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Barriers to Disaster Preparedness, Evacuation, and Emergency Response in the Colonias of El Paso County

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BARRIERS TO DISASTER PREPAREDNESS, EVACUATION, AND
EMERGENCY RESPONSE IN THE *COLONIAS*
OF EL PASO COUNTY

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2014

Dedication

For River, Reef and Rain.

BARRIERS TO DISASTER PREPAREDNESS, EVACUATION, AND
EMERGENCY RESPONSE IN THE *COLONIAS*
OF EL PASO COUNTY

by

ANTHONY MARK LECHUGA, JR., BMS

THESIS

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Abstract

The *colonias* serve as a unique challenge to healthcare professionals and government agencies in developing programs and policies to reach these underserved communities. Minorities, persons of low socioeconomic status, and disabled or medically dependent persons are disproportionately affected by disasters. Researchers have studied several health outcomes prevalent in residents of *colonias*; however, barriers to disaster preparedness, evacuation, and emergency response have rarely, if ever, been studied in this population. This cross-sectional study applied the constructs of the Health Belief Model to identify common factors, barriers, and attitudes related to disaster preparedness, evacuation, disaster perceptions, and risk communication. Participants of this study were residents of *colonias*, at least 18 years of age, and spoke either English or Spanish. Community Health Workers surveyed 598 participants from several *colonias* located throughout El Paso County. *Colonia* residents reported having a high level of perceived susceptibility to the negative outcomes related to disaster events. Factors relating to family disapproval and participation were reported as the greatest barriers to disaster preparedness behaviors and intention to evacuate in *colonia* residents. Law enforcement agencies were reported as the most reliable and trusted source of risk communication in residents of *colonias*. The severe economic inequities that exist in the *colonias* combined with inadequate disaster preparedness contribute to the extreme vulnerability of residents of *colonias* to the negative outcomes associated with disaster events. The development of programs to increase disaster preparedness behaviors and evacuation should address both the health education needs and economic barriers of *colonia* residents and their families. Government agencies should address the underlying economic and environmental inequities to improve the condition of the *colonias* and law enforcement agencies should be more involved in disaster preparedness and evacuation education programs, community engagement, and risk communication.

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Chapter 1: Introduction

The *colonias* serve as a unique challenge to healthcare professionals and government agencies in developing programs and policies to reach these underserved communities. *Colonias* lack access to many of the basic services and resources that exist in nearby cities or other rural communities in the United States (U.S. Department of Housing and Urban Development, 2008). Researchers have studied several health outcomes prevalent in residents of the *colonias*; however, barriers to disaster preparedness, evacuation, and emergency response have rarely, if ever, been studied in this priority population.

Disaster preparedness is essential in minimizing the immediate negative outcomes that result from disasters; including serious traumatic injury and death. Actions such as the storage of extra food and water, accessible emergency cash savings, and the development of an emergency family communication plan are essential in preparing families for extended interruptions in regular services as well as extended periods of evacuation. Using data and information gathered from research conducted in residents of New Orleans during Hurricane Katrina and Hispanic communities in Los Angeles County, we may better understand the barriers to disaster preparedness and evacuation in the *colonias* of El Paso County.

1.1 Life in the *Colonias*

Colonias are rural, unincorporated communities located within 150 miles of the U.S.-Mexico border (U.S. Department of Housing and Urban Development, 2008). *Colonias* are characterized as lacking access to basic utilities and infrastructure (U.S. Department of Housing and Urban Development, 2008) Many *colonias* lack electricity, potable water, emergency services, healthcare resources, paved roads and public transportation (Strategic Health Intelligence Planning Group, 2007). Housing in *colonias* is substandard at best, and residents often suffer from overcrowding at rates four

times higher than the national average (U.S. Department of Housing and Urban Development, 2008). Salvaged cinder blocks, discarded wood and cardboard are often used to modify mobile homes to build makeshift dwellings (Public Broadcasting Service, 2000). There are approximately 1,836 *colonias* in the state of Texas with over 380,000 residents (Texas Health and Human Services Commission, 2009).

Average incomes of *colonia* residents vary anywhere from \$5,000 to just under \$9,000 per year, well below state averages and federal poverty levels (Texas Secretary of State, 2012). The typical family size is between 5-6 people which is above the national average of 4 people (Public Broadcasting Service, 2000). It is reported that 97% of *colonia* residents are Hispanic, 85% of whom are U.S. citizens (U.S. Department of Housing and Urban Development, 2008). There are 324 separate *colonias* in El Paso County (See Figure 1.1) with over 77,000 residents (Texas Health and Human Services Commission, 2009).

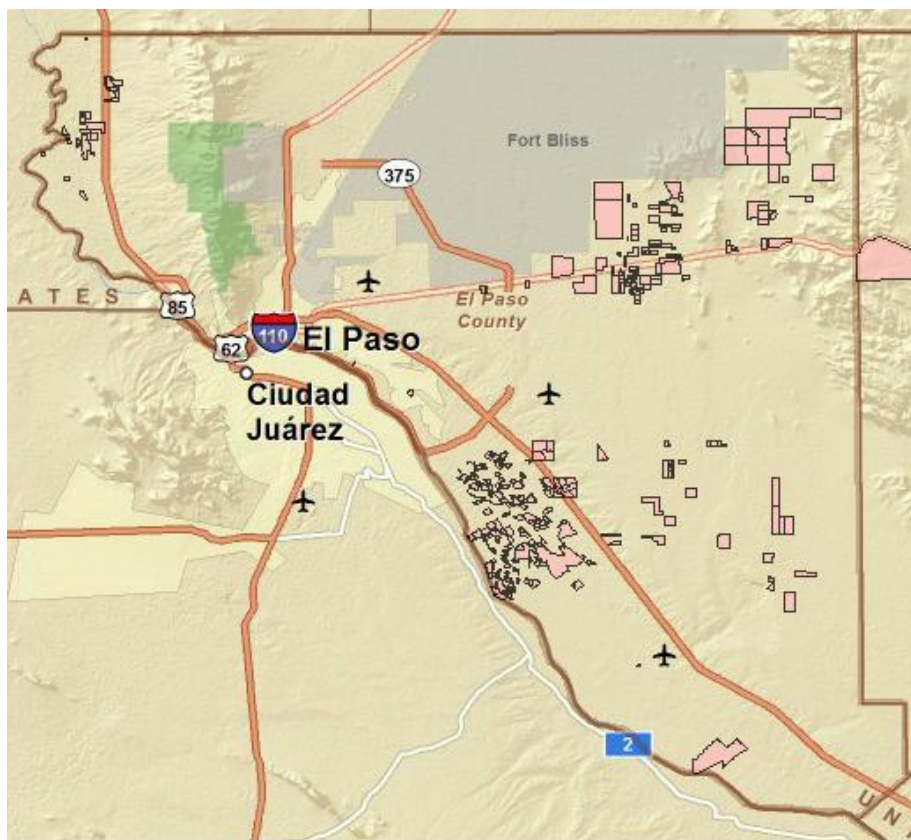


Figure 1.1: Location of *colonias* in El Paso County, areas in pink are *colonias* (2010)

1.2 Minorities and Past Disasters

The events leading up to and the aftermath of Hurricane Katrina revealed a glaring disparity; minorities are disproportionately affected by disasters (Eisenman, Cordasco, Asch, Golden, & Gilk, 2007). Despite repeated orders for evacuation and continuous media coverage, minorities were less likely to evacuate prior to the hurricane making landfall and were most reliant on government and military assistance after the extent of the damage was realized (Brodie, Weltzien, Altman, Blendon, & Benson, 2006). Though several factors were cited as preventing residents from evacuating, the most common themes included lack of reliable transportation, underestimation of the severity of the hurricane, and physical disabilities of either themselves or of family members (Brodie, et al., 2006). Other factors, including the lack of financial resources, distrust in government agencies, confusing and conflicting evacuation information, and racial biases were listed as other contributors (Elder, et al., 2007).

The residents that did not evacuate before the storm made landfall suffered some of the most severe and tragic outcomes due to Hurricane Katrina. Many of those who did survive were extricated by military or government resources and transferred to emergency shelters in surrounding cities (Brodie, et al., 2006). These residents share many similarities with residents of the *colonias*. They were mostly minorities and low socioeconomic status (SES) (Eisenman, Cordasco, Asch, Golden, & Gilk, 2007). Many evacuees did not have health insurance, were unemployed, and relied heavily on “safety net” healthcare resources (Brodie, et al., 2006).

1.3 Disaster Preparedness

Disaster preparedness includes several actions meant to minimize or avoid the immediate and long-term negative outcomes that result from natural and manmade disasters. Such actions include storage of extra food and water, maintaining a supply of extra essential medications, emergency cash savings, and a family emergency communication and evacuation plan (Eisenman, 2009). Negative

outcomes resulting from disasters result because persons are either unable or unwilling to evacuate potentially dangerous events, lack adequate supplies or resources to survive an interruption of regular services, or lack of preparations for extended periods of evacuation (Elder, 2007; Eisenman, 2009).

Minorities, persons of low socioeconomic status (SES), and disabled or medically dependent persons are disproportionately affected by disasters (Eisenman, 2009; Brodie, 2006). Residents of shelters who were evacuated from New Orleans were some of the most severely affected by this disaster; they were predominantly minorities (93%), many lived in poverty (59% earned less than \$20,000 per year), and many did not have health insurance (58%)(Brodie, et al., 2006). Programs like “*Be Red Cross Ready*” are designed to educate the community about the need for disaster preparedness and “*Texas 211*” offers assistance in case of an evacuation order.

1.4 Correlates and Barriers

There are many correlates for inadequate disaster preparedness and non-evacuation. Those who have low income and have little to no monetary savings and resources are unable to purchase emergency supplies and often lack the resources to evacuate (Elder, 2007; West, 2007). In many cases, if a person of low SES owns a vehicle, they often lack the necessary monetary resources to afford enough fuel to evacuate to a safe location (Elder, 2007). Other barriers include distrust of government officials, conflicting media reports concerning evacuation orders, a low perceived threat of the disaster, perceived racial bias, care of elderly or disabled family members, and fear of loss of personal possessions because of theft and looting (Elder, 2007; West, 2007; Rowell, 2011).

Chapter 2: Literature Review

2.1 Minorities and Disaster Preparedness

Since minorities are disproportionately affected by disasters, it is important to understand the barriers that may prevent these populations from being adequately prepared for loss of services and potential evacuations (Eisenman, Glik, Maranon, Gonzales, & Asch, 2009). Perception of potential hazards and disasters differ between minority and non-minority populations. Minorities have a fatalistic attitude toward disasters, meaning that they have a high-perceived vulnerability to the negative outcomes but feel that little can be done to protect them from the consequences (West & Orr, 2007). The same factors that increased the feelings of vulnerability also decreased their likelihood of evacuation. Not having friends or family with whom to stay during an emergency or lack of financial resources are examples of these factors (West & Orr, 2007). West and Orr (2007) warn of “cookie cutter” approaches to risk communications and emergency response, suggesting specific strategies for different populations within any community.

Hispanic communities face unique barriers to disaster preparedness and evacuation. Residents of Hispanic communities, especially immigrants, lack resources that are culturally sensitive, easily understood, or translated into Spanish (Eisenman, et al., 2009). Many residents of these communities also lack financial resources and space appropriate for storage of emergency supplies (Eisenman, et al., 2009). Attitudes toward the motives of government agencies may also act as a barrier to evacuation. The efforts of government agencies may be perceived as opportunities to identify and deport immigrants, undocumented or legal (Eisenman, et al., 2009). Residents of Hispanic communities also perceived house fires and gang violence as hazardous events and reason for evacuation and government action (Eisenman, et al., 2009).

2.2 Economic and Other Costs of Disasters

The most recent disaster in the US, “Superstorm Sandy”, was estimated to be the largest and costliest natural disaster since Hurricane Katrina (National Oceanic and Atmospheric Administration, 2013). This unusual weather event developed as Hurricane Sandy traveled north along the East Coast of the US and intensified as it combined with a winter storm that swept over many of the northeastern states (The Weather Channel, 2012). More than 50 million US residents in 24 states were threatened by Hurricane Sandy, 5.9 million were left without electricity for several days, and 131 deaths were reported (National Oceanic and Atmospheric Administration, 2013; The Weather Channel, 2012; Johnston, Llanos, Mach, & Gold, 2012). The total economic impact of Superstorm Sandy is estimated to be between \$30-50 billion with \$10-20 billion lost in insured assets (EQECAT, Inc., 2012). The enormous economic impacts of disasters are a serious concern for governments around the world; however, the impact of disasters are not only measured in dollars, but also in the number of persons affected and lives lost.

FEMA recorded 62 Major Disaster Declarations and 5 Emergency Declarations in 2013, substantially lower than the 99 Major Disaster Declarations and 29 Emergency Declarations recorded in 2011, which is the largest number of non-fire related declarations recorded by FEMA in a single year (Federal Emergency Management Agency, 2014). The US reported 318 deaths caused by disasters in 2012, which is less than the 809 deaths recorded in 2011, and pales to the 19,975 deaths estimated by Japan as a result of the Tōhoku earthquake and tsunami in 2011 and the 2,385 deaths reported by the Philippines as a result of Tropical Cyclone Bopha (Guha-Sapir, Vos, Below, & Ponserre, 2012; Guha-Sapi, Hoyois, & Below, 2013). The year 2011 was the costliest year in terms of the economic impact of disasters. The US ranked second worldwide, reporting \$59.4 billion in damages, behind Japan which estimated damages at \$212.5 billion (Guha-Sapir, Vos, Below, & Ponserre, 2012).

Between 2000 and 2013, there have been a total of 21,571,053 persons affected by disasters in the US (Centre for Research on the Epidemiology of Disasters, 2014). Of those affected, 143,238 were left homeless, 11,706 were injured and 6,842 died (Centre for Research on the Epidemiology of Disasters, 2014). The total economic cost for this time period was \$537.6 billion (Centre for Research on the Epidemiology of Disasters, 2014). The costliest disaster in recent US history was Hurricane Katrina, which caused 1,833 deaths and an estimated \$125 billion in damages (Centre for Research on the Epidemiology of Disasters, 2014).

Recent disasters in El Paso County have also proven to have enormous impacts on local residents and massive economic costs. For example, on July 27th, 2006, El Paso County suffered some of the most severe flooding in the county's history. The damage to private and commercial property alone was estimated at \$77 million with an additional \$24.5 million in damage to public infrastructure (City of El Paso Communications & Public Affairs Office, 2006). A total of 1,516 private properties, 53 commercial properties, and 20 flood drainage facilities were either damaged or destroyed (City of El Paso Communications & Public Affairs Office, 2006). Over 22,000 calls were made to 911 during this flooding event, exhausting the resources of local emergency services (City of El Paso Communications & Public Affairs Office, 2006).

El Paso County is susceptible to severe weather, including flooding, severe heat, and severe freezing. Between June and September 2013, communities in Southern New Mexico and West Texas were inundated by several rain, thunder and hail storms, resulting in moderate to severe flooding throughout El Paso County (National Weather Service El Paso/Santa Teresa, 2013). In February 2011, a highly unusual winter storm traveled through El Paso County, causing temperatures to dip near and below zero degrees for approximately 72 hours (Ramirez, Cold caution: El Paso's utility companies learn from lessons of February freeze, 2011). This winter storm caused damage to electric, water, and gas utilities equipment and infrastructure; leaving thousands of residents without basic normal services

for days (Ramirez, Cold caution: El Paso's utility companies learn from lessons of February freeze, 2011). Approximately \$5 million dollars were spent to repair damaged equipment and to winterize equipment and infrastructure for future weather events (Ramirez, Cold caution: El Paso's utility companies learn from lessons of February freeze, 2011). El Paso County has also recently experienced a minor earthquake (2.5 magnitude) and an extensive period of drought, which significantly increases the threat of wildfires (Martinez, 2012; Ramirez, 2012).

2.3 Current Efforts in Disaster Preparedness

The numerous mistakes made by local, state, and federal government agencies in response to Hurricane Katrina led to several policy changes, most notably, the reorganization of the Federal Emergency Management Agency (FEMA) (Federal Emergency Management Agency, 2014). In addition to improving emergency management and disaster response protocols and policies, both government and non-government agencies have developed programs designed to increase awareness for disaster preparedness, educate communities in disaster preparedness behaviors, and train interested citizens to respond to various types of disasters. Many programs are web-based applications and require access to the internet and internet capable devices. “*Ready.gov*” is such a resource provided by FEMA and contains information on topics ranging from identifying potential risks, making emergency evacuation and family communication plans, and building a basic disaster supplies kit (Federal Emergency Management Agency, 2012). Services available at “*Ready.gov*” includes mobile alerts, a monthly electronic newsletter, links to volunteer opportunities, and information about the Citizen Corps (Federal Emergency Management Agency, 2012). The American Red Cross (ARC) also provides an internet based resource called “*Be Red Cross Ready*”, which provides detailed instructions for building an emergency preparedness kit, lists specific information for an emergency contact card, and instructions for developing an evacuation plan (The American Red Cross, 2009). Despite the increased national

focus on disaster preparedness, approximately 48% of Americans do not have emergency supplies and 52% do not have a family evacuation plan (The Adelphi University Center for Health Innovation, 2012).

After the tragedies of September 11th, 2001, lawmakers began to discuss the need to empower citizens in assisting first responders in emergency response and homeland security (The National Office of Citizen Corps - FEMA Individual and Community Preparedness Division, 2012). The Citizen Corps was created to provide and coordinate volunteer programs designed to educate and train citizens to respond to emergency situations (The National Office of Citizen Corps - FEMA Individual and Community Preparedness Division, 2012). One Citizen Corps program, called Community Emergency Response Teams (CERT), trains citizens in skills necessary to adequately and safely respond to an emergency; courses include small fire suppression, light search and rescue operations, and emergency medical treatment and triage (Citizen Corps, 2012).

Though these interventions are sufficient to address the needs of most urban-dwelling citizens, these resources are often unavailable in *colonia* communities and inappropriate when considering the economic, social, and demographic differences. Such inequities in access to internet based resources are attributed to a *digital divide*, or a disparity in access to digital resources and information based on social, economic, or geographic factors (Norris, 2001). Low SES homes, minorities, and rural residents are less likely to have internet access at home (National Telecommunications and Information Administration , 2011). Most *colonias* lack the basic infrastructure and services needed to support internet services, and with most *colonia* residents living in severe poverty, luxuries such as internet access and cellular phones are impractical. Many *colonia* residents speak only Spanish and more that 44% have less than an 8th grade education (Mier, et al., 2008). Even if disaster preparedness programs were available in Spanish, the content may still be challenging to understand and outside the educational capacity of many of *colonia* residents. Additionally, Hispanic minorities are extremely distrustful of “outsiders”, especially

government officials, whose intentions may be perceived as gaining access to deport legal and undocumented immigrants (Eisenman, et al., 2009).

2.4 Reaching Residents of the *Colonias*

Conducting research in *colonias* or communities with high concentrations of minority or migrant populations is often challenging and problematic. A popular strategy to gain the trust of families in these communities is through the use of community health workers (CHW) called *promotores* (Zuniga, et al., 2009). *Promotores* are community leaders who reside in the *colonias* and are known personally by the residents (Ramos, May, & Ramos, 2001). They meet regularly with residents in their communities to encourage participation in social, health, educational and occupational programs which are offered periodically through the local community centers or other healthcare providers (Ramos, May, & Ramos, 2001).

Promotores have increasingly been sought by health researchers, educators, and advocates to reach at-risk Hispanic minority populations to gather valuable information and data while educating these communities in health topics ranging from colorectal cancer screening and HIV/AIDS testing to domestic partner violence and disaster preparedness (Arvey & Fernandez, 2012). Though many lack formal education or certification, the proper use of *promotores* has consistently proven advantageous to those working in Hispanic minority populations (Arvey & Fernandez, 2012). Recent efforts made by government agencies to reach minority and *colonia* residents have resulted in the development of several programs to provide *promotores* with training in health education theory, conventional and technological educational resources, and research methods (Alliance of Border Collaboratives, 2011; Texas Department of State Health Services, 2011).

In studies pertaining to disaster preparedness conducted in Hispanic communities in inner city Los Angeles County, *promotores* were trained and utilized in recruiting and interviewing participants, obtaining informed consent, collecting and recording data, and conducting health education

interventions (Eisenman, et al. 2009). According to Eisenman (2009), “*platicas*”, or informal education and discussion sessions, were more effective than media driven interventions in educating Hispanic communities on topics relating to disaster preparedness (Eisenman, et al., 2009). Participants for this study were referred using a respondent-driven sampling, where participants were asked to refer peers to the study (Eisenman, et al., 2009). The study began with seven seeds, or initial participants, and ended with over 242 participants (Eisenman, et al., 2009). *Promotores* have been proven to be credible and effective resources in Hispanic communities and are more likely to be accepted since they themselves are members of the communities in which they work (Eisenman, et al. 2009).

2.5 Theoretical Perspective

In order to develop a practical assessment of disaster and evacuation perceptions in El Paso County *colonia* residents using the constructs of the HBM, the present study incorporates West & Orr’s Models of Vulnerability and the Grassroots Risk Communication System. The Models of Vulnerability correspond to the HBM construct of perceived susceptibility and may elucidate a model of disaster perceptions and intention to evacuate specific to this priority population. The four categories defined by West & Orr correspond to modifying factors recognized by the HBM and may reveal the existence of moderator or mediator variables. The Grassroots Risk Communications System addresses the HBM’s cues to action and may provide the most efficient and effective means to reach residents of *colonias* in El Paso County.

2.6 The Health Belief Model

The Health Belief Model (HBM)(Figure 2.1) is one of the oldest and most well-known models used to describe health behavior change. The core assumptions of the HBM are that a person will participate in health-related activity if the person believes that: a negative health outcome can be avoided, the recommended action will prevent the negative outcome, and they can successfully complete the recommended action (Champion & Skinner, 2008). The original version of the HBM featured four

concepts: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers (Champion & Skinner, 2008). Two concepts were later added, cues to action and self efficacy (Champion & Skinner, 2008).

The HBM constructs of perceived susceptibility and perceived severity describes the perceived seriousness of a health outcome and perceived personal risk to it (Champion & Skinner, 2008). The HBM asserts that an increase in perceived susceptibility and perceived severity to a negative health outcome will increase the likelihood of participation in behaviors to decrease their risk (Champion & Skinner, 2008). The concept of perceived benefits relates to a person's belief that engaging in the new health behavior will decrease the risk of suffering from the negative health outcome (Champion & Skinner, 2008). Perceived barriers are obstacles that a person may perceive in adopting a new behavior, research indicates that this construct is the most powerful predictor of behavior (Champion & Skinner, 2008). Increasing the perceived benefits of adopting the health behavior and decreasing the perceived barriers, the HBM asserts, will increase the likelihood of a person adopting the new health enhancing behavior (Champion & Skinner, 2008). Self efficacy, or the belief in the ability of a person to engage in a behavior, was later added to the HBM, relates to perceived barriers (Champion & Skinner, 2008). Increasing a person's self efficacy can reduce the perceived barriers and increase the likelihood of adopting a new health behavior (Champion & Skinner, 2008). The concept of cues to action describes the events, people, or other exposures that influence a person to modify their behaviors (Champion & Skinner, 2008). These cues to action can range from a negative health event in one's family, a widely publicized media report, or advice from a valued family member or friend (Champion & Skinner, 2008). The HBM constructs of perceived susceptibility, perceived barriers, and cues to action are appropriate when studying disaster preparedness and evacuation (Elder, 2007).

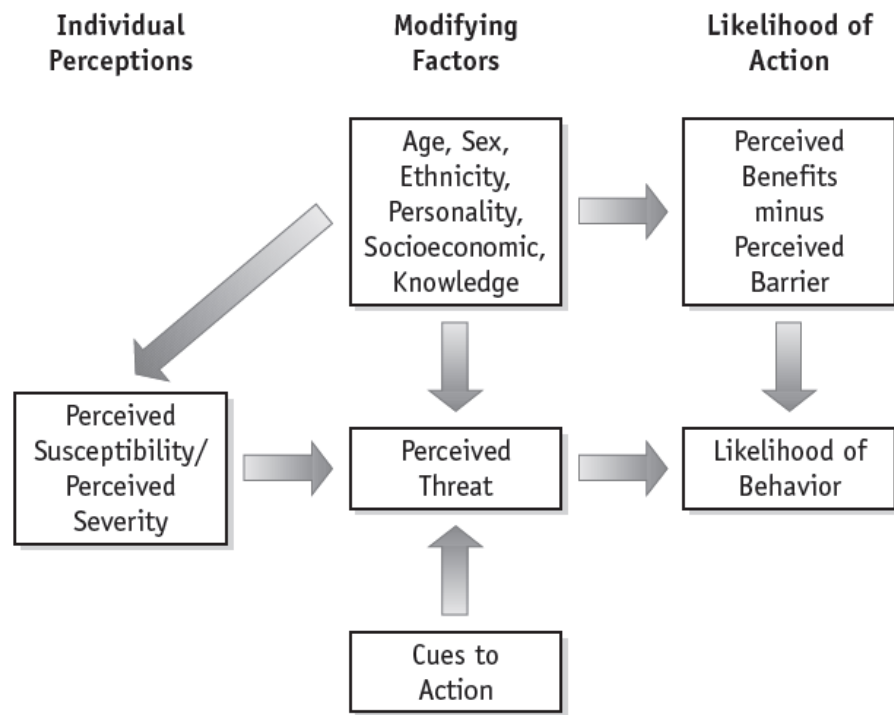


Figure 2.1 The Health Belief Model

2.7 Models of Disaster Vulnerability and Evacuation

Researchers have developed several theoretical models aimed at addressing perceptions to disaster vulnerability and evacuation. West and Orr (2007) categorized these models into four focuses: social vulnerability models, economic vulnerability models, geographic vulnerability models, and personal and governmental preparedness models. Rather than utilizing a single model from only one the categories, West and Orr suggest utilizing measures from models in all four categories to better understand disaster perceptions of residents and their intention to comply with an evacuation order (West & Orr, 2007). Information gained from all four focus areas will also aid health workers and government agencies in developing focused interventions aimed at changing disaster perceptions through educational and skills training resources, increasing the intent to evacuate in the event of a disaster (West & Orr, 2007).

Social vulnerability models hypothesize that not all people are at equal risk nor perceive disaster threats equally (West & Orr, 2007). Such differences may be attributed to age, gender, or ethnic identity (West & Orr, 2007). Elderly and minority populations are often considered to be vulnerable to disasters and are less likely to have access to reliable resources or adequate information (West & Orr, 2007). Economic vulnerability models measure the influence of economic factors like income, personal transportation, and home ownership on disaster perceptions and intent to evacuate (West & Orr, 2007). Prior research has shown that a lack of economic resources increase a person's vulnerability to disasters and slows reaction to evacuation advisories and orders (West & Orr, 2007).

Geographic vulnerability models explore the influence of geographic proximity to disaster outcomes on disaster perception (West & Orr, 2007). Geographic proximity does not have the same influence among all disasters and may differ, for example, between flash flooding and extreme weather events (West & Orr, 2007). Personal and governmental preparedness models posit that vulnerability to disaster outcomes is influenced by personal disaster preparedness, evacuation planning, and knowledge of governmental procedures (West & Orr, 2007). Those who have prepared disaster kits and are familiar with evacuation routes and behaviors are also theorized as being more likely to evacuate in the event an order is issued (West & Orr, 2007). Risk communication also have an enormous influence on the perceived threat of a disaster and contribute to evacuation decisions (West & Orr, 2007). Since conventional avenues of risk communication may not be trusted by minorities, it becomes important to design and implement a risk communication plan using trusted resources within the prioritized minority communities (West & Orr, 2007).

2.8 A Grassroots Risk Communication System

A significant factor increasing the vulnerability of low-income, minority populations before, during, and after disasters is ineffective communication (Rowel, Sheikhattari, Barber, & Evans-Holland, 2011). A traditional risk communication system is utilized by government agencies to disseminate disaster information through media such as radio and television (Rowel, Sheikhattari, Barber, & Evans-Holland, 2011). Many minorities are distrustful of government agencies, especially those who issue risk communication, leading to a lack of disaster preparedness and unwillingness to observe evacuation orders (Rowel, Sheikhattari, Barber, & Evans-Holland, 2011). This distrust of traditional risk communication, coupled with other factors that increase vulnerability to disasters, lead to disproportionate impact of disasters to low-income, minority communities (Rowel, Sheikhattari, Barber, & Evans-Holland, 2011).

In addressing the need for effective risk communication in low-income, minority populations, Rowel, et. al. (2011) have proposed the use of a Risk Communication System (Figure 2.2) which relies on grassroots organizations including established faith-based, community-based, or business organizations which operate within the communities. To establish a grassroots risk communication system, three steps are suggested: 1) identify grassroots outreach workers, 2) establish relationships with grassroots organizations, and 3) make risk communication materials available (Rowel R. , Sheikhattari, Barber, & Evans-Holland, 2009). By actively engaging the community and developing partnerships with grassroots organizations, once distrusted government agencies can effectively work to “remove the barriers of distrust, misinformation, and misunderstanding” (Rowel, Sheikhattari, Barber, & Evans-Holland, 2011).

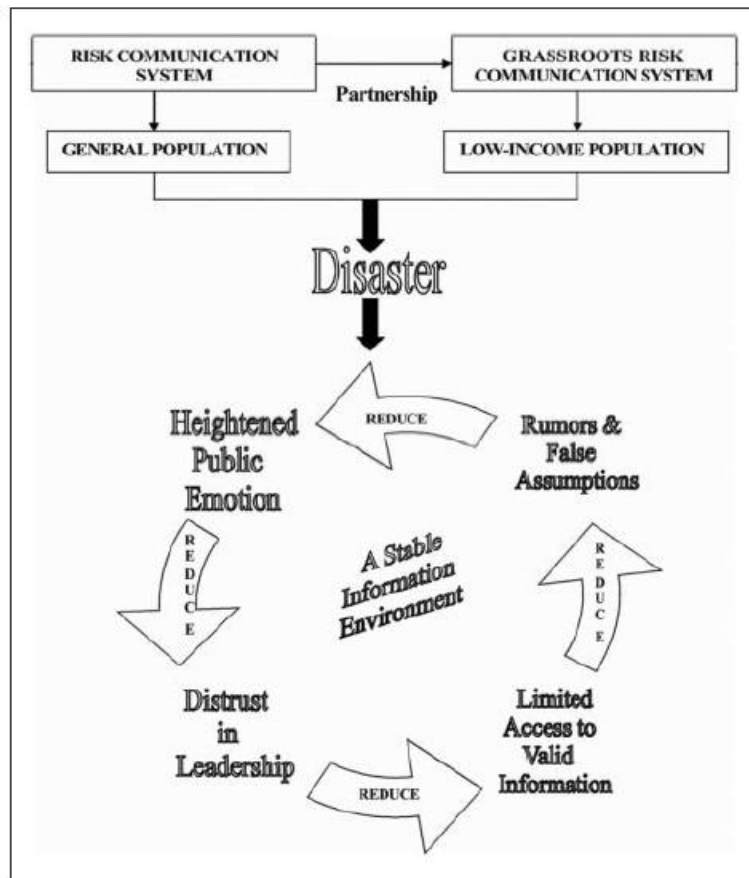


Figure 2.2: Conceptual Model to Enhance Disaster Risk Communication Among Low-Income Minority Populations

Chapter 3: Methods

The overall purpose of the study was to assess susceptibility and barriers to disaster preparedness and evacuation in residents of the *colonias* in order to prepare more effective strategies for emergency response and health promotion by government agencies. The primary objective was to determine common barriers to disaster preparedness and evacuation in *colonia* residents. The secondary objective was to develop a model of disaster perceptions and intention to evacuate specific to residents of El Paso County *colonias*. The final objective was to determine the most effective cues to action and emergency communication plan for *colonia* residents. Researching perceived susceptibility, barriers to disaster preparedness and evacuation, and emergency communication plans in *colonia* residents will help support current research conducted in minority populations and will provide several government agencies necessary data in order to develop strategies to efficiently respond to emergencies in these underserved areas.

3.1 Study Aims and Hypothesis

The specific aim of this study was to identify common factors and barriers related to disaster preparedness, evacuation, perceived susceptibility, and risk communication in residents of *colonias* to help government agencies better prepare and develop strategies for emergency response in the *colonias* of El Paso County. The following were my hypotheses:

- Hypothesis #1: Perceived susceptibility to disasters will be low among *colonia* residents.
- Hypothesis #2: Economic factors will be the greatest barriers to disaster preparedness and evacuation among *colonia* residents.
- Hypothesis #3: Trust in information from media and government sources will be low among *colonia* residents.

3.2 Design

The study used a cross-sectional design and applied the constructs of the HBM to identify common factors and barriers related to disaster preparedness, evacuation, disaster perceptions, and risk communication. The independent variables consisted of correlates from the four categories of vulnerability models defined by West & Orr (2007) thought to influence disaster perceptions and intent to evacuate. The dependent variables of this study were preparedness behaviors, perceived vulnerability to disasters, and intent to evacuate.

3.3 Measures

Demographic and Economic Risk Factors

Participants were asked to provide demographic and economic information to develop a profile of risk factors pertinent to the social and economic models of vulnerability. Demographic risk factors, as identified by previous research, included being over the age of 60, identifying as an ethnic or racial minority, being single and not married, having more than four persons living within the household, being a single parent, and/or having lived in the *colonias* for ten or more years. Economic risk factors, which were also identified in previous research, included having a yearly household income less than \$20,000 per year, not having completed high school, receiving public assistance, having no or government funded health insurance, and not having a working vehicle. The total number of demographic risk factors and economic risk factors were calculated and applied to test the Models of Disaster Vulnerability and Evacuation and the constructs of the HBM.

Health Belief Model

The constructs of the HBM, specifically perceived susceptibility, perceived severity, perceived barriers, perceived benefits, and self-efficacy, were measured using 7-point Likert scales to assess the degree to which the participant perceived each factor or variable affect's their vulnerability to the

immediate and long-term outcomes associated with disasters as well as their intent to evacuate (West & Orr, 2007; Champion & Skinner, 2008). Likert scales are psychometric measures where a participant would evaluate a statement with answers ranging from 1 to 7; where a response of 1 would indicate “strongly disagree”, a response of 4 would indicate “neutral”, a response of 7 would indicate “strongly agree”, etc. The analysis of multiple responses revealed a pattern within the constructs being measured. Information pertinent to the geographical, personal, and governmental preparedness models of vulnerability were obtained from this section.

Disaster Preparedness Behaviors and Intention to Evacuate

Participants were asked to report how prepared they felt they were for a disaster and how likely they were to follow an evacuation order. The resulting outcomes were “Perceived Personal Preparedness” and “Intention of Evacuation”, which were measured using a 7-point Likert scale. The outcome “Disaster Preparedness Behaviors” was the total number of disaster preparedness behaviors practiced by each participant, the behaviors measured were storing extra water, storing extra food, storing cash, storing extra medicines, having an emergency family communication plan, a family evacuation plan, and having a first aid kit.

Physical Characteristics of the Community and Residences and Geographic Proximity to Previous Disaster Events

A short section pertaining to the physical characteristics of the participant’s residence, neighborhood, and community was included to identify common hazards which may pose harm to emergency responders and aid in developing logistical strategies in the event an assisted evacuation is needed. Participants were asked questions related to the condition and surface type of roads leading to their communities, type of vehicle required to access their residences, and the type of utilities available in their residence. Participants were also asked to report the proximity of several disaster events to their residences, these events included tornado, earthquake, flooding, terrorist attack, wildfire, gang violence,

epidemics, and hazardous material spill. The outcome “Geographic Proximity to Disaster Events” was calculated by totaling the values of the participant’s responses to all eight disaster events, a score of 1 indicated the event occurring less than a mile from their home, a score of 2 indicated between 1 and 10 miles, and a score of three indicated more than 10 miles. A smaller calculated value indicated that disaster events occurred in close proximity to the participant’s home.

Risk Communication

Finally, participants were asked to identify the most trusted or reliable sources of emergency communication within their community and common types of media used within their residence. This information aided in evaluating the Grassroots Risk Communication Plan and identified potential partnerships between governmental organizations, grassroots organizations, and grassroots outreach workers.

3.4 Participants

Participants of this study were residents of *colonias*, at least 18 years of age, and spoke either English or Spanish. Community Health Workers surveyed 598 residents from several *colonias* located throughout El Paso County. Participants were recruited through respondent-driven sampling, where “seed” or initial participants were asked to refer peers to participate in the study. Participants were compensated for their time with a \$10 gift card to a local retail store.

3.5 Funding

This study was supported financially by the Border Regional Advisory Council on Trauma through the Hispanic Health Disparities Research Center at The University of Texas at El Paso. The City of El Paso Department of Public Health also made in-kind contributions.

3.6 Sampling Distribution

Colonias in El Paso County are geographically clustered in three general areas: Northeast El Paso County along Montana Avenue; Southeast El Paso County along Interstate 10 near Fabens and Horizon City; and West El Paso County near the Village of Anthony (see Appendix A). In order to ensure a proportionally stratified sample, rural population data from the United States 2010 Census were used to estimate the distribution of *colonia* residents throughout El Paso County stratified by general *colonia* location (United States Census Bureau, 2012). As a result, 189 participants were selected from Northeast El Paso County *colonias*, 311 participant from Southeast El Paso County *colonias*, and 98 participants from West El Paso County *colonias*.

3.7 Procedure

After IRB exemption was obtained, community health workers completed the required IRB compliance training and received additional training in data collection, inclusion criteria for participants, informed consent, and reportable ethical concerns. Data were collected by 10 community health workers who resided in each of the prioritized *colonias*. Survey packets, containing between 10 and 20 surveys and the corresponding number of \$10 gift cards, were delivered to the community health workers at the local community center. Before conducting the face-to-face interview with participants, the community health workers ensured each participant met the study criteria and obtained informed consent from each. The community health worker then administered the survey and provided assistance as needed. The participant was compensated with a \$10 gift card after completing the survey. Once all survey packets had been administered, they were collected and inspected for completion and proper accounting of participant compensation. Community health workers were then compensated with a \$100 gift card to a local retail store for every 20 interviews conducted and surveys completed.

3.8 Statistical Analysis Plan

Statistical analysis was conducted using SPSS 22 and SPSS AMOS 22. A preliminary analysis of descriptive statistics was conducted on all demographic information, the constructs of the HBM, and information pertinent to the models of vulnerability; displaying mean, standard deviation, and other statistics as appropriate. T-tests were conducted to test the hypotheses and identify significant relationships between independent variables and perceived susceptibility, perceived barriers to disaster preparedness behaviors, and trust in risk communication in *colonia* residents. To reduce the likelihood of Type I error, the Bonferroni correction technique was employed in each test.

The results were then analyzed using multiple regression to measure the relationship, if any, between the constructs of the HBM, the models of disaster vulnerability and evacuation, and the grassroots risk communication plan on disaster preparedness behaviors, intention to evacuate, perceived susceptibility, and perceive severity. The first regression analysis explored the constructs of the HBM in predicting actual disaster preparedness behaviors and intention to evacuate. The second regression analysis explored the relationship between the models of disaster vulnerability and intention to evacuate, perceived susceptibility, and perceived severity. The final regression explored the concepts of the grassroots communication system on intention to evacuate.

Chapter 4: Results

4.1 Participant Characteristics

The demographic profile for this sample population can be found on Table 4.1. Of the 598 surveys that were returned, 577 were usable instruments (96.5% response rate of returned surveys). The mean age of the participants was 45 ($\delta = 15$). The gender distribution of this sample was 75.4% female ($n=386$) and 24.6% male ($n=126$). Most participants, 88.8%, identified as being of Hispanic or Latino ethnicity ($n=498$) and 9.4% identified as being non-Hispanic white or Caucasian ($n=53$). The majority of participants, 59.7%, reported being married or cohabiting as married ($n=332$). The average participant had 4 persons living in their home ($\delta = 1$) and had resided in the *colonias* for 14 years ($\delta = 10$). Most participants, 68.4% ($n=365$), reported that they primarily speak Spanish in their homes and 15.2% ($n=81$) reported speaking both Spanish and English.

The economic profile for this sample population can be found on Table 4.2. The majority of participants met the 2014 US Poverty guidelines, 72.5% ($n=361$) reported having a yearly household income of less than \$20,000 per year. Nearly half of respondents, 45%, had not completed high school ($n=225$). More than half of respondents, 54.8% ($n = 258$), received public assistance, and 62.1% ($n = 407$) relied on government funded resources for health insurance.

Table 4.1

Descriptive Statistics, Demographic Profile

		Mean	Standard Deviation	Count	Column N %
Age		45	15		
Gender	Female			386	75.4%
	Male			126	24.6%
Race/Ethnicity	White/Caucasian			53	9.4%
	Black/African-American			3	0.5%
	Hispanic/Latino			498	88.8%
	Native American			4	0.7%
	Asian/Pacific Islander			1	0.2%
	Other			2	0.4%
Marital Status	Never Married			78	14.0%
	Married/Cohabiting as			332	59.7%
	Married			66	11.9%
	Separated			42	7.6%
	Divorced			38	6.8%
	Widowed				
Number of Persons Living in Residence		4	2		
Household Description	No Children			92	21.1%
	Single Parent Household			93	21.3%
	Dual Parent Household			212	48.5%
	Multiple Family Household			40	9.2%
Number of Years Living in the <i>colonias</i>		14	10		
Primary Language Spoken at	English Only			56	10.5%
Home	Spanish Only			365	68.4%
	Other			32	6.0%
	Both English and Spanish			81	15.2%

Table 4.2

Descriptive Statistics, Economic Profile

		Count	Column N %
Yearly Household Income	<\$5K	94	18.9%
	\$5K<\$10K	110	22.1%
	\$10K<\$20K	157	31.5%
	\$20K<\$30K	82	16.5%
	\$30K<\$40K	40	8.0%
	>\$40K	15	3.0%
Educational Attainment	<8th Grade	124	24.8%
	Some High School	101	20.2%
	High School Graduate	80	16.0%
	Some College	99	19.8%
	Associates Degree	47	9.4%
	Bachelors Degree	41	8.2%
	Graduate Degree	8	1.6%
Receiving Public Assistance	Yes	258	54.5%
	No	215	45.5%
Health Insurance Type	Private/Employer Provided	60	12.3%
	Medicare/Medicaid/CHIP	242	49.8%
	None	165	34.0%
	Other	19	3.9%
Owns a Working Vehicle	Yes	410	77.4%
	No	120	22.6%

4.2 Disaster Preparedness Behaviors and Intention to Evacuate

Using a one sample t-test, it was found that perceived personal preparedness ($\bar{x} = 3.09$, $\delta = 1.796$) was significantly lower than the neutral value of 4 ($t\{541\}=11.812$, $p<0.001$ {one-tailed}). The storing of emergency supplies was somewhat low in this sample with 26.7% ($n=153$) of respondents reported having stored water and 29.4% ($n=170$) reported having stored food in case of emergencies. Family disaster planning was also low, only 29.2% ($n=168$) of respondents reported having and

emergency family communication plan and 21.6% (n=125) reported having an emergency evacuation plan. Other personal preparedness behaviors were practiced at varying rates; having stored cash for emergencies (18.5%, n=106), extra medications (30.7%, n=177), and a first aid kit (35.6%, n=205).

Using a one sample t-test, it was found that intention to evacuate ($\bar{x} = 5.05$, $\delta = 1.912$) was significantly higher than the neutral value of 4 ($t\{555\}=13.000$, $p<0.001$ {one-tailed}). An independent sample t-test was conducted to compare the intention to evacuate score between participants who had a family communication plan and a family evacuation plan and those who did not. There was a statistically significant increase in intention to evacuate when respondents reported having a family communication plan (no plan $\bar{x} = 4.96$, yes plan $\bar{x} = 5.31$, $t\{539\}=1.964$, $p = 0.05$ {one-tailed}) and a family evacuation plan (no plan $\bar{x} = 4.94$, yes plan $\bar{x} = 5.56$, $t\{540\}=3.119$, $p = 0.002$ {one-tailed}). It is therefore concluded that a family communication plan and a family evacuation plan both significantly increase the intention to evacuate.

4.3 Hypothesis #1: Perceived Susceptibility

The instrument for this study included three measures of perceived susceptibility, to reduce the likelihood of Type I error, the Bonferroni correction technique was employed ($\alpha<0.05/3=0.017$). Using a one-sample t-test, the mean score for the first measure, “I worry a lot about disasters” ($\bar{x} = 4.95$, $\delta = 2.058$) was determined to be significantly higher than the neutral score of 4 ($t\{571\}=11.029$, $p<0.001$ {one-tailed}). Using a one-sample t-test, the mean score for the second measure, “A disaster is more likely in my *colonia* than in the City of El Paso” ($\bar{x} = 4.38$, $\delta = 2.166$) was determined to be significantly higher than the neutral score of 4 ($t\{553\}=4.177$, $p<0.001$ {one-tailed}). And finally, using a one-sample t-test, the mean score for the final measure, “Living in a *colonia* makes it more likely that I will be hurt in a disaster” ($\bar{x} = 4.87$, $\delta = 2.117$) was determined to be significantly higher than the neutral score of 4 ($t\{561\}=9.24$, $p<0.001$ {one-tailed}). Based on the results of this study, Hypothesis #1, which stated that perceived susceptibility to disasters will be low in *colonia* residents, was rejected.

Further analysis revealed a possible confounding of perceived susceptibility measures between data collection group 1 (08/22/2013-08/30/2013) and group 2 (11/01/2013-11/15/2013), which were both collected in the Southeast portion of El Paso County. An independent-samples t-test was conducted to compare the three perceived susceptibility measure between data collection group 1 and data collection group 2. There was a significant increase in the score of the first perceived susceptibility measure from group 1 ($\bar{x} = 4.74$, $\delta = 2.047$) to group 2 ($\bar{x} = 5.49$, $\delta = 1.868$) ($t_{265} = -3.036$, $p = 0.003$ {one-tailed}). There was a significant increase in the scores of the second perceived susceptibility measure from group 1 ($\bar{x} = 4.13$, $\delta = 2.187$) to group 2 ($\bar{x} = 4.99$, $\delta = 2.142$) ($t_{261} = -3.117$, $p = 0.002$ {one-tailed}). And there was a non-significant increase in the third perceived susceptibility measure from group 1 ($\bar{x} = 5.00$, $\delta = 2.031$) to group 2 ($\bar{x} = 5.18$, $\delta = 2.113$) ($t_{264} = -0.697$, $p = 0.486$ {one-tailed}).

4.4 Hypothesis #2: Barriers to Disaster Preparedness and Evacuation

The instrument for this study included three measures of perceived economic barriers to disaster preparedness behaviors and evacuation, to reduce the likelihood of a Type I error, the Bonferroni correction technique was employed ($\alpha < 0.05/3 = 0.017$). Using a paired-samples t-test, the perceived barrier to storing extra food and water “Family and friends won’t approve” ($\bar{x} = 5.01$, $\delta = 2.184$) was determined to be significantly higher than the economic barriers “Costs too much” ($\bar{x} = 4.41$, $\delta = 2.147$) ($t_{567} = 6.698$, $p < 0.001$ {one-tailed}) and “I don’t have enough money” ($\bar{x} = 3.62$, $\delta = 2.160$) ($t_{558} = 15.224$, $p < 0.001$ {one-tailed}) (Table 4.3). Using a paired-samples t-test, the perceived barrier to evacuation “Family will not leave” ($\bar{x} = 5.53$, $\delta = 2.115$) was determined to be significantly higher than the economic barrier “Costs too much” ($\bar{x} = 4.45$, $\delta = 2.214$) ($t_{552} = 11.466$, $p < 0.001$ {one-tailed}) (Table 4.4). Based on the results of this study, Hypothesis #2, which stated that economic factors will be the greatest barriers to disaster preparedness and evacuation in *colonia* residents, was rejected. It was therefore concluded that concerns with approval of family members in storing extra food and water

and fear that family members will not evacuate if given an evacuation order are greater barriers than economic concerns.

Table 4.3

Descriptive Statistics, Barriers to Storing Extra Food and Water

	N	Mean	Std. Deviation
Barriers to Storing Food and Water: Family & friends won't approve	542	5.01	2.184
Barriers to Storing Food and Water: Cost too much	568	4.41	2.147
Barriers to Storing Food and Water: I don't know how to	554	3.97	2.239
Barriers to Storing Food and Water: Takes too much time	550	3.81	2.151
Barriers to Storing Food and Water: Takes up too much space	552	3.78	2.226
Barriers to Storing Food and Water: Don't live near a store	558	3.64	2.358
Barriers to Storing Food and Water: I don't have enough money	559	3.62	2.160
Barriers to Storing Food and Water: Access to potable water	555	3.42	2.504
Barriers to Storing Food and Water: My family is too large	565	3.39	2.096
Barriers to Storing Food and Water: Family & friends will ridicule me	547	2.69	2.139

Table 4.4

Descriptive Statistics, Barriers to Evacuation

	N	Mean	Std. Deviation
Barriers to Evacuation: Family will not leave	530	5.53	2.115
Barriers to Evacuation: Afraid of losing my home	566	5.32	2.158
Barriers to Evacuation: Afraid of losing possessions	547	5.15	2.180
Barriers to Evacuation: Car doesn't work well	548	4.49	2.170
Barriers to Evacuation: Costs too much	553	4.45	2.214
Barriers to Evacuation: Too difficult	554	4.14	2.217
Barriers to Evacuation: Don't have anywhere to go	535	4.05	2.546
Barriers to Evacuation: Don't know how to	531	3.96	2.480
Barriers to Evacuation: Car is too small to fit my family	535	3.40	2.303
Barriers to Evacuation: Family is too big	503	3.09	2.174
Barriers to Evacuation: Family Member Disabled	519	2.78	2.453
Barriers to Evacuation: Family will ridicule me	515	2.58	2.169
Barriers to Evacuation: I am disabled	511	2.27	2.145

4.5 Hypothesis #3: Trusted Sources of Risk Communication

The instrument for this study included four measures for risk communication from government and media sources, to reduce the likelihood of a Type I error, the Bonferroni correction technique was employed ($\alpha < 0.05/4 = 0.0125$). Using one-sample t-tests, the scores of the risk communication measure, “How likely are you to follow an evacuation order given by”, for a government official ($\bar{x} = 5.51$, $\delta = 1.814$)($t\{575\} = 20.007$, $p < 0.001$ {one-tailed}), the police ($\bar{x} = 5.99$, $\delta = 1.535$)($t\{572\} = 31.023$, $p < 0.001$ {one-tailed}), TV media/news ($\bar{x} = 5.59$, $\delta = 1.704$)($t\{577\} = 22.404$, $p < 0.001$ {one-tailed}), and Radio media/news ($\bar{x} = 5.54$, $\delta = 1.724$)($t\{576\} = 21.422$, $p < 0.001$ {one-tailed}) were determined to be significantly higher than the neutral score of 4.

The instrument for this study also included four measures for trust in government and media sources, to reduce the likelihood of a Type I error, the Bonferroni correction technique was employed ($\alpha < 0.05/4 = 0.0125$). Using one sample t-tests, the scores of the risk communication measure, “How much do you trust”, for a government official ($\bar{x} = 5.16$, $\delta = 1.879$)($t\{568\} = 14.729$, $p < 0.001$ {one-tailed}), the police ($\bar{x} = 5.87$, $\delta = 1.592$)($t\{577\} = 28.235$, $p < 0.001$ {one-tailed}), TV media/news ($\bar{x} = 5.49$, $\delta = 1.685$)($t\{581\} = 21.305$, $p < 0.001$ {one-tailed}), and Radio media/news ($\bar{x} = 5.41$, $\delta = 1.731$)($t\{576\} = 19.509$, $p < 0.001$ {one-tailed}) were determined to be significantly higher than the neutral score of 4.

Using a paired-samples t-test, it was determined that the means score in “How likely are you to follow an evacuation order given by Police” ($\bar{x} = 5.99$, $\delta = 1.535$) was significantly higher than the mean scores for government officials ($\bar{x} = 5.51$, $\delta = 1.814$)($t\{560\} = 7.011$, $p < 0.001$ {one-tailed}), TV media/news ($\bar{x} = 5.59$, $\delta = 1.704$)($t\{567\} = 7.182$, $p < 0.001$ {one-tailed}), and Radio media/news ($\bar{x} = 5.54$, $\delta = 1.724$)($t\{567\} = 8.135$, $p < 0.001$ {one-tailed}). Based on the results of this study, Hypothesis #3, which stated that trust in information from media and government sources will be low in *colonia* residents, was rejected. It was therefore concluded that government officials, law enforcement agencies,

and TV and Radio media are trusted sources of information and evacuation orders in residents of *colonias*. It was also determined that law enforcement agencies are the most trusted sources of evacuation orders in *colonia* residents.

4.6 The Health Belief Model, the Models of Disaster Vulnerability and Evacuation, and the Grassroots Risk Communication System

Multiple regression analysis was used to test The HBM in predicting Actual Disaster Preparedness Behaviors and Intention to Evacuate. The results of this analysis indicated that The HBM explained 78.5% of the variance in Actual Disaster Preparedness Behaviors ($R^2 = 0.785$), and 72.9% of the variance in Intention to Evacuate ($R^2 = 0.729$)($\chi^2(16) = 195.513$, $p < 0.001$). The variance inflation factor was less than 10, suggesting that multicollinearity was not an issue. It was found that Perceived Threat significantly predicted Actual Disaster Preparedness Behaviors ($\beta = -0.851$, $p < 0.001$), as did Self Efficacy ($\beta = 0.179$, $p = 0.006$).

Multiple regression analysis was then used to test if The Models of Disaster Vulnerability and Evacuation significantly predicted participant's Intention to Evacuate, Perceived Susceptibility, and Perceived Severity. The results of the regression indicated that the model explained 8.2% of the variance in Intention to Evacuate ($R^2 = 0.082$), 61.6% of the variance in Perceived Susceptibility ($R^2 = 0.616$), and 56.9% of the variance in Perceived Severity ($R^2 = 0.569$)($\chi^2(13) = 106.387$, $p < 0.001$). The variance inflation factor was less than 10, suggesting that multicollinearity was not an issue. It was found that Intention to Evacuate was significantly predicted by Geographic Proximity to Disaster Events ($\beta = -0.153$, $p = 0.004$) and Perceived Government Preparedness ($\beta = 0.232$, $p < 0.001$). Perceived Susceptibility was significantly predicted by Economic Risk Factors ($\beta = 0.259$, $p < 0.001$) and Geographic Proximity to Disaster Events ($\beta = -0.738$, $p < 0.001$). And Perceived Severity was significantly predicted by

Economic Risk Factors ($\beta = 0.248$, $p < 0.001$), Geographic Proximity to Disaster Events ($\beta = -0.691$, $p < 0.001$), and Perceived Personal Preparedness ($\beta = -0.151$, $p < 0.001$).

Finally, multiple regression analysis was used to test The Grassroots Risk Communication System in predicting Intention to Evacuate. The results of this regression indicate that the eight predictors explained 11.2% of the variance ($R^2 = 0.112$, $\chi^2(28) = 3032943$, $p < 0.001$). The variance inflation factor was less than 10, suggesting that multicollinearity was not an issue. Likelihood to Follow an Evacuation Order from Police was found to significantly predict Intention of Evacuation ($\beta = 0.173$, $p < 0.001$), as was Likelihood to Follow an Evacuation Order from a Government Official ($\beta = 0.182$, $p < 0.001$), Likelihood to Follow an Evacuation Order from Radio Media/News ($\beta = 0.094$, $p < 0.001$), and Likelihood to Follow an Evacuation Order from a TV Media/News ($\beta = -0.184$, $p < 0.001$).

Chapter 5: Discussion

Residents of *colonias* in El Paso County are inadequately prepared for disaster events and evacuation. Only 26.7% of respondents had extra water and 29.4% had extra food in case of an emergency. Additionally, only 21.6% of respondents had developed a family evacuation plan and only 29.2% had a plan to communicate with their family during an emergency. These figures are much lower than those reported in a poll conducted by Adelphi University in 2012, which indicate that 47% of Americans have a 3 day supply of food and water and 48% of Americans have a family evacuation plan (The Adelphi University Center for Health Innovation, 2012). These disparities leave *colonia* residents incredibly vulnerable to the negative outcomes associated with disasters and may result in a greater burden on governmental and nongovernmental agencies responding to future disaster events in the future.

Disaster preparedness behaviors increase the ability of the population to cope with the negative outcomes of disaster events and decrease the burden on emergency response, public health systems, and acute medical resources (DeBastiani & Strine, 2012). It is therefore recommended that emergency response planners periodically assess the readiness of communities and incorporate the findings into response strategies and community programs. (Brown, Horner, Fankhauser, Roth, & Victoroff, 2012). Current efforts in disaster preparedness programming aim to aid the public in developing an emergency supply kit and customizing a family communication and evacuation plan while continuing to inform communities of current and potential public health emergencies (Citizen Corps, 2012; The American Red Cross, 2009; Federal Emergency Management Agency, 2012).

Perceived Susceptibility and Perceived Severity of Disasters

As described by West & Orr (2007) and consistent with the HBM, proximity and exposure to flooding events in September 2013 in the Southeast El Paso County *colonias* increased the perceived susceptibility and perceived severity to the related negative outcomes in *colonia* residents. Economic risk factors, such as living below the poverty level, relying on government funded healthcare resources, not having completed high school, and lacking reliable transportation, also contributed to increases in

perceived susceptibility and perceived severity. The combined perceived threat to the negative outcomes associated with disasters was not correlated with the intention of evacuation in *colonia* residents, but was negatively correlated with the number of disaster preparedness behaviors, suggesting that *colonia* residents have a fatalistic attitude toward disaster events, which is consistent with prior research (West & Orr, 2007).

Barriers to Disaster Preparedness and Evacuation

The disapproval of family was reported as the greatest barrier to disaster preparedness behaviors and fear that family members will not evacuate was reported as the greatest barrier to evacuation. Due to the dire economic circumstances of many of the participants, the role of economic factors should not be discounted and may be the underlying cause for the perceived disapproval of storing extra food and water or evacuation by family members. The storing of extra food and water may be perceived as impractical given the economic insecurity in these communities. Over half of respondents receive public assistance that includes food supplementation programs. Storing extra food may be an activity that many *colonia* residents simply cannot afford. It should also be noted that nearly 75% of respondents were female and nearly 90% of respondents were Hispanic, the responses of this sample population may have been influenced by traditional Hispanic family dynamics and male-dominated gender roles, or *machismo* (Ulibarri, Raj, & Amaro, 2012). Fear of losing the home and personal possessions were also significant barriers to evacuation in *colonia* residents and were consistent with prior research in victims of Hurricane Katrina (Eisenman, Cordasco, Asch, Golden, & Gilk, 2007; Brodie, Weltzien, Altman, Blendon, & Benson, 2006).

Grassroots Risk Communications

Law enforcement agencies were the most trusted resource in this study. Respondents reported being more likely to follow an evacuation order if given by law enforcement than any other community resource. Government officials were also highly trusted, which is inconsistent with research conducted in other minority populations (Eisenman D. P., Glik, Maranon, Gonzales, & Asch, 2009; May, et al., 2003). The results of this study diminish the need for a specific grassroots risk communication system designed for residents of *colonias* and suggest that modifying the contemporary risk communication

model to address the needs of *colonia* residents may be more effective. The importance of law enforcement agencies in these communities extend beyond policing and into emergency response and risk communication, which contradicts most common perceptions of life in the *colonias* and perceived characteristics of *colonia* residents held by researchers (Earle, 1999).

The *colonias* and their residents are often characterized as being untrusting of government agencies and unwelcoming to “outsiders”, the idea that law enforcement and other government officials are more trusted than family, friends and neighbors is surprising and contrary to the customary notions of life in the *colonias* (Earle, 1999). The severe economic and demographic inequities that exist in *colonias*, in addition to the lack of political agency contribute to an environment where any external organizations or officials are perceived as unreliable and deceitful (Earle, 1999; May, et al., 2003). This distrust is further amplified by the fears that both undocumented and documented immigrants are increasingly being targeted for deportation (Eisenman, et al., 2009). The divergence of the results of this study from the customary notions of the perceived beliefs held by residents of *colonias* may only speak to situational scenarios where disaster events threaten personal safety and loss of property. This may indicate an unreported element of crime, or may imply a broader change in community cohesion or social dynamics that have evolved over time or as a result of interventions made by law enforcement and government agencies. The recent incorporation of San Elizario, a former *colonia* included in this study, implies a growth in political organization and indicates a possible change in the culture within the local *colonias* themselves (Flores, 2013).

Models of Disaster Preparedness and Evacuation

Though the HBM explained most of the variance in both actual disaster preparedness behaviors and evacuation, none of the individual constructs were significantly correlated with intention to evacuate. The lack of correlation between the theoretical constructs and intention of evacuation may indicate that the constructs cumulatively influence intention to evacuate or may point to conceptual differences between disaster preparedness behaviors and evacuation behaviors. The geographic proximity to disasters and perceived government preparedness models described by West & Orr (2007) were significantly correlated with intention to evacuate, suggesting that the Models of Disaster

Vulnerability and Evacuation may be a more appropriate model for measuring intention to evacuate and actual evacuation behaviors. Though the results of this study may only apply to residents of *colonias* and may be confounded by the recent flooding events that occurred in many of these communities, further investigation may clarify the difference, if any, that exist between disaster preparedness behaviors and evacuation behaviors.

Recommendations for Health Education Programs and Risk Communication

The success of programs aimed to increase disaster preparedness behaviors, intention to evacuate, and adherence to evacuation orders in *colonia* residents may depend on timing. Perceived Threat was negatively correlated with decreased disaster preparedness behaviors, indicating a fatalistic attitude toward disasters. As exposure to disaster events increase the perceived susceptibility and perceived severity, and consequently perceived threat of associated negative outcomes, programs to increase disaster preparedness behaviors should be implemented before times of the year where common disaster events occur. Since flooding was the most commonly reported disaster event in this study, the appropriate time period will include the months of the year where there is little rainfall and those that precede the monsoon season. Future efforts should be family oriented and aim to increase the self-efficacy of the participants to perform disaster preparedness behaviors and address both the perceived and real barriers to adequate disaster readiness.

Future efforts to increase the intention to evacuate should focus on the development of a family evacuation and emergency communication plan, which addresses the greatest barrier to evacuation reported by study participants. Additionally, law enforcement agencies should be involved in future programming to demonstrate the readiness of government agencies to respond to disaster events, educate *colonia* residents in both disaster preparedness and evacuation procedures, and issue timely and clear evacuation orders and risk communication. The economic barriers that may prevent many families from maintaining a three-day emergency supply of food and water or timely evacuation from affected areas may require intervention by government agencies and changes to current public assistance programs and policy.

Recommendations for Agencies Involved in Emergency Response and Risk Communication

Effective emergency response and risk communication in the *colonias* hinges on the trust placed in local law enforcement agencies by the residents of these communities. Other local, state, and federal agencies who respond to disaster events in these areas should defer to this dynamic and coordinate efforts so that local law enforcement agencies are, in the very least, perceived as in command of emergency response operations. Local law enforcement agencies, in coordination with other governmental and nongovernmental organizations, should demonstrate the overall readiness of government agencies to respond to disaster events in the *colonias* through community engagement and health education programs. The communication of severe weather warnings and evacuation orders should also be coordinated through local law enforcement in these areas and broadcast over a variety of media, including face-to-face communication with *colonia* residents.

The stark condition of the residences and other buildings in the *colonias* pose serious threats to the safety of their tenants and emergency responders. The poor condition of the roads required to access the *colonias* in addition to the remote locations of many of these communities contribute to logistical obstacles in evacuating potential victims of disaster events and allocation of emergency response resources after an event such as flooding has occurred. Due to the inadequate preparedness of *colonia* residents for disaster events, strategies to limit the exposure of residents and emergency responders to hazardous situations should be prioritized and implemented proactively. These efforts should focus on areas where recent flooding events have occurred or areas at high-risk for flooding.

Implications for Future Research and Policy

The possible confounding of data which was collected during a period of severe weather and excessive flooding, presents an opportunity to measure changes in perceptions and behavior influenced by exposure to disaster events. This may contribute to a better understanding of disaster preparedness and evacuation behaviors and more effective educational programming for persons vulnerable to disaster outcomes. The ability to measure changes in perceptions and behaviors may also allow researchers to predict the needs of disaster victims before, during, and after the manifestation of a disaster and may contribute to a more effective emergency response and risk communication by government agencies.

This study tested the constructs of The Health Belief Model, the Models of Disaster Vulnerability and Evacuation, and the Grassroots Risk Communication System in measuring disaster preparedness behaviors and intention of evacuation. Though the HBM was determined to be most appropriate for measuring disaster preparedness behaviors and evacuation, constructs from the Models of Disaster Vulnerability and Evacuation were more strongly correlated with intention to evacuate. Future research will reveal theoretical constructs that more specifically apply to both disaster preparedness behaviors and evacuation behaviors, and may contribute to a more exact and valid behavioral model.

The results of this study revealed a greater level of trust placed in law enforcement and government agencies than in family, friends, and neighbors, contrary to previous research, which validates the need for future investigation into community cohesion and the social dynamics within the *colonias*. These findings may only pertain to emergency or disaster scenarios where the threat of imminent injury and loss of property exist, however, the implications may extend to other research fields and public policy. Further research will elucidate the cause of these discrepancies as well as contribute to a better understanding of the needs of *colonia* residents and more effective public policy.

In addition to demonstrating the lack of disaster preparedness behaviors in *colonia* residents, this study exposes the dire economic inequities that exist in these communities. The majority of *colonia* residents meet or exceed the U.S. Poverty Guidelines and are reliant on public assistance programs and government funded healthcare. The geographic isolation and ambiguous governmental situation of many of these communities leave many residents without basic services and resources. The lack of building codes, zoning, and infrastructure expose *colonia* residents to unnecessary risk and exposure to negative outcomes associated with disasters. Government intervention and the reevaluation of policies that prioritize the *colonias* are grossly overdue and necessary to address the inequities that plague residents of these vulnerable communities.

Community Health Workers

The involvement of the community health workers who volunteered to aid in this study extended beyond the collection of data, their extensive experience in community engagement and involvement with numerous health education programs proved to be an invaluable resource. Though most of the *promotores* did not have formal education or training in research methodology, they were able to provide insight and guidance at every stage of planning and execution, directly contributing to the successful and efficient implementation of this study. The contributions of community health workers to this study, previous research, and health promotion programs validates their unique role in both public health practice and health science research, justifying additional investment into the training and employment of *promotores*.

Strengths

This study had a large sample size and high response rate, which contributed to the ability of researchers to determine statistically significant relationships in disaster perceptions, behavioral intention, and cues to action. The utilization of community health workers located throughout El Paso County contributed to a comprehensive sampling distribution of participants from throughout the county.

Limitations

Respondent-driven sampling may have produced a non-representative sample of *colonia* residents and may have negatively affected the external validity of the study. Residents of *colonias* might have not welcomed researchers into their communities and might not have been completely truthful and forthcoming while participating in the study. Since data were collected by community health workers and not researchers, there may have been inconsistencies in the manner in which the data were collected and recorded. The severe weather events that occurred during the collection of data may have influenced the responses of the participants and may have confounded the results of the study. Finally, because data were collected from residents of *colonias* in El Paso County, Texas, the findings may not be generalizable to other populations.

Conclusion

The severe economic inequities that exist in the *colonias* combined with inadequate disaster preparedness contribute to the extreme vulnerability of residents of *colonias* to the negative outcomes associated with disaster events. The development of programs to increase disaster preparedness behaviors and evacuation should address both the health education needs and economic barriers of *colonia* residents and their families. Government agencies should address the underlying economic and environmental inequities to improve the condition of the *colonias* and law enforcement agencies should be more involved in disaster preparedness and evacuation education programs, community engagement, and risk communication.

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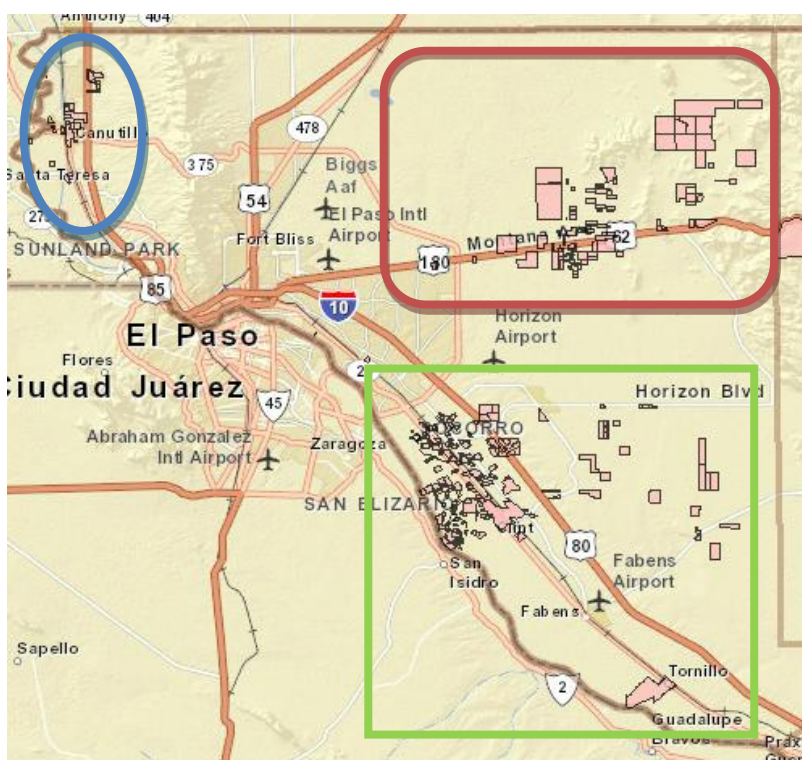
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Appendix A

Proposed Sampling Distribution



Proportional Sampling by Rural Population⁶ Stratified by *colonia* Location

Area ¹	Rural Population	% of Rural Population	# of Participants (Rounded ⁵)
North East ²	4259	34.9%	209 (200)
South East ³	5871	48.0%	288 (300)
West ⁴	2090	17.1%	103 (100)
Total	12220		600

1. Data collected and calculated by zip code

2. Zip code 79938

3. Zip codes 79928, 79838, 79836, 79849, and 79927

4. Zip codes 79821, 79911, and 79835

5. Rounded sample sizes are not statistically significantly different from those calculated from census data.

6. Data collected from the United States 2010 Census

Appendix B

Barriers to Disaster Preparedness, Evacuation, and Emergency Response in the Colonias of El Paso County

Research objective: to measure disaster preparedness perceptions, preparedness behaviors, and emergency communication in colonia residents.

If you agree to take part in this study, the research team will interview you and ask questions pertaining to your perceptions and opinions relating to disasters, preparedness, and emergency communication. Please keep in mind:

- Answer each question truthfully; you can refuse to answer any question without penalty
- You can stop the interview at any time
- There are no right or wrong answers
- Your responses are completely anonymous and will remain confidential
- You will receive a \$10 gift card at the end of the interview for your participation

If you have any questions or would like to receive the results after the study has ended, you may contact Anthony Lechuga at amlechuga2@miners.utep.edu.

Thank you.

I. Geographic Proximity to Disaster Outcomes

Since you have lived in the *colonias*, how close to your home have the following occurred:

1. Tornado: _____ < 1 Mile _____ 1 < 10 Miles _____ > 10Miles _____ Did not answer
2. Earthquake: _____ < 1 Mile _____ 1 < 10 Miles _____ > 10Miles _____ Did not answer
3. Flooding _____ < 1 Mile _____ 1 < 10 Miles _____ > 10Miles _____ Did not answer
4. Terrorist Attack _____ < 1 Mile _____ 1 < 10 Miles _____ > 10Miles _____ Did not answer
5. Wild Fire _____ < 1 Mile _____ 1 < 10 Miles _____ > 10Miles _____ Did not answer
6. Gang Violence _____ < 1 Mile _____ 1 < 10 Miles _____ > 10Miles _____ Did not answer
7. Disease outbreak _____ < 1 Mile _____ 1 < 10 Miles _____ > 10Miles _____ Did not answer
8. Chemical Spill _____ < 1 Mile _____ 1 < 10 Miles _____ > 10Miles _____ Did not answer

II. Government Preparedness:

9. How sure are you that the government can help you and your family in case of a disaster?

Not			Somewhat				Very	N/A
1	2	3	4	5	6	7	99	

10. How ready do you think the government is for a disaster?

Not			Somewhat				Very	N/A
1	2	3	4	5	6	7	99	

III. Personal Preparedness

11. How ready are you for disaster:

Not			Somewhat				Very	N/A
1	2	3	4	5	6	7	99	

In case of an Emergency or Disaster, I have:

12. Extra Water Yes No _____ Did not answer
13. Extra Food Yes No _____ Did not answer
14. Extra Cash Yes No _____ Did not answer
15. Extra Medicines Yes No _____ Did not answer
16. Plan to talk with my family during Yes No _____ Did not answer
17. Plan for my family to leave the area Yes No _____ Did not answer
18. First Aid Kit Yes No _____ Did not answer

IV. Plan to Evacuate

19. How likely are you to leave your home if you were ordered to because of a disaster?

Not		Somewhat			Very		N/A
1	2	3	4	5	6	7	99

20. Leaving the area is necessary to avoid getting hurt in a disaster

Do Not Agree		Somewhat Agree			Very Much Agree		N/A
1	2	3	4	5	6	7	99

V. Perceived Susceptibility

How likely the following will occur in your lifetime:

	Not		Somewhat			Very		N/A
21. Tornado	1	2	3	4	5	6	7	99
22. Earthquake	1	2	3	4	5	6	7	99
23. Flooding	1	2	3	4	5	6	7	99
24. Terrorist Attack	1	2	3	4	5	6	7	99
25. Wild Fire	1	2	3	4	5	6	7	99
26. Gang Violence	1	2	3	4	5	6	7	99
27. Disease Outbreak	1	2	3	4	5	6	7	99
28. Chemical Spill	1	2	3	4	5	6	7	99

How much do you agree with the following statements?

	Do Not		Somewhat			Very Much		N/A
29. I worry a lot about disasters	1	2	3	4	5	6	7	99
30. A disaster is more likely in my colonia than in the City of El Paso.	1	2	3	4	5	6	7	99
31. Living in a colonia makes it more likely that I will be hurt in a disaster.	1	2	3	4	5	6	7	99

VI. Perceived Severity

How much do you agree with the following statements:

	Do Not		Somewhat			Very Much		N/A
32. The idea of disasters scares me	1	2	3	4	5	6	7	99
33. A disaster will destroy my home	1	2	3	4	5	6	7	99
34. A disaster would be upsetting to me and my family.	1	2	3	4	5	6	7	99
35. I will lose everything in a disaster.	1	2	3	4	5	6	7	99

VII. Perceived Benefits

How much do you agree with the following statements:

	Do Not		Somewhat			Very Much		N/A
36. Storing extra food and water is helpful to me and my family	1	2	3	4	5	6	7	99
37. Leaving before a disaster hits is helpful to me and my family	1	2	3	4	5	6	7	99
38. I would not be so worried about disasters if I had extra food and water.	1	2	3	4	5	6	7	99
39. Leaving before a disaster hits will help me not get injured.	1	2	3	4	5	6	7	99

VIII. Perceived Barriers:

How much do you agree with the following statements: Storing extra food or water is difficult because:

	Do Not		Somewhat			Very Much		N/A
40. Costs too much	1	2	3	4	5	6	7	99
41. It takes too much time	1	2	3	4	5	6	7	99
42. I don't live near a store	1	2	3	4	5	6	7	99
43. I don't access to drinking water	1	2	3	4	5	6	7	99
44. It takes up too much space	1	2	3	4	5	6	7	99
45. My family/friends will not approve	1	2	3	4	5	6	7	99
46. My family/friends will make fun of me	1	2	3	4	5	6	7	99
47. My family is too large	1	2	3	4	5	6	7	99
48. I do not have enough money	1	2	3	4	5	6	7	99
49. I don't know how to	1	2	3	4	5	6	7	99

How much do you agree with the following statements: Leaving my home before a disaster hits is difficult because:

	Do Not		Somewhat			Very Much		N/A
50. It is too hard	1	2	3	4	5	6	7	99
51. It costs too much	1	2	3	4	5	6	7	99
52. I'm afraid of losing my home	1	2	3	4	5	6	7	99
53. I'm afraid of losing my things	1	2	3	4	5	6	7	99
54. My family is too big	1	2	3	4	5	6	7	99
55. I'm disabled	1	2	3	4	5	6	7	99
56. My family member is disabled	1	2	3	4	5	6	7	99
57. My family will not leave with me	1	2	3	4	5	6	7	99
58. My family/friends will make fun of me	1	2	3	4	5	6	7	99
59. I don't have a car that works well	1	2	3	4	5	6	7	99
60. My car is too small to fit my family	1	2	3	4	5	6	7	99
61. I don't have anywhere to go	1	2	3	4	5	6	7	99
62. I don't know how to	1	2	3	4	5	6	7	99

IX. Self Efficacy

I am sure that I can:

	Not Sure		Somewhat			Very Sure		N/A
63. Store extra water	1	2	3	4	5	6	7	99
64. Store extra food	1	2	3	4	5	6	7	99
65. Save extra money	1	2	3	4	5	6	7	99
66. Store an extra medicines	1	2	3	4	5	6	7	99
67. Make a plan to talk with my family	1	2	3	4	5	6	7	99
68. Make a family plan to leave in case of a disaster	1	2	3	4	5	6	7	99
69. Build a first aid kit	1	2	3	4	5	6	7	99
70. Get my family to leave	1	2	3	4	5	6	7	99
71. Find information about evacuation	1	2	3	4	5	6	7	99
72. Follow an order to leave my home	1	2	3	4	5	6	7	99

X. Cues to Action/Grassroots Risk Communication Plan

How likely are you to follow an evacuation order given by:

	Not		Somewhat			Very		N/A
73. Government official	1	2	3	4	5	6	7	99
74. TV media/News	1	2	3	4	5	6	7	99
75. Radio/News	1	2	3	4	5	6	7	99
76. Police	1	2	3	4	5	6	7	99
77. Family Member	1	2	3	4	5	6	7	99
78. Friend/Neighbor	1	2	3	4	5	6	7	99
79. Promotora	1	2	3	4	5	6	7	99
80. Pastor/Priest:	1	2	3	4	5	6	7	99

How much do you trust:

	Do Not		Somewhat			Very Much		N/A
81. Government official	1	2	3	4	5	6	7	99
82. TV media/News	1	2	3	4	5	6	7	99
83. Radio/News	1	2	3	4	5	6	7	99
84. Police	1	2	3	4	5	6	7	99
85. Family Member	1	2	3	4	5	6	7	99
86. Friend/Neighbor	1	2	3	4	5	6	7	99
87. Promotora	1	2	3	4	5	6	7	99
88. Pastor/Priest:	1	2	3	4	5	6	7	99

XI. Emergency Response

The roads I use to get to my home are:

- | | | | | |
|-----------------------|-----|----|-------|----------------|
| 89. Paved | Yes | No | _____ | Did not answer |
| 90. Dirt Road | Yes | No | _____ | Did not answer |
| 91. Walking path only | Yes | No | _____ | Did not answer |
| 92. No road or path | Yes | No | _____ | Did not answer |

93. It is easy to reach my home by car/van/truck. _____ Yes _____ No _____ Did not answer

94. My home is safe:	Not			Somewhat			Very	N/A
	1	2	3	4	5	6	7	99

95. I worry about my/my family's safety in my home:

	Do Not			Somewhat			Very Much	N/A
	1	2	3	4	5	6	7	99

I or a member of my household has the following needs: (Check only those that apply)

96. Communication needs:

_____ Is blind _____ Is deaf _____ Has a speech impairment
_____ Has hard time understanding verbal instructions _____ Communicates only with sign language
_____ Other Communication needs:

97. Independence/Mobility

_____ Requires a walker or cane _____ requires a wheelchair _____ Is partially or totally paralyzed
_____ Has had an amputation _____ Has a service animal _____ Is a bariatric patient _____ Other:

98. Transportation Needs

_____ Requires a van or truck with a lift _____ Requires an ambulance _____ Other:

99. Medical Care Needs

_____ Receives tube feedings _____ Requires daily IV therapy _____ Is on dialysis _____ Requires oxygen
_____ Has to have life-sustaining equipment that requires electricity
_____ Requires daily medical supplies (Ostomy supplies, catheters, etc.)
_____ Requires daily medications
_____ Other:

100. Medical supervision needs:

☐ Has to have a caregiver ☐ Has memory problems/ memory impairment
☐ Has a severe psychiatric condition ☐ Has a severe learning disability
☐ Has Alzheimer's Disease or other dementia ☐ Is easily confused

XII. Social Factors

101. Age: (years) ☐ Did not answer
102. Gender: ☐ Male ☐ Female ☐ Did not answer
103. Race/Ethnicity: ☐ White/Caucasian ☐ Black/African-American ☐ Hispanic/Latino
☐ Native American ☐ Asian/PI ☐ Other: ☐ Did not answer
104. Marital Status: ☐ Never Married ☐ Married/Cohabitaing as Married ☐ Separated
☐ Divorced ☐ Widow/er ☐ Did not answer
105. Number of Persons living inside your residence: (persons) ☐ Did not answer
106. Family Description: ☐ No children ☐ Single Parent Household ☐ Dual Parent Household
☐ Multiple Family Household ☐ Did not answer
107. Number of years living in the *colonias*: (years) ☐ Did not answer
108. Primary Spoken Language at home: ☐ English ☐ Spanish ☐ Other: ☐ Did not answer

XIII. Economic Factors

109. Yearly Household Income: ☐ Less than \$5,000 ☐ \$5,000 - \$10,000 ☐ \$10,000 – 20,000 ☐
\$20,000 - \$30,000 ☐ \$30,000 - \$40,000 ☐ More than \$40,000 ☐ Did not answer
110. Education: ☐ <8th Grade ☐ Some High School ☐ High School Graduate
☐ Some College ☐ Associates Degree ☐ Bachelors Degree ☐ Graduate Degree+ ☐ Did
not answer
111. Receiving Public Assistance: ☐ Yes ☐ No ☐ Did not answer
112. Health Insurance: ☐ Private/Employer provided ☐ Medicare/Medicaid/CHIP ☐ None
☐ Other: ☐ Did not answer
113. Owns a working vehicle: ☐ Yes ☐ No ☐ Did not answer

Barreras en la preparación para casos de desastre y evacuación, y la respuesta en casos de emergencia en las colonias del Condado de El Paso

Objetivo de esta investigación: para medir las percepciones de preparación para desastres, los comportamientos de preparación, y las comunicaciones de emergencia de los residentes de las colonias.

Si usted está de acuerdo de participar en este estudio, nuestros investigadores los entrevistara y les harán preguntas tocante a sus percepciones y opiniones en relación con los desastres, la preparación y las comunicaciones de emergencia. Por favor recuerda:

- Responda cada pregunta con sinceridad; puede dejar de contestar cualquier pregunta sin penalidad.
- Puede parar la entrevista al cualquier momento
- No hay respuestas correctas o incorrectas
- Sus respuestas son completamente anónimas y confidenciales
- Usted recibirá un certificado de \$10 al final de la entrevista

Si tiene alguna pregunta o quiere recibir los resultados después de terminar el estudio, puede comunicarse con Anthony Lechuga por e-mail (amlechuga2@miners.utep.edu).

Gracias.

I. Geographic Proximity to Disaster Outcomes

¿Desde que usted ha vivido en las colonias, que tan cerca de su casa se han producido los siguientes?:

1. Tornado: _____ < 1 Milla _____ 1 < 10 Millas _____ > 10 Millas _____ No respuesta
2. Terremoto: _____ < 1 Milla _____ 1 < 10 Millas _____ > 10 Millas _____ No respuesta
3. Inundación _____ < 1 Milla _____ 1 < 10 Millas _____ > 10 Millas _____ No respuesta
4. Ataque terrorista _____ < 1 Milla _____ 1 < 10 Millas _____ > 10 Millas _____ No respuesta
5. Incendios _____ < 1 Milla _____ 1 < 10 Millas _____ > 10 Millas _____ No respuesta
6. Violencia de las pandillas _____ < 1 Milla _____ 1 < 10 Millas _____ > 10 Millas _____ No respuesta
7. Epidemia de una enfermedad _____ < 1 Milla _____ 1 < 10 Millas _____ > 10 Millas _____ No respuesta
8. Accidente químico _____ < 1 Milla _____ 1 < 10 Millas _____ > 10 Millas _____ No respuesta

II. Government Preparedness:

9. ¿Qué tan seguro/a esta que el gobierno les puede ayudar a usted y a su familia en caso de un desastre?

No	Un Poco			Muchísimo		No respuesta	
1	2	3	4	5	6	7	99

10. ¿Qué tan preparado cree usted que el gobierno está en caso de un desastre?

No	Un Poco			Muchísimo		No respuesta	
1	2	3	4	5	6	7	99

III. Personal Preparedness

11. ¿Qué tan preparado está usted en caso de un desastre?:

No	Un Poco			Muchísimo		No respuesta	
1	2	3	4	5	6	7	99

En caso de una emergencia o desastre, tengo:

12. Agua guardada _____ Sí _____ No _____ No respuesta
13. Comida guardada _____ Sí _____ No _____ No respuesta
14. Dinero en efectivo guardado _____ Sí _____ No _____ No respuesta
15. Medicinas guardadas _____ Sí _____ No _____ No respuesta
16. Un plan de comunicación con mi familia _____ Sí _____ No _____ No respuesta
17. Un plan para evacuar la área con mi familia _____ Sí _____ No _____ No respuesta
18. Botiquín de emergencia _____ Sí _____ No _____ No respuesta

IV. Plan to Evacuate

19. ¿Qué tan probable es que usted evacue su casa en caso de un desastre?

			No		Un Poco		Muchísimo		No respuesta
1	2	3	4	5	6	7	99		

20. Saliendo de la área es necesario para evitar ser herido/a en caso de un desastre.

			No estoy de acuerdo		Totalmente de acuerdo		No respuesta	
1	2	3	4	5	6	7	99	

V. Perceived Susceptibility

¿Cuáles son las posibilidades que estos desastres puedan suceder en su vida?:

			No		Un Poco		Muchísimo		No respuesta
21. Tornado	1	2	3	4	5	6	7	99	
22. Terremoto	1	2	3	4	5	6	7	99	
23. Inundación	1	2	3	4	5	6	7	99	
24. Ataque terrorista	1	2	3	4	5	6	7	99	
25. Incendios	1	2	3	4	5	6	7	99	
26. Violencia de las pandillas	1	2	3	4	5	6	7	99	
27. Epidemia de una enfermedad	1	2	3	4	5	6	7	99	
28. Accidente químico	1	2	3	4	5	6	7	99	

¿Por favor indique si usted está o no está de acuerdo con las siguientes frases?

			No estoy de acuerdo		Totalmente de acuerdo		No respuesta	
29. Me preocupo mucho por los desastres.	1	2	3	4	5	6	7	99
30. Un desastre es más probable en mi colonia que en de la Ciudad de El Paso.	1	2	3	4	5	6	7	99
31. Durante un desastre, es más posible que yo y mi familia nos podamos lastimar porque vivimos en una colonia.	1	2	3	4	5	6	7	99

VI. Perceived Severity

¿Por favor indique si usted está o no está de acuerdo con las siguientes preguntas?

	No estoy de acuerdo				Totalmente de acuerdo			No respuesta
32. El pensar en desastres lo asusta?.	1	2	3	4	5	6	7	99
33. Piensa que un desastre le destruiría su casa?	1	2	3	4	5	6	7	99
34. Un desastre acabaría con usted y su familia?	1	2	3	4	5	6	7	99
35. Piensa que lo perdería todo en un desastre.	1	2	3	4	5	6	7	99

VII. Perceived Benefits

¿Está usted de acuerdo con las siguientes Preguntas:

	No estoy de acuerdo				Totalmente de acuerdo			No respuesta
36. Almacenar alimentos y agua sería útil para usted y su familia?	1	2	3	4	5	6	7	99
37. Evacuar antes de desastre sería útil para usted y su familia?.	1	2	3	4	5	6	7	99
38. Estaría usted preocupada por los desastres si tuviera alimentos y agua almacenados?.	1	2	3	4	5	6	7	99
39. Evacuar antes del desastre le ayudaría a no ser lastimado?.	1	2	3	4	5	6	7	99

VIII. Perceived Barriers:

¿Está usted de acuerdo con las siguientes preguntas?

Almacenar comida y agua es difícil para usted? Porque?:

	No estoy de acuerdo				Totalmente de acuerdo			No respuesta
40. Le cuesta mucho?	1	2	3	4	5	6	7	99
41. Toma demasiado tiempo?	1	2	3	4	5	6	7	99
42. No vive cerca de una tienda?	1	2	3	4	5	6	7	99
43. No tiene acceso a agua potable?	1	2	3	4	5	6	7	99
44. Le toma mucho espacio?	1	2	3	4	5	6	7	99
45. Su familia o amigos lo aceptarían?	1	2	3	4	5	6	7	99
46. Su familia o amigos se reirían de usted?	1	2	3	4	5	6	7	99
47. Hay demasiados miembros en su familia?	1	2	3	4	5	6	7	99
48. Tiene los recursos necesarios para almacenar alimentos y agua?	1	2	3	4	5	6	7	99

49. Sabe usted como almacenar alimentos y agua?

1 2 3 4 5 6 7 99

¿Está usted de acuerdo con las siguientes preguntas?:

Evacuar su casa antes de que ocurra un desastre es difícil? Porque.?:

	No estoy de acuerdo			Totalmente de acuerdo			No respuesta	
50. Es muy dificultoso	1	2	3	4	5	6	7	99
51. Cuesta mucho	1	2	3	4	5	6	7	99
52. Tiene miedo de perder su casa?	1	2	3	4	5	6	7	99
53. Tiene miedo de perder sus cosas?	1	2	3	4	5	6	7	99
54. Hay demasiados miembros en su familia?	1	2	3	4	5	6	7	99
55. Esta incapacitado/a?	1	2	3	4	5	6	7	99
56. Hay algún incapacitado/a en su familia?	1	2	3	4	5	6	7	99
57. Su familia evacuaría con usted?	1	2	3	4	5	6	7	99
58. Su familia o amigos se reirían de usted?	1	2	3	4	5	6	7	99
59. Tiene transportación en buenas condiciones?	1	2	3	4	5	6	7	99
60. Su carro es demasiado pequeño para su familia?	1	2	3	4	5	6	7	99
61. Tiene a donde ir?	1	2	3	4	5	6	7	99
62. Sabe como?	1	2	3	4	5	6	7	99

IX. Self Efficacy

Esta usted seguro/a que puedo?:

	No		Un Poco		Si Puedo		No respuesta	
63. Guardar agua de reserva?	1	2	3	4	5	6	7	99
64. Guardar comida de reserva?	1	2	3	4	5	6	7	99
65. Guardar dinero en efectivo de reserva?	1	2	3	4	5	6	7	99
66. Guardar medicinas de reserva?	1	2	3	4	5	6	7	99
67. Hacer un plan para comunicarme con mi familia?	1	2	3	4	5	6	7	99
68. Hacer un plan familiar para evacuar en caso de un desastre?	1	2	3	4	5	6	7	99
69. Hacer un botiquín de emergencia?	1	2	3	4	5	6	7	99
70. Convencer a su familia que evacuen?	1	2	3	4	5	6	7	99
71. Encontrar información sobre planes de evacuación?	1	2	3	4	5	6	7	99

72. Seguir una orden de abandonar su hogar

1 2 3 4 5 6 7 99

X. Cues to Action/Grassroots Risk Communication Plan

¿Qué tan probable es que usted siga una orden de evacuación dada por?:

	No		Un Poco			Muchísimo		No respuesta
73. Funcionario del Gobierno?	1	2	3	4	5	6	7	99
74. Noticias de la televisión?	1	2	3	4	5	6	7	99
75. Noticias de la radio?	1	2	3	4	5	6	7	99
76. La Policía?	1	2	3	4	5	6	7	99
77. Un miembro de mi familia?	1	2	3	4	5	6	7	99
78. Amigo/Vecino?	1	2	3	4	5	6	7	99
79. Promotora de Salud?	1	2	3	4	5	6	7	99
80. Un Pastor/El Papa?	1	2	3	4	5	6	7	99

How much do you trust:

Usted tendría confianza con?

	No		Un Poco			Muchísimo		No respuesta
81. Funcionario del Gobierno?	1	2	3	4	5	6	7	99
82. Noticias de la televisión?	1	2	3	4	5	6	7	99
83. Noticias de la radio?	1	2	3	4	5	6	7	99
84. la Policía?	1	2	3	4	5	6	7	99
85. Un miembro de mi familia?	1	2	3	4	5	6	7	99
86. Amigo/Vecino?	1	2	3	4	5	6	7	99
87. Promotora de Salud?	1	2	3	4	5	6	7	99
88. Un Pastor/ El Papa?	1	2	3	4	5	6	7	99

XI. Emergency Response

Las calles que utiliza para llegar a su casa están:

89. Pavimentadas?	Sí	No	_____ No respuesta
90. No están pavimentadas?	Sí	No	_____ No respuesta
91. Hay calle cerca de su casa?	Sí	No	_____ No respuesta

92. No hay calle ni paso cerca de su casa? Sí No ____ No respuesta
 93. Es fácil llegar a su casa por medio de transporte? ____ Sí ____ No ____ No respuesta

94. Hay peligro en su casa tocante la construcción o cableado eléctrico?:

No	Un Poco		Muchísimo		No respuesta			
	1	2	3	4	5	6	7	99

95. Le preocupan los peligros que existen en su casa para usted y su familia?:

No	Un Poco		Muchísimo		No respuesta		
1	2	3	4	5	6	7	99

Usted o un miembro de su hogar tiene las siguientes necesidades: (Marque solamente las que se aplican)

96. Necesidades de comunicación:

____ Ciego ____ Sordo ____ No poder hablar
 ____ Tiene dificultad en entender instrucciones verbales ____ comunicación con traductor de lenguaje de señas ____ Otras necesidades de comunicación:

97. Independencia / Movilidad

____ Requiere un andador o un bastón ____ Requiere una silla de ruedas
 ____ Está paralizada/o total o parcialmente
 ____ Ha tenido una amputación ____ Tiene un animal de servicio
 ____ Requiere asistencia por sobrepeso extremo Otro:

98. Necesidades de transporte

____ Requiere una camioneta o camión con un ascensor ____ Requiere una ambulancia ____ Otro:

99. Necesidades de atención médica

____ Recibe alimentación por sonda ____ Requiere terapia intravenoso diaria_
 ____ Requiere diálisis ____ Requiere oxígeno
 ____ Tiene que utilizar equipo de soporte vital que requiera electricidad
 ____ Requiere suministros diarios médicos (suministros de ostomía, catéteres, etc.)
 ____ Requiere medicamentos diarios
 ____ Otros:

100. Necesita supervisión médica:

____ Tiene que tener un proveedor de salud ____ Tiene problemas de memoria / deterioro de la memoria
 ____ Tiene una enfermedad psiquiátrica severa ____ Tiene una discapacidad severa
 ____ Tiene la enfermedad de Alzheimer u otra demencia ____ Se confunde fácilmente

XII. Social Factors

101. Edad: ____ (años) ____ No respuesta
102. Sexo: ____ Hombre ____ Mujer ____ No respuesta
103. Raza / Etnia: ____ Blanco / Caucásico ____ Negro / Afroamericano ____ Hispano / Latino
____ Nativo Americano ____ Asiático / PI ____ Otro: ____ No respuesta
104. Estado civil: ____ Nunca Casado ____ Casado/ Cohabitando como casado ____ Separado
____ Divorciado ____ Viudo / a ____ No respuesta
105. Número de personas que viven en su residencia/casa: ____ (personas) ____ No respuesta
106. Descripción de la familia: ____ No niños ____ Familia monoparental ____ Familia con los dos padres
____ Múltiple familias ____ No respuesta
107. Número de años que viven en las colonias: ____ (año) ____ No respuesta
108. Idioma principal que habla en casa: ____ Inglés ____ Español ____ Otro: ____ No respuesta

XIII. Economic Factors

109. Ingresos anuales de su hogar: ____ Menos que \$5,000 ____ \$5,000 - \$10,000 ____ \$10,000 – 20,000 ____
\$20,000 - \$30,000 ____ \$30,000 - \$40,000 ____ Más que \$40,000 ____ No respuesta
110. Educación: ____ <hasta el grado 8 ____ Un poco de escuela secundaria ____ Graduado de la escuela secundaria
____ Un poco de colegio ____ Título de Asociado ____ Diploma Universitario ____ Postgrado +
____ No respuesta
111. Recibe Asistencia Pública: ____ Sí ____ No ____ No respuesta
112. Seguro Médico: ____ Privado / empleador proporciona ____ Medicare/Medicaid/CHIP ____ ninguno
____ Otro: ____ No respuesta
113. Es dueño de un vehículo que funciona: ____ Sí ____ No ____ No respuesta

Vita

Anthony Mark Lechuga, Jr. was born in El Paso, Texas and graduated from Franklin High School. He attended New Mexico State University before enlisting in the New Mexico Army National Guard shortly before the tragedies of September 11th, 2001. His service included postings at White Sands Missile Range as an ambulance crew member and health instructor, the U.S. – Mexico Border as the Medical Operations Non-Commissioned Officer in Charge for Operation Jump Start – Joint Task Force Zia, and lead health instructor for a short training operation to support the Philippine Army. After nine years of service, Tony received an Honorable Discharge and enrolled at The University of Texas at El Paso where he completed a Bachelor's Degree in Multidisciplinary Studies in May, 2010. He then enrolled in the Master of Public Health Sciences program in the Fall 2011 cohort. His interests are in addressing health disparities in Hispanic communities involving social justice, disaster preparedness, and environmental health, as well as contributing to topics related to veteran's health. Tony interned at the Pan American Health Organization in the summer of 2012, where he contributed to research in human security topics that relate to residents of *colonias*, rural unincorporated communities along the U.S. – Mexico border. Tony currently works as an instructor at Dona Ana Community College in the Health Occupations Program where he teaches Community Health and other medical topics. He has served as secretary for Students for Public Health, team leader for the Cystic Fibrosis Foundation's Great Strides fundraiser, and volunteers with the Texas Region 9 Emergency Medical Task Force.

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