-place. The second significant relationship \((p=.016)\) is between households making more than $50,000 a year, a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting or carrying, and seeking public shelter. The third significant relationship \((p=.045)\) is between households making more than $50,000 a year, identifying with difficulties learning, and seeking shelter with family. A fourth significant relationship \((p=.000)\) appears between households making more than $50,000 a year, having a special dietary consideration, and going to a public shelter. Households making more than $50,000 a year, having a special dietary consideration, and going to a family member’s residence is the fifth significant relationship \((p=.020)\).

A sixth significant relationship \((p=.004)\) is evident between a household making more than $50,000 a year, having a reliance on refrigeration for medication or other special diets, and going to a family member’s house. The seventh significant relationship \((p=.002)\) is also between a household making more than $50,000 a year, having a reliance on refrigeration for medication or other special diets, and seeking shelter elsewhere. A household making less than $50,000 a year, having a reliance on refrigeration for medication or other special diets, and sheltering-in-place is the eighth significant relationship \((p=.040)\). The ninth significant relationship \((p=.046)\) appears between a household making more than $50,000 a year, having an unspecified ‘other’ health or access concern, and going to a hotel or motel. The tenth, eleventh, and twelfth significant relationships were households making less than $50,000 a year, identifying with an ‘other’ health or access concern, and seeking a hotel or motel.
the condition substantially limits physical activity such as walking, climbing stairs, reaching, lifting or carrying, and using a public shelter. The second significant relationship \( (p = 0.006) \) is between a person who identifies as white, with someone in the household with a special dietary consideration, and going to a public shelter. The third relationship with significance \( (p = 0.021) \) is one where the respondent identified as white, with a reliance on refrigeration for medication or other special diets, and seeking shelter elsewhere. Identifying with being non-white, an ‘other’ health or access concern, and going to a public shelter is the fourth significant relationship \( (p = 0.037) \). Finally, the fifth significant relationship \( (p = 0.045) \) shows up between identifying as white, an ‘other’ health or access concern, and seeking shelter at a family member’s residence. (See Appendix D for a summary table of the findings.)

Testing only landline data, there were two significant relationships. The first was a statistically significant relationship \( (p = 0.008) \) between someone in a landline household having a health or access concern that would impact their wellbeing in a public shelter and previous public shelter use. The second was a rejection the null hypothesis at the \( \alpha = 0.05 \) \( (p = 0.000) \) level of significance, as there is a statistically significant relationship between someone in a landline household having a health or access concern and previous public shelter use.
There are significant relationships between having a health or access concern that would impact their wellbeing in a public shelter, having previously used a public shelter and identifying as male ($p=.003$) or female ($p=.042$) (see Table 3.13).

Table 3.13 Health or access concerns, previous public shelter use, and sexual identity

<table>
<thead>
<tr>
<th>Public Shelter Use</th>
<th>Health or Access Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.003‡</td>
</tr>
<tr>
<td>Female</td>
<td>0.042‡</td>
</tr>
</tbody>
</table>

‡ $\alpha=.05$

There were no significant relationships between having a health or access concern that would impact their wellbeing in a public shelter, having sought a public shelter, and income (see Table 3.14).

Table 3.14 Health or access concerns, previous public shelter use, and income

<table>
<thead>
<tr>
<th>Public Shelter Use</th>
<th>Health or Access Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 50k</td>
<td>0</td>
</tr>
<tr>
<td>Less than 50k</td>
<td>0.104</td>
</tr>
</tbody>
</table>

‡ $\alpha=.05$

Significant relationships exist between having a health or access concern that would impact their wellbeing in a public shelter, having previously used a public shelter, and being white ($p=.004$) or non-white ($p=.038$) (see Table 3.15).
Table 3.15  Health or access concern, previous public shelter use, and race

<table>
<thead>
<tr>
<th>Public Shelter Use</th>
<th>Health or Access Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
</tr>
<tr>
<td></td>
<td>Other</td>
</tr>
</tbody>
</table>

‡ α=.05

Finally, a failure to reject the null hypothesis at the α=.05 (p=.912) level of significance occurred. There is not a statistically significant relationship between someone in the household identifying with a health or access concerns and evacuating for a mandatory category 3 hurricane evacuation order. (See Appendix D for a summary table of the findings.)

There were also no significant relationships between someone in the household identifying with a health or access concern, evacuating for a mandatory category 3 hurricane evacuation order, and sexual identity, income, and race (see Tables 3.16, 3.17, and 3.18).

Table 3.16  Health or access concern, category 3 evacuation, and sexual identity

<table>
<thead>
<tr>
<th>Evacuate for Cat 3 (Mandatory Evac)</th>
<th>Health or Access Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.293</td>
</tr>
<tr>
<td>Female</td>
<td>0.266</td>
</tr>
</tbody>
</table>
Table 3.17  Health or access concern, category 3 evacuation, and race

<table>
<thead>
<tr>
<th>Evacuate for Cat 3 (Mandatory Evac)</th>
<th>Health or Access Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>0.618</td>
</tr>
<tr>
<td>Other</td>
<td>0.824</td>
</tr>
</tbody>
</table>

Table 3.18  Health or access concern, category 3 evacuation, and income

<table>
<thead>
<tr>
<th>Evacuate for Cat 3 (Mandatory Evac)</th>
<th>Health or Access Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 50k</td>
<td>0.332</td>
</tr>
<tr>
<td>Less than 50 k</td>
<td>0.198</td>
</tr>
</tbody>
</table>

Discussion

The following discussion analyzes the implications of survey findings for planning and policy regarding access and functional needs (AFN) individuals during hurricane evacuation.

The most striking feature of the survey data as it pertains to AFNs is the difference in responses between “do you or a household member have a health or access consideration that may impact their wellbeing in a public shelter” and “would any of the following physical or health conditions impact someone in your household were they to use a public.” There were 62 people who indicated a health or access consideration would affect someone in their household’s well-being in a public shelter and 153 people who identified that a person in their household had a physical or health
condition that would impact them if they used public shelter. It was expected that the first question would act as a gateway question to what specific health or access concerns were found in the household. That is, the number of respondents indicating the presence of a physical or health concern in the household – the respondent identifying with at least one of the concerns – would sum up to the number of respondents who indicated a health or access concern would impact their well-being in a public shelter. However, the number of people identifying with a health condition which would impact their well-being in a shelter was less than half of those who identified someone with a specific physical or health concern that would impact their usage of a public shelter (approximately 14 percent versus 36 percent of the survey population). This percentage compares to the approximately 19 percent of the US population with a legally recognized disability (Roth, 2010). Given that the survey includes a higher percentage of people with a specific physical or health condition, the results may be most representative of the fraction of the population with an AFN rather than a legally recognized disability. The disparity between the two survey responses may have several explanations.

One explanation is that people may not view their general health or access concern as something requiring specialized assistance. Because of the arrangements in their own homes to deal with various needs, their health or access concern may not be perceived as an impediment even when relocating to another location. However, it may be that people are under-estimating the help or assistance they may need during an evacuation. Yet why the large discrepancy when both questions asked about health and public shelter usage? In fact, the opposite may be true. Individuals may use public
shelters regardless of health concerns, but, once there, be concerned about their well-being.

A second explanation may be that responses to particular health conditions increased due to the subject realizing the conditions listed might affect them. That is, at first, the respondent did not think their health condition was a concern when staying in a shelter, or perhaps were not thinking of all of the possible health conditions. When individual health conditions were listed, they realized specific issues might affect their ability to stay in a public shelter, particularly related to physical conditions such as walking.

Perhaps the wording “well-being” resulted in an important distinction for respondents. Although intended as a holistic category that could include physical, social, and psychological wellness, it is possible that the term was interpreted as more of a psychological condition. Given how many respondents indicated that a physical condition such as walking, climbing stairs, reaching, lifting or carrying would impact them in a public shelter (as further discussed below), it could be that these conditions were less closely aligned to preconceptions of well-being. More research on this distinction would serve to clarify the different results.

Another interesting finding was the number of households that identified with each individual health or access consideration. Of the 153 households that identified one of the conditions, nearly one half identified with a condition that substantially limits physical activity. The number of households that identified with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying was, at 79 responses, the most identified condition. This was greater by 20 than the next condition (special dietary considerations). With an aging population,
physical access considerations may need to be more fully planned for because of the larger number of people who may need accommodations in order to stay in public shelters.

The four statistically significant relationships observed between a specific health access concern and the type of shelter a household would seek in the event of a hurricane are noteworthy. That a relationship exists between a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and seeking a public shelter may be explained by individuals believing the shelter would be accessible. People who have difficulty with specific types of physical activity may assume the public shelter has modifications that allow people easier access, compared to, for example, the homes of friends or family. Shelters may also be attractive to those with physical limitations in that they may presume a public shelter would provide access to multiple services in one location, eliminating the need to travel to a range of locations. Home health aides, visiting nurses, and occupational therapists, among many others, perform services people require daily or regularly to manage their health condition. It is possible in the wake of service disruptions that providers relocate. When that happens, a service-seeker may have difficulty locating or accessing the service-provider, a potentially large burden for those with AFNs.

The second statistically significant finding was relationship between special dietary considerations and seeking to stay at a public shelter. This relationship may reflect knowledge of the fact that at shelters meals are prepared and served to feed the greatest number of people with the least effort. People with a special dietary health or access concern may perceive that a public shelter would have the necessary foods for a range of shelter occupants. Yet if the shelter provides only one type of food to
facilitate efficiency of service provision, someone with special dietary needs that did not bring their own food may suffer unique challenges in such an environment.

While the survey did not yield sufficient data to explore if other factors – such as lack to access to alternative sheltering options – influenced their choice of a public shelter, the results do suggest a vital implication. In both of these instances, respondents who identified these particular health concerns within their household were more likely to choose public shelters as their evacuation destination of choice. Shelter managers must therefore pay particular attention to planning, anticipating that their shelter will not necessarily be the last option, but rather the first option for people with physical or dietary concerns and others in their household.

Reliance on refrigeration for food or medication was significantly associated with seeking shelter at a family member’s house, and constituted the third significant relationship in the analysis. For example, insulin is a medication that must be refrigerated and is a medical necessity for someone with diabetes. A family member’s household may be perceived as allowing greatest access to the refrigeration (compared to a hotel, for example, that may not have a fridge in the room, or a public shelter, that may only have a centrally located refrigeration unit). It may be that the family member whose home is the evacuation destination could provide other support services. That said, there is still a risk for evacuees who rely on refrigeration when they evacuate to another home. If the family members live close enough to the hurricane-impacted area, they may suffer from power outages even if they are spared from other forms of damage to the home. After Hurricanes Irene (2011) and Sandy (2012) stuck the Mid Atlantic coast, households across many states lost power for days to weeks, even though they were out of the direct impact area. An initial absence of people with
refrigeration needs in shelters may hide an initial vulnerability in a hurricane-impacted area when power outages are common. It is possible that public shelters will serve as a final destination for these households, even if not part of initial household evacuation planning.

A fourth significant relationship exists between reliance on refrigeration for medications or other special diets and seeking shelter at a location that is not any of the other five options (i.e. public shelter, friend, family, hotel/motel, or shelter-in-place). People who planned to go to an undisclosed (i.e. other) location may simply want to be spatially removed from the hurricane impact area. Rather than identify a building that could be within the limits of where a hurricane is forecasted to make landfall, the respondent may have thought of the five options but described it as an ‘other’ category because it is outside of the hurricane zone. This may indicate the person is concerned about the refrigeration they need have for their medication or special diet rather than associating it with any particular location. People who rely on power to refrigerate medication or special foods may plan to shelter outside of the expected hurricane impact zone. Although areas outside of a hurricane impact zone may be affected by the hurricane, these areas may be less likely to lose utility service and more quickly regain utility service if lost.

While significant relationships exist between two variables, other significant relationships occur with a third control variable. Adding sexual identity in as a third control variable with shelter type and health or access concerns show two significant relationships with males and one with females that indicates sexual identity may play a larger role in this relationship than was originally found with the two initial variables. Although there is no way to know the actual numbers of males and females who
would seek a public shelter, this does support some literature that suggests males are more likely to use a public shelter than females (Whitehead et al., 2000).

Further relationships are found when adding income to the variables of shelter type and health and access concerns. Having an income greater than $50,000 a year accounts for the majority of significant relationships. While previous studies suggest that households with higher incomes are less likely to go to a public shelter, it may be that $50,000 is not a high enough income level for a household to go to a hotel or motel. Instead, they may seek alternative accommodations. This finding has serious implications for planners, as there may be difficulties tracking households for services because they are in locations that are more diffuse. More outreach may be necessary to find households that take shelter in private residences or remain in their homes. There is the likelihood the elderly and PWD will remain unconnected to services and resources, such as in the aftermath of Hurricane Sandy (Span, 2012).

Considering race as a third control variable, respondents who identified as white had four out of five relationships significant when including shelter type and health and access concerns as the other two variables. Of those four significant relationships, two were found when accounting for public shelter use, which supports research conducted by Whitehead et al. (2000) that individuals who identify as white are more likely to use a public shelter. These significant relationships with race as a control variable indicates race may have a larger effect on the relationship than is explored at this time.

Type of housing unit, in conjunction with shelter type and health and access concerns, does not yield any discernable significant relationships between these three variables in the data. For instance, mobile home owners are more likely to evacuate
than those who live in single-family homes built on site (Solis et al., 2010). But, when investigating significant relationships, respondents living in mobile homes as the control variable does not appear any more frequently than other types of housing structures. Perhaps where people seek shelter and the likelihood of evacuating does, as previous studies suggest, have more to do with storm intensity than type of housing unit. The way in which the survey question asked about the two initial variables did not specify the category of storm.

Finally, two significant relationships were found using only landline households, excluding the cell phone sample because information was not collected on this variable. When both ‘health or access concerns that would impact wellbeing in a public shelter’ and a ‘physical or health concern that would impact public shelter usage’ were compared to previous public shelter use, the relationships were significant. Households with health and access concerns may have sought out public shelters for a recent household evacuation to minimize the disruption in services (i.e. home care services) or resources (i.e. medications). A second possible explanation for the relationship is households with health or access concerns did not immediately evacuate due to the health concerns. Indeed, the households may have waited and found roads congested with traffic and hotels and motels in the area where they indeed to go to filled. Instead, these households needed to go to a public shelter. Regardless, the findings bolster the assertion that households with health and access concerns do seek shelter in public shelter environments.

Interestingly, identifying with a health or access concern was not significantly associated with willingness to comply with a mandatory hurricane category three evacuation order. A category three hurricane is the middle of the Stafford-Simpson
scale measuring hurricane intensity. Of note, highly damaging and life-threatening hurricanes such as Fran, Ivan, Katrina, Rita, and Sandy were all category three events. The lack of a relationship between health and access concerns and intention to comply with a mandatory category three hurricane evacuation order suggests that a health or access concern may not have any bearing on if a household decides to evacuate for an impending hurricane. This is a serious concern for planning and policy if it truly indicates households are not accounting for the needs of household members when deciding whether to evacuate.

Limitations

Many of the hypotheses when tested did not yield statistically significant relationships. This may be in part due to limitations in the survey data. These include both potential methodology/measurement errors and sample issues. Some of the issues discussed below are often problems in survey-based studies while others are unique to the methods and aims of this survey.

We attempted to account for respondent availability. Telephone calls were conducted primarily in the evenings for both landlines and cell phones. This maximized the chance people were home during the hours that calls occurred (Lavrakas, 1993). Evening calls allowed interviewers to call during nonpeak rate time for the cellphone sample. Some shifts were scheduled during the day to attempt to reach landline numbers where there was no answer in the evening.

Moreover, it is typical for both current landlines and cell phones to have caller identification (ID). The phone’s ability to display the number calling influences the response rate (Qayad et al., 2013). People who are curious about the caller will answer their phone. Conversely, if people do not want to be bothered – or are not curious
enough to answer – they may either allow the phone to ring continuously or pick up and immediately replace the receiver (Lavrakas, 1993). A person may choose to ignore a call displaying “University of Delaware” (UD), especially if they have had no previous interaction or personal connection with UD.

Emergency managers in North Carolina indicated state residents were typically amenable to people administering surveys from North Carolina’s universities. Their experience may be that residents are open to answering questions by North Carolina’s universities because residents have a stake in schools in their state. However, the sample called in North Carolina may not have been receptive to researchers from a school with which they were unfamiliar.

Another general issue was the potential for problems regarding wording of questions. Participants could have been confused about what the question was asking. A second issue that may have created confusion among participants was the ordering of questions. The responses given to an initial set of questions may have affected participants’ mindsets when answering subsequent questions. Chronologically ordering questions attempted to address this issue. That is, asking about previous experience occurred first in order to lead into what might happen in the future.

Specific to the study, there were several potential limitations. Of most concern was the fact that a small number of people told interviewers they were unable to take the survey because of their health conditions. Interviewers were often not successful in convincing people with health conditions to take the survey. Interviewers anxiously reported this reason for some refusals upon the completion of the study. There is no record of the number of people who decline to take the survey for health reasons because the CATI system does not record the specific refusal reason. When people
found their health condition to be an impediment severe enough to forgo a phone interview, there might also have been serious issues surrounding evacuation and sheltering. In other words, for the purpose of this particular analysis, the people who declined to speak to interviewers might have had information crucial in better understanding AFN requirements. For instance, one interviewer reported the person was unable to participate because they had a tracheotomy tube and would be fatigued speaking for the length of the survey. Based on the disclosed health condition, there may have been equipment necessary for the health condition that could have affected both when the person would evacuate and where they would seek shelter. However, due to the individual’s reticence to take the survey, no specific information on either health or equipment can be confirmed, and the information could not be formally included as data because of the decline to participate.

Of additional concern regarding questions surrounding health, some people may have found the questions too personal in nature to answer truthfully. Although an issue more often associated with disclosing health concerns such as venereal diseases and mental illness, respondents’ perceptions of how their health or access concerns would be accepted by interviewers could have influenced how they chose to disclose them (Fowler, 2009). If respondents believed they would appear negatively to the interviewer by disclosing their health or access concerns, fewer people might have answered the question or answered the question honestly (Fowler, 1995).

Some questions were eliminated for the cell phone sample, while the landline sample used the original, longer survey. Although the questions asked were identical, the total number of questions on the survey differed. The intention of the deletions was to shorten the total time a respondent was on the phone completing the survey.
(Fowler, 2009). The shorter survey had the added benefit of using fewer cell phone minutes for the respondent. Although we do not expect that the deletion of question influenced subsequent answers included in the analysis, there is a possibility that respondents’ interpretation of latter questions in the survey were guided by the way they answered earlier questions.

Data collection software generated one problem for analysis. Previous evacuation location was asked of landline respondents but not cell phone respondents. When the cell phone survey was loaded into the CATI system, the system did not recognize the ordering of the set of questions regarding previous evacuation location and therefore never queued it to be asked by interviewers. This resulted in no data collection for that questions and consequently no analysis of those questions from the cell phone respondents.

Conclusion

Present federal policies are designed to take into account those with disabilities and AFN. Current shelter policies stipulate sheltering should be inclusive, from the buildings selected to the accommodations provided inside. But there is currently no published data describing who may come to a public shelter and what their needs may be. The research described in this work is a first step to quantify the number of people with AFNs and the specific issues they may bring with them to a shelter.

Overall, some statistically significant chi-squared relationships supported previous research findings. Males reported more public shelter use than females (Whitehead et al., 2000), and people who reported possible public shelter use identified as white more often than minorities (Whitehead et al., 2000). While using income as a control variable, more relationships that are significant appeared when
household income was greater than $50,000. People with disabilities often have limited incomes (Atkins & Guisti, 2003, Clive et al., 2010), so there may be additional factors influencing health conditions and shelter selection when income is involved in this analysis. Moreover, analysis of mobile home households did not overtly support previous literature by Smith and McCarty (2009) and Solis et al. (2010) that households living in those types of structures would seek out alternative shelter arrangements. Of note are the relationships between types of health and access conditions and type of shelters household plan to seek out in the event of a hurricane. Conditions that substantially limit physical activities and special dietary considerations in households that plan to seek public shelters are significant. Reliance on refrigeration is statistically significant in households that plan to go to a family member’s home. Finally, reliance on refrigeration and the plan to stay in a location not listed on the survey is significant. Each of these relationships between a specific health concern and a shelter location goes beyond the current literature and heralds a need for further study.

The data collected in this survey addresses a gap in the literature by addressing specific health and access concerns rather than the broader category of disability. A deliberate decision to exclude the phrase “do you have a disability” (or similar phraseology) in the survey that limited responses to yes or no was made, as the grouping of the presence or absence of a disability does not address the heterogeneous nature of disabilities. Equally important, asking about the broad category of disability does not embrace the AFN paradigm that includes health and general accessibility concerns that are not related to a limitation in bodily functioning. Asking about specific health and access concerns isolates specific issues that inform what solutions
or resources may need to be available to fulfill people’s needs. This is a relatively new approach to asking about needs, as an AFN may be just as serious as a disability given a particular set of circumstances.

Failure to sufficiently include people with AFN when planning will cause problems for both the individuals with AFN and emergency managers. Results of this study indicate that many people may identify with one or more health or access considerations but not always believe that a health or access concern affects their well-being in a public shelter. The heterogeneous groups of those with AFN are found throughout the country. The specific resources for one group vary widely compared to those required by others (i.e. refrigeration requirements compared to American Sign Language interpreters, etc.), but are not mutually exclusive. It is possible for a person to have multiple needs across different health considerations. Emergency managers must plan for all types of health or access concerns and be flexible in making accommodations for individuals who require services or resources beyond what is readily available in a public shelter.

The Americans with Disability Act should guide shelter selection, although it is unclear how many shelters are actually fulfilling AFN requirements once opened. Especially when in a large scale or sudden onset disaster, shelters might be opened as an ad hoc arrangement in the nearest available, unaffected building. These buildings may not have been approved as shelters during the planning process. These shelters may not have relationships in place to provide all of the necessary services or resources. This becomes particularly problematic for people who identify with a health or access concern as they will still come to shelters, regardless of who opens or maintains the shelter’s operations. If a person or household goes to an ad hoc shelter,
services and resources would still be needed. It is therefore imperative policies continue to provide guidance on shelters for the whole community.

To be prepared for individuals with AFN and disabilities to come to public shelters during disasters, planners should include the AFN and disability community in disaster planning. People who require accommodations are the most knowledgeable about their needs. Planners should also approach organizations that may open ad hoc shelters to encourage connections between the shelter and services and resources people may need. Based on the type health considerations our respondents identified, physically accessible spaces are imperative. Planners should select or configure spaces to allow for easier mobility for AFN. Planners need to be aware that although they plan for a segment of the population to have AFN, there may be a greater number of people who will come to public shelters with health or access concerns and fit into the AFN category than expected given their prevalence in the population.
Chapter 4

THE EFFECT OF SITUATED ACCESS ON PEOPLE WITH DISABILITIES:
AN EXAMINATION OF SHELTERING AND TEMPORARY HOUSING
AFTER THE 2011 JAPAN EARTHQUAKE AND TSUNAMI

Introduction

The March 11, 2011 Tohoku earthquake and tsunami that devastated coastal communities in three Japanese prefectures resulted in tremendous loss of life, loss of property, and community disruption. A cascade of events unfolded when the tsunami struck Japan’s northeastern coast. The earthquake and tsunami led to a subsequent power loss for much of the region, exposure to radiation for a large swath of the population residing near the Fukushima Daiichi nuclear plant, and petro-chemical fire ignitions throughout the region. Additional logistical problems emerged as a result of the large numbers of displaced people. The event reemphasized the complexities and devastation of catastrophic events, particularly those involving the combined uncertainties of natural and technological triggers. The National Police Agency (2011) estimated that over 22,000 people were killed or missing, over 100,000 buildings collapsed, and an additional 111,000 partially collapsed. It would be easy to consider such catastrophes as the great equalizers in a society: to imagine a shaking earth, a wall of water, or a release of radiation as elements that act in total disregard to class, gender, race, age, or ability of the individuals they threaten. Yet years of disaster

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research have pointed to structured inequalities in the distribution of disaster vulnerability, capacity, and outcomes. That is, disasters affect people in different ways, with some shouldering greater risk than others (for further discussion see, for example, Cannon, 1994; Anderson & Woodrow, 1998; Bolin, Jackson, & Crist, 1998; Cutter, Boruff, & Shirley, 2003; McEntire, 2004; Wisner, Blaikie, Cannon, & Davis, 2004).

We saw evidence of this in 2011 in Japan. The mean age of those who died in the tsunami was in the lower 60s (Cabinet Office, Government of Japan, 2011). Impaired mobility affected their ability to reach higher ground as the tsunami approached (Chang et al., 2011) whether they lived on their own, relied on family, or were housed in institutions and were left behind (Booth & McCurry, 2011). Lest we be tempted to think that the Tohoku catastrophe is somehow atypical, we should recognize that other scholars have found that older residents bear a greater burden during disasters than the general population. We saw this after the Kobe earthquake, where 57% of the casualties were elderly (Hewitt, 2007). We saw this after the 1995 Chicago (Klinenberg, 2002) and 2003 European (Larson, 2006) heat waves where the majority of casualties were elderly. In these cases, their susceptibility to high temperatures combined with a higher likelihood of social isolation (fewer social ties to check on their well-being) contributed to higher fatality rates (Klinenberg, 2002; Larson, 2006). We saw this in Hurricane Katrina, where 67% of the 1300 people who died were age 65 or older, despite only comprising 12% of the pre-hurricane population (Sharkey, 2007). Vulnerability extends not only to the frail elderly in these events, but to all age groups of people who live with a range of functional or intellectual impairments. The effects also reach beyond fatality rates. In a (2006)
report on the impact of Hurricane Katrina and Rita on people with disabilities, the National Council on Disabilities (NCD) reported that people with sensory disabilities faced barriers receiving emergency alerts. Daily barriers to transportation access by those with disabilities plagued emergency evacuations. The NCD found many cases where evacuees with disabilities were refused admittance to shelters or could not access essential services.

According to the Ministry of Internal Affairs and Communication (2012), Japan’s October 2010 population – based on census data – was 128,057,352 people, of which 62,327,737 were male and 65,729,615 were female. Overall, the population has remained relatively constant since the 2005 census (Ministry of Internal Affairs and Communication, 2011). However, over this same time there has been a population decline in Iwate Prefecture of more than three percent. Miyagi has had less than one and a half percent decline, and Fukushima’s decline has been between one and a half and three percent (Ministry of Internal Affairs and Communication, 2011). Even with a decrease in population in some prefectures, there has been an increase in the number of individuals over the age of 65 by 2.8%. Of the “aged-single-person” category over the age of 65, one in ten males live alone compared to one in five females (Ministry of Internal Affairs and Communication, 2011). Certainly, many elderly people do not have disabilities, and many people with disabilities are not elderly. In 1999, approximately six and a half million people had some form of disability in Japan (Weiss, 2010), many of these non-elderly residents. Still, Weiss (2010) suggests that the number of people with disabilities will continue to increase with increases in Japan’s overall population (Weiss, 2010). Others (McGuire, Ford, & Okoro, 2007) suggest that rate will increase as the population ages. With the stigma associated with
disabilities in Japan (Matsui, 2009) and a reported tendency to ostracize or hide people with disabilities (Matsui, 2009), preparing and planning for how disasters might uniquely affect people with disabilities creates additional challenges. That people with disabilities comprise the broad age spectrum of the population and contend with vast range of functional and access needs raises additional challenges on how to best ensure disaster resilience for such a diverse group.

Research on evacuation and sheltering notes that the disability community is often left out of the planning process (Parsons & Fulmer, 2007), which may partially account for the lack of resources and services for those with disabilities observed after disaster events. Emergency planning most often happens for those with disabilities by others without disabilities rather than with the input of people who live with the disabilities daily. Complex disaster events like the Tohoku disaster highlight how the needs of some segments of the population may be accounted for while the needs of other members of the community are largely overlooked. For example, Kailes and Enders (2007) find that emergency plans are often designed for those who have access to transportation and do not have functional limitations. When individuals lack transportation – or transportation that accommodates mobility needs – incorrect planning assumptions could prove fatal. Twigg, Kett, Bottomley, Tan, & Nasreddin (2011) note that problems with access, admission, needs assessment, facilities, food, medication, communication, personal support, staff training, and facility management plague the experience of people with disabilities in disaster shelters.

Our exploratory field research in Japan following the 2011 catastrophe suggests that – what we term – situated access was a contributor to how and to what extent people with disabilities (PWD) received information, resources and services.
We define situated access as *the ability to acquire and utilize information, material resources, or services based both on the physical location of the individual or group and the social standpoint or circumstances of the individual or group within that physical location.* In this case, we examine the post-disaster shelter and temporary housing environment after the 2011 event. We also focus on the social standpoint of PWD compared to those people without disabilities. Where limitations were present, they often led to additional disparities. These disparities were as much connected to the physical locations PWD occupied (their physical situated-ness) as well as their lived experiences at those locations (as a result of their social situated-ness).

In many ways, PWD routinely encounter situated access to information, resources and service during non-disaster periods. Yet there are two important reasons to consider the issues posed by the physical location of PWD during the immediate and short term post-disaster-impact phase and their lived experiences within those locations. First, Japan operates two distinct types of shelters during disasters, as discussed in greater detail below. Most of the population that accesses public shelters use general shelters, often operated from facilities such as schools but also from improvised facilities in hotels and other buildings. Social welfare shelters are specially designated facilities for disaster survivors requiring assistance, resources, or facility design not available in general shelters, although general shelters may designate areas within their facility as social welfare shelters if adequately equipped for these evacuees. In other words, ways in which post-disaster shelter use and designation is organized in Japan offers a unique opportunity to examine influence of shelter organization on access to post-disaster assistance. Second, the catastrophic nature of this event provides an opportunity to consider the effects of situated access for PWD
in communities outside of Japan in future work, particularly when public shelter usage, temporary housing use, and extended stays with family or friends may exceed what is typically following more frequent but less catastrophic events. Indeed, the physical spaces PWD occupy in the post-disaster environment may vary from Japan, as may the social embodiment of that experience given cross-cultural differences in understanding the ascribe social status of PWD and the extent to which they are involved in community disaster planning.

Situated access is a term we developed that has relevance to all segments of the population, and may prove useful in other examinations of differential vulnerability. For example, evacuees who cannot speak or understand the primary language used in the affected area may find their access to information, resources, and services heavily influenced by the physical location they are directed to or find themselves in as well as their embodied experiences within that space given their language differences. Every survivor is situated within a particular physical location and social standpoint. Our focus in this paper is on how situated access affected PWD following the Tohoku earthquake and tsunami.

**Methodology**

We argue here that disparate information, material resources and services were available at different types of sheltering and temporary housing environments, which in turn led to access disparities for people with disabilities compared to the rest of the population. We also argue that how people with disabilities (PWD) are situated socially influences their ability to access necessary information, material resources, and services in the same location compared to evacuees without disabilities. Our
exploratory findings suggest that situated access was a contributor to how and to what extent PWD received information, resources, and services.

Findings presented here are based primarily on three exploratory research trips to Japan that took place following the 2011 catastrophe. During each trip, an inductive qualitative approach was used to gather and analyze data collected through field interviews, photographs, observation, and secondary documents. We entered the field with the intention to broadly examine the effects of the disaster on PWD. The first trip occurred in June 2011, approximately one hundred days after the event, as part of an Earthquake Engineering Research Institute (EERI) social science reconnaissance effort. Seven days were spent in the field (eleven communities visited) with the EERI team. The authors spent three additional days in the field (two additional communities visited). All communities were in Iwate and Miyagi prefectures, and sites ranged in size from small towns to large metropolitan areas. We attended briefings with officials from national, prefecture, and local governments; academic scholars; and representatives from non-governmental and private sector organizations. We visited and observed activity at four sites still in use as temporary shelters, multiple sites currently in use as temporary housing, warehouse facilities for supplies, debris processing sites, and multiple areas heavily impacted by the catastrophe. Informal interviews were conducted with officials, response personnel, volunteers, and survivors through the reconnaissance field work, often with the assistance of an interpreter. A second field trip took place in January 2012. One author spent three days in the field, again in Iwate and Miyagi prefectures, visiting three communities. Interviews were conducted with ten key stakeholders representing government officials, non-governmental organizations, and volunteer groups. Site observation took
place at such locations as temporary houses, a hospital, a non-profit organization, and government buildings. The second author participated in a third field trip that took place in August 2012. Two days of fieldwork included site visits to four women-owned businesses in Iwate prefecture, including a presentation by owners and employees at each site, as well as panel briefings by women affected by the catastrophe. Conversations around the idea of situated access took place with survivors, organizational representatives working with survivors, and scholars working in the region during this third site visit as a means to determine fit of the preliminary findings with the experiences and insights of those in the local communities. Information was also drawn from conversations with colleagues from the Disaster Research Center and Osaka University who engaged in fieldwork in the affected areas in spring and fall of 2011.

Each night, team members would meet and debrief on the interviews, observations, and documents collected during the day. Upon returning from each of the three different trips into the field, the new data were shared with other group members and analyzed in conjunction with previously collected data. The observations based on the data and documented in field notes, in conjunction with the discussions with field members, coalesced into three distinctive themes: access to information, material resources, and services. These themes are similar to those documented in previous disaster research compiled by Fritz and Mathewson (1957) in a report on convergence behavior in disasters. Fritz and Mathewson (1957) discuss convergence as it applies to three different types: personal, informational, and materiel. These types of convergence refer to the movement of people, message transmission and dissemination, and supplies and equipment physically moving from one location to
another, respectively. The concept of convergence helped inform this analysis of the data. As we noted the emergence of these areas of differential access while conducting fieldwork, we returned to the data to analyze specifically for the ways that differential access to information, resources, and services manifested themselves for PWD led to what we term situated access, discussed further below. Consequently, our analysis of field notes and observations initially took an inductive. We then took a more focused coding approach to examining access to information, resources, and services.

Our findings are restricted to Iwate and Miyagi prefectures as no fieldwork took place in Fukushima prefecture. The findings collected may have limitations in their applicability to other areas of Japan, based on the area’s demographics and the geography of the northeastern region where the earthquake and tsunami caused the most damage. Additionally, limitations may be found when applying these findings to a United States context based on demographic, geographic and cultural differences. The generalizability of these qualitative inductive findings merit more systematic research in future study. At the same time, we believe these findings are valuable in both understanding the 2011 catastrophe, differential access as a function of physical and socially situated-ness, and the effects of such high consequence events on PWD.

Finding Shelter

The earthquake struck on the afternoon of March 11, 2011, and a tsunami warning was issued a few minutes later by the Japan Meteorological Agency. Initially, people evacuated to public schools, shrines along hillsides, and other areas perceived as safe due to their elevation. Some of these sites were pre-designated as evacuation sites and widely known as such given yearly drills held regionally on September 1 to highlight Disaster Reduction Day (Cabinet Office, Government of Japan, n.d.). As the
magnitude and scope of the destruction became evident, survivors realized they needed to find temporary shelter if they had not already done so. In many cases, returning to their homes was simply not possible.

Studies conducted in the United States show that approximately 13 percent of the population relies on public shelters (Mileti, Sorenson, & O’Brien, 1992). Although the seminal research in this area is several decades old, recent post-hurricane assessments point shelter-use rates that fall within this range. Nine percent of residents from counties bordering the affected sound in North Carolina used public shelters during Hurricane Isabel (National Oceanic and Atmospheric Administration [NOAA], 2005). During Hurricane Floyd, this number was between 5-10%, depending on the county (NOAA, 2005). Hurricane Katrina was a catastrophic event, but public shelter usage is difficult to determine because the statistics referencing shelter usage often do not make clear whether the people using public shelters represent a portion of the evacuees from New Orleans, or the state of Louisiana, or all-affected states, or even between those who used a shelter versus those who had sheltered elsewhere but sought transportation out of the city at a shelter facility (The White House, n.d.).

Hurricane events, where most of the large scale evacuations in the United States take place, typically allow for some lead-time when many people can seek shelter with family, friends, or hotels. The Tohoku catastrophe happened suddenly, affected alternative sheltering arrangements in the area, and often isolated survivors from more distant alternatives for at least several days. Moreover, such research, however, has not typically examined the aftermath of catastrophes such of the size of the 2011 event. In the initial one-week aftermath, there were over 386,000 individuals displaced from their homes. Three months after the earthquake and tsunami, more than
50,000 individuals were still residing in public shelters and of those, over 41,000 were in Iwate, Miyagi or Fukushima Prefectures (Cabinet Office, Government of Japan, 2011).

Some survivors were able to immediately or eventually stay at the homes of family members or friends. Others stayed in ad-hoc emergent shelters (developed by the survivors and community members themselves) or in public shelters opened by the government and designated for the general population or those requiring special consideration for disabilities or health concerns (what is termed social welfare shelters). Eventually, those who put their name in a lottery for housing were assigned to a temporary unit while communities await the reconstruction process.

General population shelters in Japan are designed for people who require little to no specialized assistance during their stay. In contrast, social welfare shelters are designated for people who require specialized care or need additional services. In particular, planning anticipates that PWD and the elderly (particularly frail elderly) will occupy the social welfare shelters. Social welfare (SW) shelters are fewer in number than general population (GP) shelters, and the facilities are supposed to include such functional access features as western style toilets, beds (rather than futon mattresses), and ramps. These two types of public shelters are predetermined in municipalities’ disaster plans and are supplied services and resources by the local government, non-profit agencies and volunteer organizations (Tatsuki, 2011).

Our research revealed many examples of PWD initially evacuating to a GP shelter before being directed to a SW shelter. Family members could accompany those needing to switch shelters in order to keep the family unit intact; although we talked to elderly survivors with disabilities who evacuated to SW shelters alone while leaving
family members in GP shelters. SW shelters were primarily opened by the
municipality and eligible to receive supplies and reimbursement for expenses from the
central government. Unfortunately, some municipalities opted to not open SW shelters
because they were unaware of their eligibility to receive funds to cover the cost of
providing supplies and staffing support. Amidst a dearth of formally-designated SW
shelters, emergent or ad-hoc shelters sometimes sought to meet the needs of these
survivors.

As the weeks passed on, temporary housing was constructed at the discretion
of municipal governments and located in places where there was open space. Given
the terrain of the coastline, flat land on which to site temporary homes was limited.
Individual units were attached to one another in rows of five or six, with usually a few
dozen strips of units located in each area (see Figure 4.1). The units we observed in
both Iwate and Miyagi prefecture were all elevated off the ground and most often had
one or two steps leading up to the door (see Figure 4.2). Community centers within the
complex of temporary housing were generally equipped with ramps (see Figure 4.3).
Parking lots and the playing fields of local schools were among the sites where
temporary housing was erected. Sometimes the units were located near public
transportation systems and shopping areas, while other times these amenities were far
from residences. Survivors who were displaced from their homes often lost access to
their vehicles. Warehouses distributing supplies and location of support services were
frequently located at great distance from the various housing areas.

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Figure 4.1

An example of temporary housing units for displaced survivors of the 2011 Tohoku earthquake and tsunami.
Steps lead to the entrance of temporary housing units for displaced survivors of the 2011 Tohoku earthquake and tsunami.
Community centers constructed near the temporary housing units for tsunami survivors were generally equipped with ramps.

The limited available housing was allocated by a lottery system that was weighted in favor of the elderly and families with children, although there was no guarantee that one would receive housing near family members, friends, or former neighbors. This prioritization method was similar to what occurred after the Kobe earthquake (Otani, 2010).

Situated Access

The concept of situated justice has been used to recognize that justice is historically situated within a particular time and cultural context (e.g. see Stassen’s
1994 review of Waltzer) and that justice is a phenomenon linked to perception; it is not entirely objective in its reality but instead bound to symbolic and structural elements of lived experience and relationships to institutions (e.g. see Berrey et al. 2011). In other words, justice as a concept is socially constructed and situated or placed in the individual, their experiences, and cultural context. Certainly, an examination of what is fair and just for disaster response from an emergency management perspective compared to the situated justice perspective of those people in a community with disabilities is a valuable applied and theoretical path for research. Here, however, we instead borrow the term situated and use it to examine access rather than justice. Situated justice includes a consideration of how justice is situated socially. To restate our definition, situated access is the ability to acquire and utilize information, material resources, or services based both on the physical location of the individual or group and the social standpoint or circumstances of the individual or group within that physical location. We focus here primarily on how place-based situation – in this case, the physical location of post-disaster shelter or housing – for people with disabilities affected their access to post-disaster information, resources, and services in the aftermath of the Tohoku catastrophe. This exploratory research directly contends with the notion that post-disaster assistance, once made available in the intangible somewhere, is available more broadly to the full range of disaster survivors. Our preliminary findings suggest otherwise. Access to such assistance is closely connected to the individual’s state of physical situated-ness (i.e. where they are) of the individual. But like situated justice, we also consider the social context. Their social situated-ness – in this case, the symbolic, time, structural elements that affect their lived experiences given their disability in both pre-disaster and post-
disaster society – led PWD to experience differential access to resources within the physical spaces they occupy.

**Access to information**

Informal interviews and site observation suggested that displaced survivors staying in general population shelters – at least those run by municipal agencies – had greater access to information than those survivors staying in other locations. For example, we heard reports that PWD staying in one ad hoc SW shelter were told to leave the facility one month after the tsunami. This health center – described in more detail below – was not initially intended for use as a shelter. Yet after a few weeks, the facility needed to resume routine operations. Because the shelter was an ad hoc system, the same level of information was not available for these residents compared to other government run GP and SW shelters. They were left to their own devices to find alternative sheltering or housing arrangements (Miyamoto, 2011).

Walls of GP shelters had extensive signage informing shelter residents about available services, relocation of government offices, and temporary housing (see Figure 4.4). Conversations with key stakeholders representing government officials, non-governmental organizations, and volunteer groups indicated that posting information in these shelters was the primary strategy to conduct outreach in the initial weeks after the catastrophe. Three months after the event, once people began to secure temporary housing through the lottery system, shelters still appeared to be the primary place for information distribution. Information was available online or at government agencies, but the GP shelters seemed to provide near “one-stop shopping” for information. Based on our findings, few coordinated mechanisms to reach out to those
survivors staying with family or friends, or who had secured apartments in cities well outside the affected areas, were in place at that time.

Figure 4.4

Signage with information about post-disaster services and resources were frequently posted on the walls of the general population shelters.
Although the lack of information access to those not in shelters was also
experienced by those people without disabilities, the situated lived experiences of
PWD within similar physical locations meant that this information disparity
potentially had stark implications for them, as noted by organization representatives
we spoke with who routinely worked with this segment of the population. Locating
PWD to give and collect information proved difficult in practice. Privacy restrictions
as found in Public Law No. 57 were cited as the barrier to sharing this information
(Act of Personal Information, 2003). A clause in the Disaster Countermeasure Act
allows for sharing of personal information in times of disaster (Chang et al., 2011).
Still, resistance to sharing information prevailed despite the allowances that should
have facilitated the coordination. Host municipalities receiving displaced survivors
were unwilling or unable to provide the names or addresses of relocated residents. One
volunteer organization that exclusively provides services to PWD attempted to
approach staff in the towns where they believed displaced residents from coastal
communities had evacuated to. With the exception of one town, all others refused to
aid the organization in acquiring information about their residents or giving them
access to information. This organization could have provided a crucial link to PWD.
Ten months after the catastrophe, volunteer organizations that routinely worked with
PWD were still attempting to find people they knew who had moved out of the area
and to provide services using the inefficient strategy of word-of-mouth.

Many non-profit organizations (NPO) or volunteer groups that routinely
worked with PWD stressed the need to find these survivors. The organizations pointed
out that specialized information about resources and services may be required. In one
community alone, over 50,000 people were listed on the municipality’s registry for
disability services. Again, because of privacy concerns about information sharing, those organizations were unable to access this database. What could have proved an efficient way to 1) determine how many PWD perished in the tsunami; 2) contact survivors; and 3) provide specific information about services and post-disaster recovery options relevant to their needs was instead not utilized. Ad hoc measures prevailed instead. For example, one NPO sent volunteers out with public health nurses who were reaching out to people requiring hearing aids. A useful approach, however, this clearly constituted only a very small segment of the disability community in the area. Three months after the tsunami, only 1,386 PWD had been located in order to provide information to (and thereby also services and resources). Over 48,000 people on the registry were still unaccounted for at that time. Those who worked most closely with this population knew very little about if PWD were receiving information in general, or if they were receiving information most relevant to their health status.

The high presence of ad hoc SW shelters and the lack of access to resources and services (note below) rendered PWD more likely to stay with family and friends for shelter, at least that is what we assume given their lack of presence in other shelters. Like people without disabilities situated in similar sheltering options, they were left without access to the same information widely disseminated in public shelters. Because of their social circumstances (e.g. lack of mobility, sight, hearing, cognitive abilities) – organization representatives suggested they were less likely to learn of this information elsewhere. The inability to systematically follow up with many of them – given privacy restrictions – left many questions unanswered about the extent to which information was reaching PWD in a timely manner.
Access to material resources

Initially, of course, survivors of the earthquake and tsunami relied upon each other for supplies. Some facilities, such as schools or hospitals just beyond the inundation zone, had supplies they could share. Households shared with households. In the days after the event, the first outside supplies and resources were brought in by the Japanese Self-Defense Force (SDF). Roads were impassable, infrastructure was destroyed and resources were scarce. The SDF used heavy machinery to clear some roads. Eventually, volunteer organizations and the private sector were able to provide additional support.

One key disparity that emerged from our field work was an apparent lack of material resources at many SW shelters in the initial weeks compared to what was present at GP shelters. This disparity includes supplies that were general purpose goods (e.g. blankets, fans, and wheelbarrows for debris and mud removal) desirable in any shelter and not specifically unique to the needs of SW shelter residents. Lack of clarity regarding organizational responsibility seemed a contributing factor to this disparity. Although both GP and SW shelters were opened to accommodate displaced residents, the organizations that were to be supplying the individual shelters with supplies and resources was not clearly established or understood.

For instance, we learned of one health center that, in an ad hoc effort, was converted into a SW shelter for those with disabilities. Community residents took their family members who had disabilities to that location because it was associated with health provision and their loved ones had received routine health service at the facility in the past. Unfortunately, however, the center had received little to no outside supplies because it was not officially designated a shelter. All the while, other shelters in neighboring areas had sufficient material resources. The disparity was present
weeks after the tsunami inundation and when volunteer groups and supplies had already reached the community. Volunteers distributing supplies at a GP shelter assumed that the health center was providing ongoing supplies and services for displaced residents staying at the site. Yet the health center staff believed their only responsibility was to provide a location for a shelter. The people we spoke with from the area explained how many residents did not complain of harsh conditions because they did not want to appear ungrateful. The result was a gap in supply provision, even after supplies were readily available in the area. At that time, residents in the ad hoc SW shelter were without sufficient blankets, even when their frailty and health concerns left them particularly vulnerable to the cold. It was only when volunteers providing footbaths - a type of eastern medicine where washing the feet in warm water helps bring the bad 'heat' down from the head – did those with access to the supplies learn of these unmet needs in the SW shelter.

Foot-bath volunteers became intermediaries to listen to the survivors’ stories and glean information about their needs. Information was then passed to those handling supplies in order to get the necessary resources where they needed to go. In this instance, volunteers transported approximately one hundred blankets to the SW shelter, where the majority of residents were PWD sleeping on cold floors (Miyamoto, 2011). This informal information network provided by volunteers was a crucial link in providing services and supplies that would otherwise not have reached PWD.

Most of the problems we heard about were at what seemed to be ad hoc or emergent SW shelters. It is unclear the extent to which these problems were present in SW shelters that were pre-established, where volunteers may have been better able to become aware of their existence. For example, a representative from volunteer
organizations distributing free eyeglasses (and providing free eye exams) stated that
the GP shelter they were located adjacent to was the only shelter in that particular
community they were visiting (see Figure 4.5). If someone was staying with family or
friends, or at a SW shelter in that area, they would not have had access to the
eyeglasses available from this organization. To some extent, these same problems
might have occurred in ad hoc GP shelters. Yet PWD may have difficulty transferring
from an ad hoc shelter to an established one. In some communities, officials did not
establish or delayed the establishment of SW shelters because they did not believe
they had sufficient resources to devote to it. We encountered one government hotel
operating as a GP shelter that, despite having actual rooms available, had residents
sleep in common areas such as the lobby. Only after several days, when someone at
the hotel was able to reach their superior, did they open up the rooms with beds and
private toilets to the elderly, PWD, and families with small children. In short, those on
site either did not think how the private space and special facilities could benefit some
shelter residents or they did not feel they had the authority to make a decision to open
up rooms. Staying at an ad hoc shelter, such as a health center or day care center
facility known to them, sometimes became the residents’ only option besides moving
to a GP shelter. Moreover, the health consequences for some PWD of going without
supplies such as blankets arguably is more life threatening than for those survivors
without disabilities and staying in ad hoc GP shelters.
Free eye glasses and eye examinations were provided to residents outside of one general population shelter.

A second resource disparity was related to situational access *within* GP shelters. Because of differences between SW and GP shelters, resources within GP shelters typically did not accommodate the specific needs of PWD. For example, GP shelters located in schools arranged for sleeping on the floor, sometimes with blankets or eventually mats. Without beds, many PWD experienced difficulty sleeping in the GP shelters, and we heard reports of some experiencing exacerbated health challenges as a result. Japanese-style toilets in GP shelters frequently did not allow for easy access or use. For example, one elderly woman we spoke with recalled needing to use
the toilet several times during each night. In order to get up off the floor, move to the toilet facilities, and then use the facility itself, she required the physical assistance of several men. In addition to privacy considerations, her physical well-being – she could have fallen at any point - was jeopardized during these efforts. She eventually was transported to a SW shelter, but her experiences highlight a dilemma for people with disabilities. Certain aspects of the SW shelter may better accommodate PWD compared to GP shelters, but GP shelters may also be more likely to garner supplies – particularly when the responsibility for the operation and supplying of the SW shelters are unclear.

The previous two disparities are linked to the immediate and short term relief period. A third disparity was noted in the short term recovery period – a phase we are defining in this event as the period when most evacuees had moved out of the public shelters into temporary housing. We found that situational access to supplies was linked to public shelter versus temporary housing accommodations. As displaced survivors began transitioning from the public shelters into homes scattered in fields and parking lots throughout the community, we quickly noticed that many of the supply warehouses were located in close proximity to the public shelters. In the initial response period, this made sense. As donations and formal flows for critical supplies came in, after all, they would be particularly needed by those staying in the shelters. As people moved out of the shelters, however, it became increasingly difficult for survivors to access these available goods. They needed to come to the warehouse themselves, or, if they were fortunate, make contact with a volunteer organization who was delivering supplies to private homes. It seemed from our conversations that there were many volunteers willing to engage in such assistance. The challenge for them
was connecting with those in need. Although problematic for all displaced survivors, again, survivors with mobility disabilities would have a hard time accessing transportation to these sites.

To illustrate using one example, we encountered a very elderly couple with serious medical concerns. The walls of their housing unit were weeping with condensation. Although many fans had been donated and were available at their community’s donation warehouse (see Figure 4.6), they had been unable to acquire a fan to contend with the heat and humidity in their temporary unit. Indeed, they were unaware that so many fans were actually available. With access to only a bicycle (for the husband) and a motorized mobility scooter (for the wife), it was extremely difficult to visit the warehouse routinely, if at all. Instead, a relative finally purchased a fan for them.
Donated fans were readily available at this supply warehouse.

The elderly woman was essentially trapped in her own home. She had difficulty traversing the steps from the unit and the rocky stones covering the lot made it impossible for her to use the scooter (see Figure 4.7). In January 2012, we visited several temporary housing areas where municipalities had installed ramps to individual units – not solely community buildings – and made outer areas easier to walk on. This effort facilitated access to outside resources. Some unit groupings were
not close to public transportation. Where public transportation was in close proximity to the housing units, access to resources was also enabled. Yet even in these cases, accessing donations at supply warehouses was challenging for individuals with mobility limitations.

Figure 4.7

Rocky stones covering the lot in this temporary housing area made it impossible for one elderly woman to use the scooter, thus limiting her independent mobility.

Displaced individuals could apply for temporary housing at public shelters, government offices, and online. Yet some survivors delayed accepting a temporary
housing unit, despite efforts by the government to close down the shelters. In the town of Minamisanriku, for example, households given preference in the lottery – due to having elderly family members or children – initially declined a temporary unit at a rate of twenty percent (Miyamoto, 2011). We heard from some elderly survivors in another community who were still in the public shelter system that they were concerned that they would not receive food and other supplies if they moved out of the shelters. Being cut off from those supplies outweighed their initial desire to have a temporary house.

When attempts were made to address needs or make shelters and temporary housing accessible for those with functional needs, efforts often did not go far enough to fully eliminate or substantially reduce disparities. There were some exceptions, however, that had emerged over the first six months after the catastrophe. For example, one near-thirty year old organization we encountered was originally established to provide job skill training to PWD. After the tsunami, a large donation from a private corporation helped the organization expand its mission to meet the needs of more people from the disability community. The organization received financial resources to retrofit the temporary houses with bathroom access ramps, anti-slip pads for bathtubs, and hand-holds for different areas of the house. The items were purchased by the volunteer organization and, with the help of occupational therapists, properly installed in the homes of those with disabilities or other functional or access limitations in order to increase independent mobility.

In sum, the physical siting of PWD appeared to have significant effects on their ability to access material goods. Those physical constraints were exacerbated by their live experiences within that environment. Poor organization and role designation
in SW shelters may lead to a lack of blankets in those facilities even when GP shelters are adequately supplied. Yet given other considerations – such as the availability of beds and accessible toilets, PWD are relegated or choose to stay in these facilities. Socially situated in a system that separated shelter service, did not adequately manage operational roles, and limited mobility to visit surrounding shelters left some survivors without blankets. For survivors contending with health challenges, exposure to the cold can become a post-disaster threat to well-being as life-threatening as the initial disaster itself.

Access to services

The presence of various volunteer groups and aid organizations was inconsistent across shelters. That is, one organization might have a strong presence in one particular shelter in one community, but not be present in another. For example, in one GP shelter we visited in June 2011, a medical clinic was in operation staffed with medical personnel providing service under the auspices of the Japanese Red Cross. At another GP shelter we visited, the Red Cross did not have a consistent presence and we saw no evidence of an onsite medical clinic. Both shelters, although in different communities, were located in schools, and both had very elderly people as occupants. In other words, a frail elderly survivor displaced in one shelter had daily access to physicians and other health care providers as well as facilities to support some level of onsite care. A frail elderly survivor in another shelter did not have such access to on-site health services.

The skills of service providers in the shelters was also inconsistent, even if well-meaning. We encountered one non-profit organization in a large metropolitan area that sent personal health aides and occupational therapists to assist at shelters.
Interviewees stated that even staff at SW shelters sometimes did not have training to assist with the specific needs of PWD. For shelters not as geographically proximate to large urban areas with operating organizations able to send such specialized staff, this kind of health support in even SW shelters might have been delayed or lacking.

*Follow-up* with survivors leaving the shelter system was reported as inadequate, which could have dire consequences for PWD. Whether due to the scale and scope of the event or because of a lack of organizational responsibility or system to account for survivors in the shelter, we heard reports that people with disabilities who made some initial contact with an established public shelter were frequently not followed up with once they left the facility. For example, we talked with members of one organization that routinely provided service for PWD. The building housing the organization suffered very little damage from the earthquake, was not inundated with water from the tsunami, and they did not suffer any staff fatalities. Staff members were able to connect with some of their network of “friends” or clients and help them to a nearby shelter. Unfortunately, the shelter was ill-equipped to meet the needs of PWD. As an alternative, the survivors in the friend-network were taken to the organization’s office building and sheltered in place with a few staff members. Water was working in the building, a supply of food was available, and there was a battery operated hot-plate on which to cook. A neighbor to the organization was soon able to provide electricity from their generator. The staff and friends who stayed there were self-sufficient in the weeks after the disaster. Despite making initial contact with the established public shelter, no follow-up occurred to ensure that their ad hoc shelter was meeting the needs of the survivors or to provide a link with additional services that might have become available since those initial post-impact days.
As noted above, moving out of public shelters into temporary housing or with other caregivers created disparate challenges for PWD compared to the general population. Just as material resources were more difficult to acquire, so too were some services that had previously been provided by volunteers in the shelters. This service provision shift was, in many ways, consistent across the survivor population. That is, as survivors transitioned to temporary housing, reduction in relief services was experienced by people with or without disabilities. Yet for people with disabilities, the service reduction by disaster volunteers sometimes led to a gap in need-fulfillment. Similar to the difficulty in finding transportation to volunteer centers for resources, we heard reports of PWD struggling to secure regular and appropriate transportation to areas where volunteer services were available. Some volunteer services operating in smaller geographic areas were able track the relocation of displaced residents with disabilities, but that was more challenging in larger towns or cities. These survivors were entitled to additional support by Social Welfare Councils; however, if their whereabouts was unknown, outreach could not occur.

Consistent with a long history of evacuation research dating back to work such as Drabek and Boggs (1968) many people affected by the Tohoku catastrophe chose to go to the homes of family. This may have occurred immediately after the March 2011 event or after several days or weeks in a SW or GP shelter. Because the homes of host family members were often not in close proximity to the inundation areas (which was why they were not uprooted themselves), displaced residents’ new locations were typically unknown to the municipality they left. It seemed, based on interviews with volunteers during field work in June 2011, the farther a household moved across the country from the impact area, the harder it was to find and establish contact, let alone
provide disaster-related or routine social services the resident was entitled to. Based on our interviews with members of volunteer organizations in January 2012, the residents who sought shelter with family members in unaffected areas immediately following the event still remained a concern to those organizations seeking to help PWD even nearly one year after the event. Unlike shelter residents, whose access to service was situated in the facility they happened to find shelter in, access to service for those out of the public shelter system was situated in their proximity to service providers and in the extent to which their temporary housing arrangement was known to service providers themselves.

**Discussion**

The conclusions of this study on sheltering and temporary housing after the 2011 Japan Tohoku earthquake and tsunami point to the importance of situated access – or the ability to acquire and utilize information, material resources, or services based both on the physical location of the individual or group and the social standpoint or circumstances of the individual or group within that physical location – or if and how post-disaster survivors receive assistance. The physical location PWD found themselves housed in was important, but so too was the social context of PWD in Japan affected how they experienced their physical situated-ness.

In this case, we found evidence of disparities for PWD that was connected to their shelter and housing location. GP shelters seemed to offer greater access to information about the housing, shelter alternatives, and other forms of assistance. We heard reports that such information was less present at SW shelters and ad hoc shelters. Information was difficult to acquire on PWD who found housing with
relatives – particularly if those accommodations were far from the inundation area. It was equally challenging to get information to those outside the public shelter system.

Although information was difficult to disseminate to people without disabilities situated in similar ad hoc shelter or housing arrangements, the potential dire consequences for PWD included failing to get in a lottery for housing (even when they would have had priority); not being aware of special assistance that would best meet daily living needs; and not having a say in the reconstruction process from the perspective of PWD. Access to some resources was more readily available at GP shelters, particularly compared to ad hoc SW shelters. Differential access to other resources within GP shelters – not designed to accommodate PWD – was also apparent. That is, PWD had less access to some resources within these same shelters because of how PWD were situated socially within the community, the culture, and the post-disaster environment. People in public shelters had greater access to both some services and some supplies compared to temporary housing, with particular consequence for PWD who had limited access to transportation. Access to services was inconsistent across GP shelters, and skill sets needed to serve some survivors with disabilities were not consistent across shelter and housing environments.

There are some limitations to our conclusions. First, we were unable to directly observe activities in SW shelters, as we did in GP shelters, and in those instances relied on information collected from briefings and interviews. Although the information we received was consistent across sources and demonstrated fit in the field through conversations with key informants on our third visit to affected communities, we would have preferred to triangulate that information with direct observation in the shelters themselves. Second, we see the value in conducting a more
systematic study for situated access in shelters. The scope of our initial research was quite broad, focused more generally on the social impacts of the catastrophe and then somewhat specifically on the impact of disasters on people with disabilities. The issues surrounding situated access emerged over the course of the reconnaissance field work despite not directly including it in our initial questions. Given the potential effects of differential access to assistance based on sheltering and housing options, a great deal more research is needed in this area. Further research may benefit from follow-up interviews with more survivors to detail their journeys out of the impact area and into their current living arrangements.

Indeed, these findings from the Tohoku event, one catastrophic in scale and scope, have implications beyond the event itself. Japan has increasingly acknowledged the need for universal design or barrier free environments to limit differential access by PWD. In a like manner, the United States has increasingly placed an emphasis on redefining access to services and resources in the post-disaster environment as a civil rights issue under the Americans with Disabilities Act. If access to information, resources and services are situated by place and social circumstances, and if PWD are by choice or circumstance placed in locations that differ from others, the ability to reduce disparities is compromised. The increased cultural value placed on equal access regardless of function or cognitive ability combined with the logistical challenges of a post-catastrophe environment demand consideration of how best to address such issues in the planning and post-event phases.

The goal of universal design in Japan strives to make access and use of space easier for everyone regardless of age or physical ability, without having to adapt the environment (Saito, 2006). For instance, a ramp that allows someone using a
wheelchair to access a building also allows a caretaker pushing a baby carriage greater ease of access. Although universal design conferences have taken place in Japan and have been viewed as an efficient solution to many people being able to use the same space without restraint (Marcus, 2003), other research suggests some buildings in Japan will be slower to implement universal design principles than others because of the cost (Saito, 2006). In the post-disaster environment, the gap between the goal and the reality of universal design has consequence. Political will is necessary to make the kind of universal policy changes necessary. SW shelters may be better equipped to allow for mobility and other health consideration, yet if there is a resistance to establish them and a failure to adequately supply and service them, the lack of access within GP shelters generates disparities. As suggested by Fukuzawa (n.d.), designing GP shelters as barrier free and following universal design principles would perhaps facilitate broader access to information, supplies, and services.

In a similar manner, the United States has increasingly placed emphasis on access as a civil rights issue. The Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 prohibits public shelters from refusing access to those individuals who identify with having a disability during presidentially declared disasters (FEMA, 2011). In more recent years, various disability-rights communities have increased pressure on emergency and shelter managers to provide equal access to PWD. They argue that individuals should not be relocated to another shelter if the shelter does not appear to be able to handle their needs. Such a forced relocation would be considered a direct violation of their civil rights (Americans with Disability Act of 1990 [ADA], 2011). When a person identifies with a disability, their functional needs must be met by services coming to them. Simply put, regardless of the health
conditions people have, if they made it to a public shelter the law requires that shelter staff allow them to stay. As a result, people with a variety of disabilities share shelters with those without disabilities. Equally important, the framing of the law leads to a directive that one type of sheltering option should be available to all people. Separate but equal shelters are not permitted. The American Red Cross as well as relevant local and state agencies charged with shelter provision have taken measures to comply with the relevant laws surrounding the issue, although from the perspective of many groups advocating for the rights of people with disabilities, more needs to take place.

Many of the same challenges experienced in the Japan context are present in the United States. For example, concerns exist regarding the extent to which tracking or disability registries are effective, secure, or legal to share. Others contend that ensuring the stark reduction or elimination of disparities is impossible in catastrophic events. Reasonable accommodations during routine periods, they would argue, become too burdensome during disaster. Until local government is recreated in local communities, access inequity is inevitable. Here is where we return to the concept of situated justice initially used as a departure point for our consideration of situated access. Greater research is needed to understand how PWD conceptualize justice and adequate access to services in post-disaster and catastrophe environments. Indeed, assumptions of helping the general population arguably ignore that the general population is comprised of people who have a range of needs, perhaps based on ability, need, language, domestic circumstance, or any number of issues. Making a public shelter available for all people does not inherently lead to equal service provision. Intent to create a separate but equal circumstance does not necessarily lead to equal outcomes. As we saw from Japan’s Tohoku event, disparities can occur when
PWD are located in different sheltering and housing arrangements, but also when they are located in the same sheltering or housing arrangement as people without disabilities. Inadequate information dissemination about the housing lottery to people staying with family and friends disadvantages all evacuees in certain housing arrangements. Yet it disproportionately disadvantages people with disabilities who would otherwise have received housing priority had they known to put their name in the housing lottery. Such disparities have consequences beyond the post-impact phase and potentially extend well into the recovery period. The reasonable accommodations may be controversial in the disaster management community, yet many of the examples noted in our research did not demand unreasonable accommodations compared to what was undertaken for the general population, even in the midst of such a catastrophe. Moreover, there are frequently many organizations not typically a part of local emergency planning who could augment post-disaster services and work to ensure essential needs are met, if allowed to do so. In Japan, several organizations tried to locate evacuees with disabilities, but lack of understanding about privacy restrictions and failure to integrate these organizations more fully in the response left them unable to adequately help. Access to certain toilets may appear a post-disaster luxury from some perspectives, but for others it may mark the difference between life and death if a fall results. Locating donated supplies away from temporary housing could emerge as an inconvenience for some, but for a person with a disability it could result in a disparity that compromises short and long term recovery. What perspectives can be brought to the planning table to enable greater equity – as conceived of by PWD – after such catastrophic events?
Conclusion

It remains a formidable task to ensure that PWD have equal access to the assistance they need in the post disaster environment of a more predictable concentrated event. The 2011 Japan catastrophe shows us that providing equal access to upwards of 400,000 people displaced from their homes across multiple jurisdictions is an even more daunting task. Yet it must be undertaken if we wish to ensure that all survivors of these events have an equal chance for survival, quality of life, and successful recovery. Most importantly, involving members of the disability community in our planning processes to address these issues is paramount. When people with disabilities are not adequately involved in the planning process, the available services are more likely to fall short of what is required to meet the needs of PWD staying in shelter environments (Wisner, 2002).
Chapter 5

CONCLUSION

The findings from this research have important implications for administration of emergency management. Research on policy and planning documents showed that disability frameworks play a role in the framing of disaster management. That is, different documents identify the needs and responsibility of disaster planning and response, with respect to PWD, differently. Consequently, the level of inclusion in planning and response, and the leanings of various management trajectories (e.g. problematizing an individual’s condition versus problematizing the social or physical environment they find themselves in routinely or during a disaster) differ. Given that practice is influenced and, indeed, often mandated, in accordance with these documents, this research demonstrates that how we talk (or write) about disabilities has implications for practice. The research in the dissertation also shows that consideration of disabilities, access, and functional needs is not a matter than can be negated to the periphery of disaster planning. Survey research presented here showed that people in households where someone has a health or access concern are just as likely to see public shelters as an evacuation option (sometimes a first option) as those households without identified health or access concerns. As Lazo (2013) pointed out in her study of the 2009 lawsuit brought by Communities Actively Living Independent and Free against the City of Los Angeles – which resulted in a ruling that the City had “broken federal and state law in failing to plan adequately for the needs of people with disabilities during disasters” – assumptions that emergency managers can take up such
considerations in an ad hoc way during an event are not acceptable. Despite that improvisation of some sort is inherent to the unexpected nature of disaster (Wachtendorf, 2004), planning remains an important aspect of disaster management, both facilitating appropriate improvisation and allowing the time and space to engage in it, when necessary (Kendra and Wachtendorf, 2007). Anticipating that people with disabilities will seek shelter at public shelters is not a characteristic that can be presented as unexpected. And certainly, when organizations fail to adequately account for the diverse needs of PWD in disaster situations, the consequences can prove dire. This research shows, through a close examination of the 2011 Great East Japan earthquake and tsunami, that people experience disaster differently depending on their physical and social standpoint. Introducing the new term, situated access, findings clearly demonstrate how access to information, services, and resources differs according to the intersection of where one finds themselves (location) with how one experiences that location given their social experience in that environment. The case study of Japan’s 2011 disaster allows us to clearly see how planning for people with disabilities is an inadequate approach. The ways in which physical and social situatedness influence the experiences of PWD is best identified and contended with through inclusive planning, or planning with PWD.

A lack of inclusion underscores the fact that, globally, people with disabilities encounter a greater risk of displacement, destitution, injury, and possible death during and after disasters compared to the rest of the population (Priestly and Hemingway, 2008). Often, the word ‘inclusion’ is utilized to either favorably reflect on disaster planning or is generally misunderstood, while, in reality, disability groups are not aware of possibilities for engaging in activities (Kett, Stubbs, & Yeo, 2005). While
policies require planners to include PWD in disaster planning, there is a lack of agreement between what policies stipulate and what exists in plans.

Certainly, state plans address PWD and, more recently, AFN. PWD and the elderly were two initial groups defined by planners as ‘at-risk’ or ‘vulnerable’ to disasters. A recent shift in the view of PWD suggests the focus should be less on categories or groups of people and more firmly focused on people’s abilities. Additionally, terms or phrases to describe PWD often place the person in the role of victim (Oliver, 1996). The evolution from an overarching category of special needs to AFN moves away from the damaging paradigm that everyone with ‘special needs’ is incapable of doing things for themselves (Zola, 2005). Plans that continue to reference the term ‘special needs’ or place people into a special needs category reinforces the paradigm. This is a cause for concern, as these plans are what emergency managers refer to when preparing for and responding to disasters. Policy narratives driven by outdated terms of reference can influence how those who enact that policy consider or treat PWD or AFN.

While there are costs associated with involving the public in disaster planning, the inclusion of PWD can benefit the planning process (Murphy, Falkiner, McBean, Dolan, & Kovacs, 2005). The lack of understanding of disabilities and of what an AFN is and who might have one – or more – results in situations in which necessary services and resources are limited or nonexistent. A disaster can cause injuries or other health considerations, whereby there is a possibility of an expanding number of AFN as a disaster unfolds. Emergency managers may take into account some types of disabilities when planning, but this does not preclude planners from considering other types of AFN in the planning process. In this way, if a PWD arrived at a shelter, their
needs would be met while at the same time also meeting the needs of others in the shelter. This finding poses serious implications for the ways in which planners take on the challenges associated with providing disaster shelter to the public. The experiences people have in the shelters will have far-reaching ramifications, especially for PWD or AFN whose experience may be predicated on their health or access concerns.

An important finding to emerge from this research is the interaction between national level law and interpretation on a prefectural (or state) level. The Japanese Disaster Countermeasures Act provides unique considerations for PWD. Even with this act, the catastrophic devastation after the earthquake and tsunami highlight how little is known by municipalities of assistance that can be provided for - and in conjunction with - PWD. A clause in the Disaster Countermeasures Act allows for the sharing of private information on PWD to assure there is a way to track and provide services and resources post-disaster. After a catastrophic event that disproportionately affected PWD and others with specific AFN (Tatsuki, 2013), municipalities did not understand that they were, in fact, able to share the information of PWD in order to assist in relocation. Insufficient numbers of accessible shelters increased the likelihood PWD lost touch with local government, as people sought out public shelters or private residences that were not within their home municipality. Further, the unknown ad hoc shelter locations supporting PWD left critical gaps in fulfilling the needs of PWD. Municipalities did not know the location of shelters populated mainly with PWD, and so were routinely unable to provide lifesaving services and resources. Paradoxically, municipalities are in the best position in the government hierarchy to know about their regions’ vulnerabilities and to take actions in support of decreasing the vulnerability.
However, to achieve this, higher levels of government, such as the national level, must support the municipalities’ undertakings (Murphy et al., 2005).

Lest Japan appear as the only nation that struggles to incorporate PWD in planning, one has only to look at the way PWD are involved in planning in the United States to recognize similar disconnects between policies and plans. State accountability for maintaining services and resources for PWD during disasters is essential. If disasters become a justification for setting aside these responsibilities, PWD then face exacerbated challenges. This is particularly troubling if agencies receive minimal or vague guidance regarding their responsibilities for assisting PWD during disasters. In a lawsuit brought against New York City by the Brooklyn Center for Independence of the Disabled, the judge ruled in favor of the plaintiffs, citing deficiencies that put PWD at increased risk to physical harm based on inadequate evacuation resources, accessible sheltering resources, and insufficient information on emergency services (Brooklyn Ctr. for Independence of Disabled v. Bloomberg, 2013). In this case, the incorrect assumptions made in the planning process about agency capabilities to respond to the needs of PWD during disasters illustrates an overwhelmed system, incapable of fulfilling planning assumptions.

The socially entrenched aspects of disability, AFN, and disasters have serious implications for negatively affecting people's safety by increasing their risk of death and injury in disasters. While use of cell phone towers to disseminate vital warning information on the March 2011 tsunami was lifesaving for some, many PWD were left in their homes without access to necessary information, and, in many cases, unable to physically move from their locations to a safer place (Tatsuki, 2013). Without evacuation assistance, PWD were, literally, left behind as others self-evacuated. For
those with disabilities, they found themselves in a situation not uncommonly found post-disaster, wherein the problems associated with the disaster itself were worsened. The deaths of caregivers in and outside of the family, relocation to unknown environments not equipped with appropriate aids or devices, and a dearth of food, water, sanitation, and information renders PWD even more socially isolated than those in the general population (Edmonds, 2005). Plans must address these known issues in order to decrease the mortality and morbidity that PWD suffer post-disaster. It is imperative to educate local planners and emergency managers about laws and regulations to improve the experiences of PWD in the aftermath of an event while encouraging members of the disability community to personally prepare their household for disasters.

Undoubtedly, gaps identified by Priestly and Hemingway (2008) that detail a lack of guidance, resources, commitment, and knowledge in disaster planning for PWD are best addressed in conjunction with the disability community. In areas with prior disaster experience, emergency managers acknowledge the impossibility of meeting all the needs in the community (Kartez & Lindell, 1987). Utilizing the knowledge of disability organizations and researching large databases provided by government organizations that track different types of disabilities (e.g. Center for Disease Control’s Social Vulnerability Index) enables planners to make necessary adjustments to plans to assure compliance with laws and make meaningful improvements to disaster planning. Communities know their members - and their members’ needs – best, and engaging in disaster planning relevant to specific communities reaps the benefit of a community more prepared for a disaster (Murphy et al., 2005).
This dissertation does not set out specific actions to solve the complex issues surrounding disabilities and AFN in the disaster context. The tasks associated with planning for potential disasters are inherently copious and multifaceted, especially when considering the interconnected nature of these tasks. Recognizing this complexity, this dissertation can only make broad recommendations that may aid in better planning.

Of foremost consideration is understanding that the frames used to consider or portray PWD and AFN are powerful forces that have far-reaching ramifications. These frames manifest themselves in planning documents and policies. The limitations of the plans and policies, in turn, influence how the underlying principles of the documents are carried out and brought to bear during disasters. While legislation attempts to address an identified problem, the entrenched ideas surrounding disabilities continue to put PWD or AFN in disadvantaged positions in society. These disparities can then carry through to disaster situations. If the view of PWD or AFN is of people who are unable to function on their own and who are always in need of assistance, an able-normative lens will result in differential treatment. Planners must understand that how they frame the documents and plans sends a message. This message leads people to a belief orientation of how they are likely to be treated during a disaster. The belief that the treatment may be unfair or discriminatory may cause people to choose to remain removed from emergency and disaster management activities. Indeed, they may be correct in that belief, given evidence that differential access for PWD or AFN can emerge both within similar facilities and when segregated to alternative sites.
Individuals who take part in planning need to have an understanding of which frame, or frames, appear in planning documents. Moreover, it is imperative that they make meaningful changes towards greater inclusion and meaningful disaster preparation and response.

People prioritize what needs to be done when planning. The influence of a person’s personal views of PWD and AFN inform what constitutes an important task and dictates how quickly the task is addressed, as well as what resources and services are assumed necessary. PWD and AFN should be on the planning agenda, but it is possible that disabilities and AFN are not high planning priorities even with current federal policies enumerating planning requirements. If disabilities and AFN are not viewed as an important part of the planning process, or are only tangentially addressed while fulfilling state-requirements, crucial planning assumptions to address needs and services are likely to be missed, skipped, or forgotten altogether. Relegation of disabilities and AFN to a second-tier planning problem sends the message that the people, resources, and services associated with disabilities and AFN are not as important or as pressing a concern compared to other priorities. However, the rapidly aging population, the presence of people with newly diagnosed disabilities, and the number of people with disabilities living in community settings, among other factors, increases the number of people who may be in the category of PWD and AFN. Consequently, it is even more imperative to make AFN a planning priority.

Policies and guidance are there for a reason - to help make it equal or to ensure that policy is implemented in the fashion it was originally designed. It behooves
planners to know what the guidance documents say and actually try to meet the standards as laid out in the documents. These documents align closely with the policies and set out ways to operationalize the intent of the policies. These documents are designed by people who have a stake in working in the federal office that represents the class of people the policy is designed to protect. FEMA provides guidance documents for planning for AFN which are written based on federal policies. Individuals who are subject matter experts write the guidance documents that are accessible to planners.

People need to realize and understand that many people have AFN in communities. These issues are not limited to PWD. Assuming everyone who does not have a legally defined disability is self-reliant and that all PWD need help in ways defined by a medical or charity model overlooks the range of needs in our communities. The impetus behind the AFN paradigm shift is AFN acknowledgement that people without disabilities also have needs. A broader approach to considering the strengths and vulnerabilities of the community is appropriate. Indeed, we must be bold in our inclusion of different perspectives, allowing for the fact that people might better know their capacities and vulnerabilities than domain experts and that holistic consideration of AFN can improve planning for the whole of the community, not solely for those who are assumed to fall under specific categorization.
Future Research Considerations

The area of research at the intersection of disabilities, AFN, disasters, and policy is largely uncharted territory with a plethora of research possibilities. Understanding how PWD and AFN are included in the disaster policy and planning process demonstrates opportunities for improvement. Given that United States federal policy dictates the best way to gain understanding of what people need is to bring the people with the needs to the planning table, many states lag behind in this type of inclusion. A key question is: Are disability community groups being included in the planning processes and to what extent are larger, state-run planning groups utilizing the input of these groups. Further, are resources available to enable disability advocacy and support groups to connect with other groups to facilitate information flow, appropriate planning, organizational response, and general participation?

Disability groups know and understand the communities they serve. Consequently, there could be numerous groups each with their own constituencies. As each group represents different constituencies, planners must involve a wide range of groups. If planners purposefully or inadvertently do not include disability groups or individuals who identify with disabilities in the planning process, potentially lifesaving information for the needs of PWD and AFN have the possibility to be left out of plans.

Especially for cities that have been named as defendants in civil rights litigation because of disaster planning, understanding what, if anything, is changing in the wake of these lawsuits is paramount. One area of needed research includes comparisons between cities with judicial rulings by courts to comply with federal policies and cities that have not been part of a disaster-related lawsuit in order to investigate the differences in policies and implementation. It is imperative to understand if plans are reflecting federal policies. If cities are not changing their plans
even after judicial rulings to comply with laws, PWD remain at an increased risk of physical harm to disasters compared to others in the population.

The most fundamental and important step for further research is to gain a greater understanding of AFN. While many people may identify with a disability and be protected from discrimination by the Americans with Disability Act (ADA), other people may have temporary impairments or health or access concerns that are not considered disabilities. Thus, the person may have an AFN. These needs should be documented on a household level, for all members of the household. While the U.S. Census and American Community Survey require disability information on household members over the age of five, both miss out on valuable data concerning household members who may have AFN by virtue of their age or transient diagnoses. To create a survey designed for each member of the household with specific health or access concerns that cross-cut all five AFN areas (i.e. communication, medical, independence, supervision, and transportation) would be beneficial in understanding what areas of possible need are present on a household level. Additional data on the perception people have regarding how they believe their needs might change, or how a disaster might affect their AFN would inform planning. As planners are to be addressing AFN rather than specific people, having information that could have generalizable and scalable applications are worthwhile to communities. It is on a community level that people seek out disaster assistance, whether it is public shelter or assistance in evacuating, therefore planners should include AFN and realistic planning assumptions.

This work serves as a crucial advancement in understanding the intersection of PWD and disaster policies and plans. As an overlooked segment of the population,
PWD are currently recognized as full members of the population with rights to disaster resources and services. This is a heartening trend, as the number of people that these disaster policies will cover is ever increasing due to the rise in the prevalence in disasters, as well as the number of people who identify with disabilities, access, or functional needs. The aging population in the United States, and indeed world-wide, increases the likelihood disabilities are present, and as the baby boomer generation ages diagnosed disabilities will only increase. Considering AFN, there are even more individuals who may seek out public shelters or disaster services that do not fit with mainstream planning.

Emergency managers cannot ignore the fact that PWD and others with AFN are part of their communities. There cannot be assumptions made based on personal preference or anecdotal evidence. Assuming that because one did not see someone in a wheelchair use a public shelter does not mean that no one in the public shelter had a disability. As Kett, Lang, and Trani (2009) aptly pointed out, emergency managers assuming they do not personally know PWD is erroneous. The assumption that disabilities can always be seen or pieces of information people disclose is inaccurate. Rather, PWD and individuals with AFN are everywhere, regardless of whether one personally knows about any health or access condition. That is precisely why disaster policies change. These federal level policies and their implementation have far-reaching implications for the experiences PWD have when preparing for and responding to disasters.

The complexity of taking current planning assumptions based on outdated disability models that are discriminatory and remaking these assumptions based on new, more appropriate trends in disability studies is not to be taken lightly. As
highlighted by recent lawsuits, these changes grounded in people’s ability to be independent must occur, but will require an ongoing dialog between the disability community and planners. The hope, here, is that by further including the heterogeneous group in the broad consideration of disaster research, improved policies may result that positively affect the experiences of PWD during disasters.
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Appendix A

IRB APPROVAL LETTERS

Figure A.1

Institutional Review Board approval for RAPID: The Tohoku Catastrophe-Volunteers and Non-Profit Organizations in Post-Kobe Japan.
Based on the risks, this project requires Continuing Review by this office on an annual basis. Please use the appropriate renewal forms for this procedure.

If you have any questions, please contact Nicole Farnese-McFarlane at (302) 831-1119 or nicolefm@udel.edu. Please include your study title and reference number in all correspondence with this office.

Figure A.2 (Continued)
## Appendix B

### QUESTIONNAIRE VARIABLES

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<td>Q9everevac</td>
<td>Have you ever evacuated your residence for a hurricane?</td>
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<td>Question 13</td>
<td>Have you ever sought shelter at any of the following places because of a hurricane threat? Please answer yes or no for each. (y/n)</td>
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<td>Q13Apubshlt</td>
<td>Have you ever sought shelter at a public shelter because of a hurricane threat?</td>
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<td>Q13BFriensht</td>
<td>Have you ever sought shelter at a friend's residence because of a hurricane threat?</td>
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<td>Q13Cfamshlt</td>
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<td>Q13Dhotshlt</td>
<td>Have you ever sought shelter at a hotel/motel because of a hurricane threat</td>
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<td>Q13Eothshlt</td>
<td>Have you ever sought shelter anywhere else because of a hurricane threat?</td>
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<td>Question 55</td>
<td>Where would you most likely seek shelter if a hurricane were to threaten your area in this coming year?</td>
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<td>Q55Apubshlt</td>
<td>Would they stay in a public shelter this year? (from Q55 this year)</td>
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<td>Would they shelter at a friend's this year? (from Q55 this year)</td>
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<td>Would they shelter with family member's this year? (from Q55 this year)</td>
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<td>Q55Dhotmot</td>
<td>Would they shelter at a hotel/motel this year? (from Q55 this year)</td>
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<td>Would they shelter in place this year? (from Q55 this year)</td>
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<td>Q55Fothshlt</td>
<td>Would they shelter somewhere else this year? (from Q55 this year)</td>
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<td>Q62sltheal</td>
<td>Does anyone in your household have health or access considerations that may impact their well-being in a public shelter?</td>
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<td>Question 63</td>
<td>Would any of the following physical or health conditions impact someone in your household were they to use a public shelter? Please answer yes or no for each.</td>
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<td>Q63Ablindeaf</td>
<td>Blindness, deafness, or severe vision or hearing impairment: Would any of the following physical or health conditions impact someone in your household were they to use a public shelter? Please answer yes or no.</td>
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<td>Description</td>
<td>Answer</td>
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<td>Value</td>
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<td>Q63Bphyslmt</td>
<td>A condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying: Would any of the following physical or health conditions impact someone in your household were they to use a public shelter? Please answer yes or no for each.</td>
<td>-</td>
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<td>Q63Cmemlearn</td>
<td>Difficulties learning, remembering, or concentrating: Would any of the following physical or health conditions impact someone in your household were they to use a public shelter? Please answer yes or no for each.</td>
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<td>Q63Dbreath</td>
<td>Difficulty breathing: Would any of the following physical or health conditions impact someone in your household were they to use a public shelter? Please answer yes or no for each.</td>
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<td>Q63Edietary</td>
<td>Special dietary considerations: Would any of the following physical or health conditions impact someone in your household were they to use a public shelter? Please answer yes or no for each.</td>
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<td>Question</td>
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<td>Type</td>
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<tr>
<td>Q63FregMed</td>
<td>Reliance on refrigeration for medication or special diets: Would any of the</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>following physical or health conditions impact someone in your household</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>were they to use a public shelter? Please answer yes or no for each.</td>
<td></td>
<td></td>
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<tr>
<td>Q63Gothcond</td>
<td>Are there any other conditions?</td>
<td></td>
<td></td>
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<tr>
<td>ReQ63FinalHATotals</td>
<td>Each person who answered 'yes' to any of the possible health/access concerns :</td>
<td></td>
<td></td>
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<td></td>
<td>From question 63</td>
<td></td>
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<tr>
<td>Q72housing</td>
<td>Can you describe the type of housing unit you live in? I am going to read a list. Please stop me when I note the type that best describes your home. Is it a:</td>
<td>Nominal</td>
<td>8</td>
<td></td>
<td></td>
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<tr>
<td>ReQ72HousManu</td>
<td>Do you live in a manufactured home?</td>
<td>Nominal</td>
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<tr>
<td>ReQ72HousMob</td>
<td>Do you live in a mobile home, trailer, or RV?</td>
<td>Nominal</td>
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<tr>
<td>ReQ72houssingde</td>
<td>Do you live in a single family home, detached?</td>
<td>Nominal</td>
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<tr>
<td>ReQ72hous2apt</td>
<td>Do you live in a unit with 2 apartments?</td>
<td>Nominal</td>
<td>27</td>
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<td>ReQ72houssingatt</td>
<td>Do you live in a single family home, attached?</td>
<td>Nominal</td>
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<td>ReQ72hous3or4apt</td>
<td>Do you live in a unit with 3 or 4 apartments?</td>
<td>Nominal</td>
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<tr>
<td>ReQ72hous5to9apt</td>
<td>Do you live in a unit with 5 to 9 apartments?</td>
<td>Nominal</td>
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<td>ReQ72hous10apts</td>
<td>Do you live in a unit with 10 or more apartments?</td>
<td>Nominal</td>
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<tr>
<td>ReQ72housassisted</td>
<td>Do you live in an assisted living facility?</td>
<td>Nominal</td>
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<tr>
<td>ReQ72housother</td>
<td>Do you live in a different housing structure?</td>
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<td>Q75educ</td>
<td>What is the highest level of education you have completed?</td>
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<td>ReQ75educnohighsch</td>
<td>Did not attend high school</td>
<td>Nominal</td>
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<tr>
<td>ReQ75edusomehighsch</td>
<td>High school but not completed</td>
<td>-</td>
<td>Nominal</td>
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<tr>
<td>ReQ75educompletedhs</td>
<td>Completed high school</td>
<td>-</td>
<td>Nominal</td>
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<tr>
<td>ReQ75educsomecollege</td>
<td>Some college but didn't finish</td>
<td>-</td>
<td>Nominal</td>
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<td>ReQ75educ2yrcollege</td>
<td>2 year college degree</td>
<td>-</td>
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<td>ReQ75educ4yrcollege</td>
<td>4 year college degree</td>
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<tr>
<td>ReQ75educmasters</td>
<td>Completed Master's or professional degree</td>
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<td>ReQ75educadvanced</td>
<td>Advanced graduate work or PhD</td>
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<td>Q74work</td>
<td>Are you working full time, working part time, looking for work, a homemaker, retired, or a student? [Interviewers: If you are given two, ask “which best describes you”]</td>
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<td>ReQ74workfulltime</td>
<td>Working fulltime [35 hrs/wk or more]</td>
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<td>ReQ74workparttime</td>
<td>Working part time</td>
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<td>ReQ74worklooking</td>
<td>Work status: looking for work</td>
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<td>ReQ74workhomemaker</td>
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<td>ReQ74workretired</td>
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<tr>
<td>ReQ74workstudent</td>
<td>Work status: student</td>
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<td>ReQ74workother</td>
<td>Work status: other</td>
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<td>Q86Aamerind</td>
<td>American Indian or Alaskan Native</td>
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<td>Q86Basian</td>
<td>Asian</td>
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<td>Q86Cblack</td>
<td>Black or African American</td>
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<td>Q86Dhawaiian</td>
<td>Native Hawaiian or other Pacific Islander</td>
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<td>Q86Ewhite</td>
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<td>Q89gender</td>
<td>The survey requires that I ask you this directly: Are you male, female, or other?</td>
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Category Three Hurricane: If the local authorities mandated that you evacuate for one of the following conditions, would you actually do so? Please answer yes or no for each.

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<td>Q78inc50k</td>
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<td>Is your household’s income more or less than $50,000 a year?</td>
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**LITERATURE VARIABLES**

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<td>Gladwin et al. (2001)</td>
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<td>Riad et al. (1999)</td>
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<td>Q13Bfrienshlt</td>
<td>Van Willigen et al. (2002)</td>
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<td>Drabeck &amp; Boggs (1968)</td>
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Appendix C

HYPOTHESES

H1: We fail to reject the null hypothesis at the $\alpha=.05$ (p=0.449) level of significance.
There is not a statistically significant relationship between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and staying in a public shelter.

H2: We fail to reject the null hypothesis at the $\alpha=.05$ (p=0.889) level of significance.
There is not a statistically significant relationship between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and staying at a friend’s house.

H3: We fail to reject the null hypothesis at the $\alpha=.05$ (p=0.923) level of significance.
There is not a statistically significant relationship between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and staying at a family member’s house.

H4: We fail to reject the null hypothesis at the $\alpha=.05$ (p=0.385) level of significance.
There is not a statistically significant relationship between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and staying in a hotel/motel.

H5: We fail to reject the null hypothesis at the $\alpha=.05$ (p=0.312) level of significance.
There is not a statistically significant relationship between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and sheltering-in-place.
H6: We fail to reject the null hypothesis at the $\alpha=.05$ (p=.667) level of significance. There is not a statistically significant relationship between someone in the household identifying with blindness, deafness, or severe vision or hearing impairment and staying in some other location.

H7: We reject the null hypothesis at the $\alpha=.05$ (p=.001) level of significance. There is a statistically significant relationship between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying in a public shelter.

H8: We fail to reject the null hypothesis at the $\alpha=.05$ (p=.149) level of significance. There is not a statistically significant relationship between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying at a friend’s house.

H9: We fail to reject the null hypothesis at the $\alpha=.05$ (p=.075) level of significance. There is not a statistically significant relationship between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying at a family member’s house.

H10: We fail to reject the null hypothesis at the $\alpha=.05$ (p=.727) level of significance. There is not a statistically significant relationship between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying at a hotel/motel.
H11: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.641$) level of significance. There is not a statistically significant relationship between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and sheltering-in-place.

H12: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.305$) level of significance. There is not a statistically significant relationship between someone in the household identifying with a condition that substantially limits physical activity such as walking, climbing stairs, reaching, lifting, or carrying and staying somewhere else.

H13: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.603$) level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulties learning, remembering, or concentrating and staying in a public shelter.

H14: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.588$) level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulties learning, remembering, or concentrating and staying at a friend’s house.

H15: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.681$) level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulties learning, remembering, or concentrating and staying at a family member’s house.

H16: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.266$) level of significance. There is not a statistically significant relationship between someone in the
household identifying with difficulties learning, remembering, or concentrating and staying at a hotel/motel.

H17: We fail to reject the null hypothesis at the $\alpha=0.05$ ($p=0.755$) level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulties learning, remembering, or concentrating and sheltering-in-place.

H18: We fail to reject the null hypothesis at the $\alpha=0.05$ ($p=0.113$) level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulties learning, remembering, or concentrating and staying somewhere else.

H19: We fail to reject the null hypothesis at the $\alpha=0.05$ ($p=0.425$) level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulty breathing and staying in a public shelter.

H20: We fail to reject the null hypothesis at the $\alpha=0.05$ ($p=0.320$) level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulty breathing and staying at a friend’s house.

H21: We fail to reject the null hypothesis at the $\alpha=0.05$ ($p=0.184$) level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulty breathing and staying at a family member’s house.

H22: We fail to reject the null hypothesis at the $\alpha=0.05$ ($p=0.280$) level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulty breathing and staying at a hotel/motel.
H23: We fail to reject the null hypothesis at the $\alpha=.05 \text{ (p=.284)}$ level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulty breathing and sheltering-in-place.

H24: We fail to reject the null hypothesis at the $\alpha=.05 \text{ (p=.845)}$ level of significance. There is not a statistically significant relationship between someone in the household identifying with difficulty breathing and staying somewhere else.

H25: We reject the null hypothesis at the $\alpha=.05 \text{ (p=.003)}$ level of significance. There is a statistically significant relationship between someone in the household identifying with special dietary considerations and staying in a public shelter.

H26: We fail to reject the null hypothesis at the $\alpha=.05 \text{ (p=.690)}$ level of significance. There is a statistically significant relationship between someone in the household identifying with special dietary considerations and staying at a friend’s house.

H27: We fail to reject the null hypothesis at the $\alpha=.05 \text{ (p=.074)}$ level of significance. There is a statistically significant relationship between someone in the household identifying with special dietary considerations and staying at a family member’s house.

H28: We fail to reject the null hypothesis at the $\alpha=.05 \text{ (p=.222)}$ level of significance. There is a statistically significant relationship between someone in the household identifying with special dietary considerations and staying at a hotel/motel.

H29: We fail to reject the null hypothesis at the $\alpha=.05 \text{ (p=.798)}$ level of significance. There is a statistically significant relationship between someone in the household identifying with special dietary considerations and sheltering-in-place.
H30: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.103$) level of significance. There is a statistically significant relationship between someone in the household identifying with special dietary considerations and staying somewhere else.

H31: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.053$) level of significance. There is not a statistically significant relationship between someone in the household identifying with reliance on refrigeration for medication or special diets and staying in a public shelter.

H32: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.266$) level of significance. There is not a statistically significant relationship between someone in the household identifying with reliance on refrigeration for medication or special diets and staying at a friend’s house.

H33: We reject the null hypothesis at the $\alpha=.05$ ($p=.027$) level of significance. There is a statistically significant relationship between someone in the household identifying with reliance on refrigeration for medication or special diets and staying at a family member’s house.

H34: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.536$) level of significance. There is not a statistically significant relationship between someone in the household identifying with reliance on refrigeration for medication or special diets and staying in a hotel/motel.

H35: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.296$) level of significance. There is not a statistically significant relationship between someone in the household identifying with reliance on refrigeration for medication or special diets and sheltering-in-place.
H36: We reject the null hypothesis at the $\alpha=.05$ (p=.038) level of significance. There is a statistically significant relationship between someone in the household identifying with reliance on refrigeration for medication or special diets and staying somewhere else.

H37: We fail to reject the null hypothesis at the $\alpha=.05$ (p=.059) level of significance. There is not a statistically significant relationship between someone in the household identifying with any other health or access concern and staying in a public shelter.

H38: We fail to reject the null hypothesis at the $\alpha=.05$ (p=.517) level of significance. There is not a statistically significant relationship between someone in the household identifying with any other health or access concern and staying in at a friend’s house.

H39: We fail to reject the null hypothesis at the $\alpha=.05$ (p=.174) level of significance. There is not a statistically significant relationship between someone in the household identifying with any other health or access concern and staying at a family member’s house.

H40: We fail to reject the null hypothesis at the $\alpha=.05$ (p=.070) level of significance. There is not a statistically significant relationship between someone in the household identifying with any other health or access concern and staying in a hotel/motel.

H41: We fail to reject the null hypothesis at the $\alpha=.05$ (p=.829) level of significance. There is not a statistically significant relationship between someone in the household identifying with any other health or access concern and sheltering-in-place.
H42: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.237$) level of significance. There is not a statistically significant relationship between someone in the household identifying with any other health or access concern and staying somewhere else.

H43: [landline] We reject the null hypothesis at the $\alpha=.05$ ($p=.008$) level of significance. There is a statistically significant relationship between someone in a landline household having a health or access concern that would impact their wellbeing in a public shelter and previous public shelter use.

H44: [landline] We reject the null hypothesis at the $\alpha=.05$ ($p=.000$) level of significance. There is a statistically significant relationship between someone in a landline household having a health or access concern and previous public shelter use.

H45: We fail to reject the null hypothesis at the $\alpha=.05$ ($p=.912$) level of significance. There is not a statistically significant relationship between someone in the household identifying with a health or access concerns and evacuating for a mandatory category 3 hurricane evacuation order.
## Appendix D

### HEALTH AND ACCESS CONCERN, SHELTER TYPE, AND SEXUAL IDENTITY

Health and access concern, shelter type, and sexual identity

<table>
<thead>
<tr>
<th>Health/access concern</th>
<th>Shelter type</th>
<th>Public shelter</th>
<th>Friend</th>
<th>Family</th>
<th>Hotel/motel</th>
<th>Shelter-in-place</th>
<th>Elsewhere</th>
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</thead>
<tbody>
<tr>
<td><strong>Blindness…</strong>*</td>
<td>Male</td>
<td>0.427</td>
<td>0.585</td>
<td>0.867</td>
<td>0.101</td>
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<td>0.665</td>
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<td>0.51</td>
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<td>0.339</td>
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<tr>
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<td>Male</td>
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* deafness, or severe vision or hearing impairment.
† physical activity such as walking, climbing stairs, reaching, lifting, or carrying
‡ α=.05

Health and access concern, shelter type, and income

<table>
<thead>
<tr>
<th>Health/access concern</th>
<th>Shelter type</th>
<th>Public shelter</th>
<th>Friend</th>
<th>Family</th>
<th>Hotel/motel</th>
<th>Shelter-in-place</th>
<th>Elsewhere</th>
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<td>Blindness...*</td>
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<td>Less than 50k</td>
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* deafness, or severe vision or hearing impairment.
† physical activity such as walking, climbing stairs, reaching, lifting, or carrying
‡ α=.05
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<th>Health/access concern</th>
<th>Shelter type</th>
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<td>Family</td>
<td>Hotel/motel</td>
<td>Shelter-in-place</td>
<td>Elsewhere</td>
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<td>Blindness…*</td>
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<td>0.289</td>
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<td>0.045‡</td>
<td>0.128</td>
<td>0.65</td>
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</table>

* deafness, or severe vision or hearing impairment.
† physical activity such as walking, climbing stairs, reaching, lifting, or carrying
‡ α=.05

Health and access concern, shelter type, and housing unit

<table>
<thead>
<tr>
<th>Health/access concern</th>
<th>Shield type</th>
<th>Public shelter</th>
<th>Friend</th>
<th>Family</th>
<th>Hotel/motel</th>
<th>Shelter-in-place</th>
<th>Elsewhere</th>
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<td></td>
<td>Manufactured home</td>
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<td>-</td>
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<tr>
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<td>Unit with 10 or more apts</td>
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<td>Single family home (attached)</td>
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<td>Unit with 3 or 4 apts</td>
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<td>Unit with 10 or more apts</td>
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<td>0.248 - 0.046‡ 0.505 - -</td>
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<table>
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<th></th>
<th>Manufactured home</th>
<th>Mobile home, trailer, or RV</th>
<th>Single family home (detached)</th>
<th>Single family home (attached)</th>
<th>Unit with 2 apts</th>
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Reliance on Refrigeration for Medication or Other Special Diets

Other

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$\alpha = 0.05$
Appendix E

PERMISSIONS

Figure E.1

Approval to use material published in *Disaster Science and Management*.
Figure E.2

Approval to use material published in *Earthquake Spectra*.