University of Colorado Denver

Cultural Vulnerability Analysis Project Report

Project Lead: *Debra Kreisberg, PhD*

Project Team:
Deborah Thomas, PhD
Morgan Valley, MS, MPH
Comilla Sasson, MD, MS
Enessa Janes
Shannon Newell
Charles Little, DO

Field Research:
Francisco Gónima
Daniel Talero

Contents

Figures

Tables

ABSTRACT

Hospitals around the nation are struggling to meet daily demands for service, particularly to underserved and marginalized populations, and disasters and mass casualty events exacerbate the existing strain on local health infrastructure. As the frontline of the U.S. health system, hospitals are considered critical infrastructure in all stages of the emergency management cycle, and as such often conduct independent disaster response exercises and create facility preparedness plans as standard practice. However, many of these efforts fail to comprehensively incorporate a robust appreciation of the social, cultural and economic fabric of the communities they serve into hospital disaster preparedness policies and procedures. Ultimately, these considerations are vital to maintaining continuity of operations and reducing losses from disasters. Yet, neither the research nor practice community has established an approach that sufficiently integrates hospital disaster planning with holistic community vulnerability assessments.

In response to the need for a comprehensive approach to hospital disaster preparedness planning, the University of Colorado Denver (UCD) Cultural Vulnerability Analysis Project focuses on socio-economic and cultural considerations for hospital disaster preparedness planning. Ultimately, the demonstration pilot establishes a process that can directly align cultural and social vulnerability considerations to existing hospital preparedness procedures. Four project phases included: (1) a comprehensive literature review of existing regulatory frameworks and research related to hospital preparedness and response, disasters and vulnerable populations, (2) a statewide vulnerability assessment using geographic information systems (GIS) identifying Colorado populations that are potentially most susceptible to the effects of a disaster or mass casualty event, which is then extended to hospital service areas, (3) focus groups garnering more detailed information on access to healthcare during disasters, highlighting experiences of Spanish-speaking populations in vulnerable communities, and (4) a survey of hospital emergency planners followed by more in-depth interviews of a subset of those surveyed.

Taken together, the results suggest a robust, mixed-methods approach for comprehensively incorporating marginalized and vulnerable populations into hospital disaster planning, offering a model that could promote integration between public health, hospitals and emergency management. Ultimately, disaster planning for all populations should include an evaluation across functional areas for various groups, including communication, medical care, independence, supervision, and transportation.

GLOSSARY of ABBREVIATIONS & ACRONYMS

AHA	American Hospital Association
CBP	Community-Based Participatory
CDPHE	Colorado Department of Public Health and Environment
CHA	Colorado Hospital Association
CLAS	Culturally and Linguistically Appropriate Services
COMIRB	Colorado Multiple-Institutional Review Board
CPI	Consumer Price Index
DEM	Colorado Division of Emergency Management
EPRD	Emergency Preparedness and Response Division
FEMA	Federal Emergency Management Agency
GIS	Geographic Information Systems
HHS	Department of Health & Human Services
NHSS	National Health Security Strategy
NRF	National Response Framework
OCR	Office for Civil Rights
OMH	Office of Minority Health
PAHPA	Pandemic and All-Hazards Preparedness Act
SES	Socio-Economic Status
SLVIRC	San Luis Valley Immigrant Resource Center
SSA	Social Security Administration
TJC	The Joint Commission on Accreditation of Healthcare Organizations
UCD	University of Colorado Denver
UCD-CVAP	University of Colorado Denver Cultural Vulnerability Analysis Project
WHO	World Health Organization

INTRODUCTION

Continuity of medical services during and after a disaster is one of the most essential components of emergency management. The criticality of hospital disaster preparedness has been emphasized by the World Health Organization (WHO) because "people count on hospitals and health facilities to respond, swiftly and efficiently, as the lifeline for survival and the backbone of support"(WHO, 2009). Beyond their provision of medical care, hospitals are also a symbol of social stability. Survivors often identify hospitals as a first safe haven, especially during the immediate aftermath of a disaster. However, the inclusion of hospitals and public health organizations in hazard mitigation and disaster planning processes has, until very recently, remained limited. Furthermore, the development of essential capabilities within the healthcare systems for increased disaster response effectiveness has revealed itself, as evidenced in the U.S. by the Anthrax Attacks in 2001 and Hurricane Katrina in 2005 (Barbera, Yeatts & Macintyre, 2009; Daub, 2002; Messias & Lacy, 2007).

At the frontline of the U.S. health system, hospitals are considered critical infrastructure in all stages of the emergency management cycle. Yet, providing the best healthcare possible to every person seeking medical assistance is a pervasive daily challenge for hospitals and the healthcare system, particularly for marginalized and vulnerable populations. Disasters and mass casualty events exacerbate the existing strain on local health infrastructure and emphasize already existing health disparities. In the U.S., "research documents that a variety of patient populations experience decreased patient safety, poorer health outcomes, and lower quality care based on race, ethnicity, language, disability, and sexual orientation" [The Joint Commission on Accreditation of Healthcare Organizations (TJC), 2010, p. 1]. Typically, healthcare disparities within these populations, as well as within economically deprived groups, are magnified in the wake of disasters when health resources and systems become exponentially stressed.

Although most hospital disaster planning efforts presently fall short of holistically integrating socially vulnerable and marginalized populations, the potential for dramatically increasing disaster resilience and capacity exists by adopting a more robust and integrated approach. In response to the need for a comprehensive approach to hospital disaster preparedness planning, the University of Colorado Denver (UCD) Cultural Vulnerability Analysis Project (UCD-CVAP) focuses on socio-economic and cultural considerations for hospital disaster preparedness planning. Ultimately, the goal of the UCD-CVAP is to provide hospitals with critical pathways to more effectively incorporate all types of social and functional needs, not only cultural and linguistically diverse populations, into their institutional disaster plans.

The demonstration pilot project establishes a process that directly aligns cultural and social vulnerability considerations to existing hospital preparedness procedures. The report subsequently describes the four project phases, including: (1) a comprehensive literature review of existing regulatory frameworks and research related to hospital preparedness and response, disasters and vulnerable populations, (2) a statewide vulnerability assessment using geographic information systems (GIS) identifying Colorado populations that are potentially most susceptible to the effects of a disaster or mass casualty event, which is then extended to hospital service areas, (3) focus groups garnering more detailed information on access to healthcare during disasters, highlighting experiences of Spanish-speaking populations in vulnerable communities, and (4) a survey of hospital emergency planners followed by more in-depth interviews of a subset of those surveyed. The methods specific to each phase are described within the corresponding section.

BACKGROUND & LITERATURE

As an initial starting point for the project, the team at the University of Colorado Denver undertook a literature review of existing regulatory frameworks and research related to hospital preparedness and response, disasters and vulnerable populations. This effort provided a contextual framework in which to situate the study. This section reviews current practices situated around five themes: (1) hospital disaster preparedness, (2) existing regulatory frameworks and standards, (3) community vulnerability and capacity, (4) vulnerability and capacity assessments, and (5) community resilience in relation to health-related disasters.

Hospital Disaster Preparedness

Hospital preparedness is typically a private endeavor in which individual hospitals invest in programs and supplies, direct community drills and exercises, and train medical staff to respond to mass casualty events. With most hospitals currently functioning at or above capacity, it is essential that steps be taken to increase surge capacities and connect hospitals with their communities at large in an effort to enhance local resiliency (AHA, 2007). In a general sense, hospital disaster preparedness is a measure of the ability of a hospital to prevent, respond to, and recover from the impacts of a disaster while continuing to provide routine care (Nelson et al., 2007). In the past, efforts to enhance hospital preparedness have focused on improving surge capacity, defined by the American College of Emergency Physicians as the "healthcare system's ability to manage a sudden or rapidly progressive influx of patients within the currently available resources at a given point in time" (American College of Emergency Physicians, 2005, p. 239). Surge capacity is influenced by three essential elements: staff, supplies and equipment, and structure (Barbisch & Koenig, 2006; Kaji, Koenig & Bey, 2006). Structure refers to both the location for patient care and the organizational infrastructure, such as the hospital incident command system (AHA, 2007).

Unfortunately, according to the American Hospital Association, 48 percent of all U.S. hospitals—and 65 percent of urban hospitals—are already at or over emergency department capacity (AHA, 2007). While these numbers show an improvement over a similar study conducted in 2002, new challenges such as increasing critical staff vacancies, facility closures, and funding reductions, work to compound this strained system. Thus, determining the best way to surge an already overwhelmed system is a momentous challenge. In fact, the same study (AHA, 2007) found that only 17 percent of hospitals would be able to surge 30 or more staffed beds 12 hours after a disaster.

Efficiency is paramount in future efforts to increase the surge capacities of hospitals that are already strained for resources. Having a complete picture of the facility's service population during a disaster will allow hospitals to develop preparedness and response plans in a more targeted manner. Enlisting community input during the preparation of local response plans will assist hospitals in understanding the specific health needs that exist within their service community, including those that are likely to be exacerbated by a disaster (Community-based Emergency Preparedness Roundtable, 2003). The Community-based Emergency Preparedness Roundtable (2003) advocates for a community-wide, participatory approach to disaster planning and highlights the imperative that hospitals must take a systems approach to adequately plan for disasters.

A new body of hospital disaster planning literature addresses the importance of incorporating underrepresented groups in community participation processes (Albanese et al., 2008; Braun et al., 2006; Community-Based Emergency Management Roundtable, 2005; Emergency Preparedness

Roundtable, 2003). The following community groups represent those populations that are considered most vulnerable in the context of hospital disaster planning: patients who receive at home routine care from the hospital, pregnant women, existing or pending surgical patients, and existing critical care patients. Currently, limited resources exist to assist hospitals in linking their disaster preparedness activities with broader community vulnerability and capacity concerns.

Recent recommendations for disaster planning in healthcare facilities have expanded the definition of vulnerable populations to include: children, limited or non-English-speakers, geographically or culturally isolated groups, medically or chemically dependent individuals, homeless individuals, and the frail or elderly (Community-Based Emergency Management Roundtable, 2005). As the field of health emergency preparedness has matured, the usefulness of demography as a tool for understanding the health vulnerabilities of communities in the context of disasters has been increasingly embraced (Allen & Katz, 2010). While there is a general consensus that the service population during a disaster will be significantly larger than a hospital's normal emergency service population, evaluations of the needs of this service group must go beyond numbers of individuals. Demographic characteristics of the hospital disaster service area must be identified in order to improve service and response capabilities. It makes sense that a disaster survivor will seek medical assistance at the facility he or she can access most easily, which may not necessarily be the facility normally used for routine care.

In the state of Colorado, the Colorado Department of Public Health and Environment's (CDPHE) Emergency Preparedness and Response Division (EPRD) (Hospital Preparedness Program, 2010) is responsible for organizing hospital disaster preparedness. In 2008, EPRD established the Hospital Preparedness Advisory council as the principle advisory element for hospital disaster preparedness in Colorado.

Existing Regulatory Frameworks and Standards

In 2008, the Department of Homeland Security changed the 'National Response Plan' to the 'National Response Framework' in an effort to emphasize the concept that disaster mitigation, preparation, response and recovery activities must occur together. The National Response Framework describes them as interconnected activities, engaged in a continuous process as opposed to the production of static planning and protocol documents (Department of Homeland Security, 2008). A significant change within the new national guidelines was the creation of the 2006 Pandemic and All-Hazards Preparedness Act (PAHPA), which assigned formal leadership to the health sector in the development of preparation and response activities for all health related emergencies (Hodge, Gostin, & Vernick, 2007). These pieces of legislation prompted the development of a series of strategies and programs to assist hospitals in preparing for multi-hazards, and spurred an influx in research activity to inform their implementation.

The Hospital Preparedness Program was established in 2006 as a mechanism to support goals established in the PAHPA, specifically: integration of healthcare systems; improving medical capabilities that support disasters; accounting for and understanding at-risk populations; coordination among all levels of government; and maintaining continuity of operations [Department of Health & Human Services (HHS), 2010]. For FY10, the Hospital Preparedness Program outlined planning requirement with a focus on the needs of at-risk populations. According to HHS, individuals considered 'at-risk' include "children, senior citizen, pregnant women, those who have disabilities, live in institutionalized settings, are from diverse cultures, have limited English proficiency or are non-English speaking, are transportation disadvantaged, have chronic medical disorders, and have pharmacological dependency"

(HHS, 2010). Planning considerations for these groups should be evaluated across functional areas, including communication, medical care, independence, supervision, and transportation.

The most recent national guidelines for healthcare system preparedness were outlined in the inaugural *2009 National Health Security Strategy* (NHSS). The goal of the NHSS is to reduce the health impacts of disasters by developing resilient communities. According to the NHSS, the first step towards developing a disaster resilient community is an assessment of the community's overall baseline health. This pre-event, community health assessment involves the consideration of the prevalence and distribution of chronic disease and of the ability of community members to access timely and appropriate preventative health services (Chandra et al., 2010). It is critical that vulnerable populations, including minority groups, the elderly and the disabled, are incorporated into the analysis because these groups generally suffer greater levels of disease and injury, often have functional limitations due to decreased mobility, and are most likely to have the lowest rates of health insurance in the community (Chandra et al., 2010). Assuring that the most vulnerable people have adequate access to health services will ultimately result in a population that is more resilient to disasters as a whole.

The NHSS outlines eight key components to assist in meeting ten strategic objectives for increased national health security in its "Community Resilience and Recovery" focus area. The key components include:

- Public education to inform and prepare individuals and communities
- Public education in local decision-making
- Identification of local preparedness and resilience social networks
- Integration of support from non-governmental organizations
- Development of emergency public information and warning systems
- Foster post-incident social network re-engagement
- Provision of case management support or individual assistance
- Reconstitution of the public health, medical, and behavioral health infrastructure
- Mitigation of hazards related to health and public health facilities and systems
- Development of support services network for long-term recovery (NHSS, 2009, pp. 20-21)

In addition to the establishment of healthcare system preparedness standards as articulated in the NHSS, steps have been taken towards reducing vulnerability and increasing capacity through cultural competency efforts and the reduction of chronic health disparities. In 1997 the Office of Minority Health (OMH) released a set of comprehensive, national standards to assist hospitals in providing culturally and linguistically appropriate healthcare services (HHS, 2001). Aimed primarily at healthcare organizations, the Culturally and Linguistically Appropriate Services (CLAS) standards contain recommendations meant for different organizational levels to encourage individual providers to use the standards as a guide for providing services that are culturally and linguistically appropriate.

The CLAS standards consist of 14 elements. These elements are organized into three thematic areas: Culturally Competent Health Care (Standards 1-3), Language Access Services (Standards 4-7), and Organizational Support for Cultural Competence (Standards 8-14). There are three types of cultural competency actions articulated by the standards– mandates, guidelines, and recommendations – and they vary in degrees of stringency (HHS, 2001). For example, some CLAS standards are mandates for all recipients of federal funding; others are suggested mandates for adoption by State and Federal

accrediting agencies; and some are recommended voluntary actions that can be adopted by healthcare organizations to assist them in their efforts to reduce health disparities.

Enforcement of the CLAS standards, mandatory or otherwise, has been challenging for OMH and for the HHS Office for Civil Rights (OCR). However, the standards have been successful at setting expectations for what quality healthcare for diverse populations should look like, and how agencies and healthcare providers can play a role in improving care for minority populations (Lurie, Jung & Lavisso-Mourey, 2005; Diamond, Wilson-Stronks & Jacobs, 2010).

In 2010, TJC published a *Roadmap for Hospitals* that established additional standards for cultural competence. The roadmap outlines strategies for "effective communication" and puts an emphasis on patient and family-centered care (TJC, 2010, p. 1). This document serves as a companion piece to the existing *Comprehensive Accreditation Manual for Hospitals* and provides comprehensive, detailed recommendations and best practices for achieving its cultural competency goals. TJC already provides guidelines and standards to help hospitals prepare for emergencies. These standards include three elements of performance that relate specifically to social vulnerability (TJC, 2010, p. 50):

- Establishing a communication plan that communicates response efforts to staff, patients, and external organizations, including non-English speaking populations and the hearing impaired.
- Ensuring the plan is capable of communicating care with the patient and their family, including the relocation of the patient.
- Ensuring the plan accounts for an increase in care for individuals with ongoing chronic conditions.

Hospitals can draw from TJC's *2010 Cultural Competency Roadmap* to ensure that their emergency preparedness plans are capable of providing appropriate, comprehensive care for diverse populations. The development of processes and programs that couple the TJC's cultural competency and hospital emergency preparedness objectives will require a significant amount of planning. Moreover, it necessitates a bottom-up approach to the assessment of hospital performance and the identification of areas for improvement. The TJC encourages hospitals to engage local communities in discussions about their healthcare services. It also recommends the use of existing population datasets (e.g. census) to identify populations included in the hospital service area. Comprehensive community vulnerability assessments are a strategic starting point for this type of planning (Thomas, Stephens & Goldsmith, 2010).

Both the CLAS standards and those of TJC recognize that culturally and linguistically appropriate services are essential to safe, high-quality care. Coupled with many other helpful sets of standards, the CLAS standards are meant to correct existing inequities in healthcare access and service provision and to make services more appropriate and adaptive to the individual needs of all patients.

Community Vulnerability and Capacity

Literature suggests that vulnerability and capacity are inherently linked to disaster management and preparedness. Capacity refers to "the resources and assets people possess to resist, cope with and recover from disaster shocks they experience" (Gaillard, 2010, p. 220). On the other hand, vulnerability highlights where weaknesses exist in a community that may or may not be feasible to overcome. In short, vulnerability identifies the factors that limit the ability of systems and individuals to adequately

prepare and respond to disasters, while capacity identifies the resources and strengths available. It is important to note that these concepts are not necessarily inversely related, as a highly vulnerable community can, in fact, have many internal assets that contribute to community capacity.

Many factors play a role in determining community vulnerability. When looked at in the broadest context, vulnerability includes social conditions, demographic characteristics, hazard risks, as well as infrastructure and resources. In other words, "vulnerability depends critically on context, and the factors that make a system vulnerable to a hazard will depend on the nature of the system and the type of hazard in question" (Brooks, 2004, p. 153). For example, if a community is located near the Atlantic or Gulf shoreline, the community may experience high environmental vulnerability from the risk of a hurricane. However, vulnerability also incorporates the lack of resources available to individuals of a community in the face of disaster, *social* vulnerability, which is the focus of this analysis.

A disaster's effects are magnified for those with disabilities and those at risk. According to the Department of Health and Human Services, the definition of an at-risk population is based on a function of needs. Those with a need for medical care, transportation, communication, or supervision are at risk and may require increased support during times of disaster. This definition can encompass people with physical, sensory, mental, and cognitive disabilities; the elderly; non-English speaking individuals; children; prisoners; pregnant women; people who are homeless; single working parents; and people with special dietary needs (NHSS 2010). It is difficult to quantify this population because at any given time, any of us could become at-risk based on where we live in relation to a disaster, the onset of a sudden illness, financial difficulties, or other circumstances.

Vulnerability and Capacity Assessments

Community vulnerability assessment is a critical component of both hazard mitigation and disaster preparedness. However, a single approach to vulnerability assessment has not been agreed upon, either conceptually or practically (Thomas et al., 2009). Increasingly, it has been recognized that a key to meaningful vulnerability assessment is the development of place-based approaches. Assessments are most relevant when developed to systematically evaluate vulnerability and capacities, as well as specifically incorporate and address the contextual distinctiveness of a particular setting.

A common approach to hazard vulnerability assessment involves an evaluation of physical hazards, infrastructure, and mitigation activities. Within each of these broad elements, however, social factors and community demographics are also relevant to vulnerability assessment, including: elderly populations, children, female-headed households, physically or mentally disabled, ethnic minorities, education level, low economic status, linguistic or cultural barriers, immigration status, homeless and transients (Morrow, 1994). Community Vulnerability Assessments are useful to emergency preparedness and response planners because the indicators used to summarize risks are flexible and can be modified to a specific contextual situation (Thomas et al., 2009).

While vulnerability and capacity are difficult to define and quantify, well-established indicators can establish a baseline and reveal important trends. Indicators summarize and reflect specific information about places and people, and we use them often in our daily lives (Birkmann, 2006). The identification of meaningful and relevant indicators for complex concepts is essential because they provide mechanisms not only revealing baseline information, but also for revealing changes over time. This information can support the selection of appropriate mitigation and adaption options. Meaningful

indicators must be simple and concise, and should be appropriately related to the identified goals and objectives of the community vulnerability assessment.

When assessing community vulnerability and capacity as they relate to economic and social resources within the community, socio-economic status (SES) is at the root of much social and economic equity (and inequity). The core components of SES include education and income levels, occupation and wealth (Chandra et al., 2010). Determining the SES of various groups within a population is important to understanding vulnerability because in order for a community to be truly resilient, it must be characterized by "reduced levels of vulnerability for all members of society" (Tobin, 1999). If social vulnerability issues are not addressed, deep inequities in SES will persist and the community will not improve upon their baseline pre-disaster vulnerability (Tobin, 1999).

For example, neighborhoods that are at or below the poverty line may be less resilient to disasters because of their lack of financial resources. Additionally, they may be less able to respond to their needs during a disaster because they do not have access to a car or do not have money to pay for temporary housing. Similar inequities can emerge due to educational factors. Lack of education is often related to low SES status, which, as explained previously, can contribute to depressed community resilience. Understanding the educational level of a population is also important when determining how to communicate risks or disaster plans to a community. Individuals with lower degrees of education or literacy may have difficulty understanding traditional forms of communication. Inequities that derive from race and ethnic differences are also important to consider. Groups with cultural or linguistic differences may experience increased instances of misunderstanding that contribute to distrust of information provided to them about preparedness and response. Ultimately, it is critical that appropriate communication strategies are devised in order to best serve and prepare communities for hazards and their impacts.

In their efforts to reduce community vulnerability, local health departments and health service delivery organizations should identify local exposure to hazards, vulnerable populations, and proactively address emergency response, recovery time, and hazard mitigation (California Department of Health Services, 2007). An effective way for hospitals to comprehensively understand their service populations is through conducting a community vulnerability assessment, or to directly participate in a local and/or regional hazard and vulnerability assessment process being conducted by other emergency management organizations.

A variety of criteria come into play in disaster and non-disaster times, including geography (closest facility), awareness (one that is known), confidence in the facility (one that is trusted), financial considerations (cost), among other factors. A systematic, data-driven assessment contributes baseline information and a mechanism for tracking trends. For example, hospitals serving a large population of non-white, non-English speaking people need to be prepared to serve non-English speaking patients in possibly larger numbers during a disaster, which may require alterations in care practices and supplementation to staff. Conversely, those who utilize hospital services during non-disaster times may not correspond to the populations who access these services during an event. Thus, a baseline assessment should be combined with participatory approaches and community outreach to derive a more comprehensive understanding of who might need and utilize services during a disaster, suggesting mechanisms for improved efficiency and effectiveness of care delivery. Overall, the assessment process provides locally derived information about the expectations and needs of the community during disasters that can in turn be incorporated into hospital disaster plans.

Community Resilience to Health-Related Disasters

Community resilience has emerged recently as an important concept to consider when assessing a population's ability to respond to and recover from a disaster, essentially evolving from earlier debates on vulnerability that emerged in the late 1980s and progressed throughout the 1990s to the present. Beyond some of the more academic debates, the concept of resilience underlies the current U.S. National Security Strategy, which directly speaks not just to security, but also resilience. The Department of Homeland Security's (DHS) Quadrennial Homeland Security Review (2010) identifies resilience as essential to homeland security. As an extension, FEMA's mission and priorities also explicitly commit to supporting community resilience (Fugate, 2010).

Although a single, agreed-upon definition does not exist for community resilience, it is often defined as a community's ability to "absorb disturbance (i.e. disaster) and re-organize into a fully functioning system. It includes not only a [community's] capacity to return to the state that existed before the disturbance, but also advancing this state through learning and adaptation" (Cutter et al., 2008, p. 599). When assessing a community's resilience, both the community's inherent and adaptive resilience must be considered. "Inherent" resilience refers to how well a community functions during non-crisis periods, while "adaptive" resilience refers to a community's flexibility in responding to a disaster when it occurs. Both of these qualities can be addressed when evaluating the resilience of a community's infrastructure, institutions, organizations, and socio-economic systems (Cutter et al., 2008). Resiliency assessments incorporate vulnerability and capacity, but extend beyond to a more comprehensive evaluation of how a community will absorb and rebound from a disaster event. The resiliency of a community increases as it takes measures to reduce its vulnerability to hazards and disasters. Given the complexity of resilience, a single, best-practice approach for assessment does not exist, but it is emerging as an extremely important and relevant concept.

The first step towards assessing a community's resilience to health-related disasters is to determine the baseline, pre-disaster health of the community. This requires a comprehensive understanding of the prevalence and distribution of chronic diseases in the community and of the ability of the community to access timely and appropriate preventative health services (Chandra et al., 2010). Minority populations must be explicitly incorporated in this assessment as these groups generally suffer from more disease and injuries and are most likely to have the lowest rates of health insurance; these disparities can often be hidden when looking at the total population. Other vulnerable groups to consider are the elderly and disabled populations that may have functional limitations because of their decreased mobility, hearing, sight, or other debilitating factors. Assuring that these groups have adequate access to health services prior to a disaster event will increase the disaster resilience of the broader community.

An evaluation of the environmental quality of the community is also important as environmental factors affect the pre-event health of a community. Low-income neighborhoods sometimes suffer from elevated health problems because they are often located in areas with lower land values where environmental quality is worse. Low-income neighborhoods are largely populated by high numbers of minority families that are already vulnerable due to other socio-economic factors (Davis, Cook & Cohen, 2005). Sub-standard living conditions can also have indirect impacts that can affect the overall psychological health of a population. Psychological health is another important component to consider when assessing the community's baseline health and vulnerability.

Information and research from the current body of literature can be leveraged to inform local planning. For example, according to Chandra et al.'s (2011) report on Building Community Resilience, it is critical

that communities engage in planning at the local level. Moreover, robust partnerships must be fostered among community organizations to build resilience. Chandra et al. (2011) assert that these partnerships and community engagement strategies are best sustained by local leadership. Finally, the creation of culturally relevant education programs about risk and vulnerability, open and equitable access to healthcare and services, the integration of preparedness and wellness, and the creation of preparedness and wellness strategies that empower vulnerable populations are fundamental to increasing both the local health and resilience of a community. How will we know when our planning efforts are working? It is critical for states to begin standardizing their resiliency assessments at the local and community levels so that we are able to measure where we are and where we want to go.

Ultimately, the resilience approach to disaster vulnerability reduction represents a newer method for hospital disaster planning as healthcare facilities are encouraged to take a more inclusive, detailed look at their service areas. Understanding at-risk communities and specific vulnerability factors, as well as local support networks that may reinforce and strengthen disaster management efforts, can provide hospitals with new capabilities for comprehensively serving the populations within their care. Such an understanding can also provide a model for an integrated disaster planning approach between hospitals, public health, and emergency management.

SOCIAL VULNERABILITYANALYSIS

The goal of this phase of the project is twofold. First, the systematic statewide assessment provides baseline information across Colorado and identifies concentrations of vulnerable segments of the population potentially most impacted in the face of a disaster or mass casualty event. This, in turn, offered the project team with a mechanism by which to identify and prioritize communities for conducting in-depth focus groups. Second, since the emphasis of the entire project is to provide a resource for hospital disaster planning, the data are summarized by geographic trauma center service areas, which reveal the populations that could utilize the trauma center during a disaster event. A hospital planner could use these data to prioritize and integrate cultural competencies, language needs, and even special services explicitly into the disaster plan. Further, the hospital could also utilize this information to seek organizations that provide services to these populations for fostering partnerships. This approach acts as a first step and a systematic baseline, but cannot provide the in-depth information that surveying, interviews, or focus groups can with regard to perceptions or experiences with the healthcare system or disaster preparedness.

Methods

This phase of the UCD-CVAP included three aspects, including descriptive mapping, statistical analysis, and trauma center service area calculations, each contributing a slightly different view of populations across the state. Based broadly on the social vulnerability analysis conducted by Cutter et al. (2003) and drawing on literature describing various vulnerability assessment and health equity approaches, fifteen variables were selected and analyzed from five main content areas: groups in high need of services, socio-economic status, indicators of deprived environment, indicators of cultural/linguistic barriers and awareness, and transportation mobility. These variables were compiled from the U.S. Census Bureau (www.census.gov) by Census tract for the entire state of Colorado and then linked to U.S. Census *TIGER* boundaries in ESRI's ArcGIS (version 9.3) software for the purpose of mapping individual variables. Descriptions of the fifteen variables are summarized in Table 1 and are subsequently described in more detail as the maps are presented. Importantly, these variables were collected as a total number of people in that group, a total number of families in that group, a total number of houses in that group, or a total number of households in that group. When the percentage was subsequently calculated, the corresponding denominator was utilized. The statistical analysis to identify communities where several of the vulnerability indicators exist together was conducted with IBM's SPSS (version 18) software, using a factor analysis to reduce the data when the variables correspond. The results were incorporated back into the GIS for mapping.

Table 1. Compiled Variables from the U.S. 2000 Census.

Category	Variable from 2000 U.S. Census at Tract Level	Denominator
Groups in High Need of Services	Seniors (age 65+)	Total Population
	Children (age 0-14)	Total Population
	Women of reproductive age (age 14-44)	Total Population
	People living in group quarters	Total Population
Socio-economic Status	Poverty (families and non-family households below poverty)	Households
	Female-headed households	Households
	Home ownership	Homes
	Median income	None
Indicators of Deprived Environment	Households with more than one occupant per room	Households
	Housing without basic amenities	Homes
Indicators of Cultural and Linguistic Barriers and Awareness	Population without high school diploma	Total Population
	Linguistically isolated households	Households
	Hispanic population	Total Population
	Non-white minority	Total Population
Transportation Mobility	Households without vehicles	Households

Aligning the variables utilized in the GIS-based social vulnerability analysis to the geographic location of hospitals provides the foundation for an assessment ofthe relevant cultural competency concerns for specific hospitals as they engage in disaster preparedness planning. For the purpose of this study, 86 trauma centers were utilized based upon an inventory maintained by the Colorado Department of Public Health and the Environment (Table 2) (CDPHE, 2009). Geographic service areas were calculated for each trauma center through a network analysis in the GIS. Each service area reflects the shortest distance from a given location to a trauma centerbased on the physical location of the facility and the Colorado road network. This technique was used to identify the most probable service regions for each of the 86 trauma centers during a disaster based upon the assumption that people would generally seek service from the trauma center located closest to them. Once the service areas were derived, the social vulnerability indicators were re-aggregated to the service areas to more adequately inform hospital emergency planners about the characteristics of the population that might need services in the time of disaster (Figure 1).

Table 2. Trauma Centers (2009).

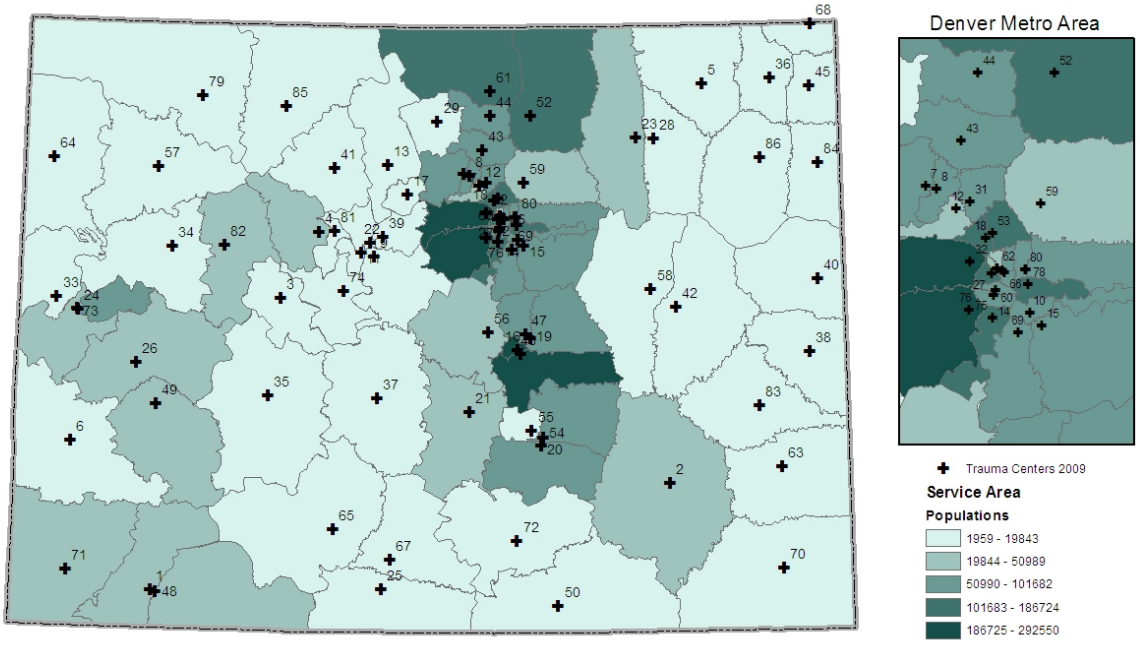
ID	NAME	CITY	LEVEL
1	Animas Surgical Hospital	Durango	NonD
2	Arkansas Valley Regional Medical Center	La Junta	IV
3	Aspen Valley Hospital	Aspen	III
4	Avon Medical Center	Avon	NonD
5	Banner Health	Sterling	III
6	Basin Clinic	Naturita	NonD
7	Boulder Community Hospital	Boulder	III
8	Boulder Community Hospital-Foothills Campus	Boulder	NonD
9	Breckenridge Medical Clinic	Breckenridge	V
10	Centennial Medical Plaza	Englewood	NonD
11	Centura-St. Anthony at Copper Mountain	Copper Mountain	NonD
12	Centura Health-Avista Adventist Hospital	Louisville	III
13	Centura Health-Granby Medical Center	Granby	IV
14	Centura Health-Littleton Adventist Hospital	Littleton	II
15	Centura Health-Parker Adventist Hospital	Parker	III
16	Centura Health-Penrose Hospital	Colorado Springs	II
17	Centura Health-Seven Mile Clinic	Winter Park	V
18	Centura Health-St Anthony North Hospital	Westminster	IV
19	Centura Health-St Francis Medical Center	Colorado Springs	IV
20	Centura Health-St Mary-Corwin Medical Center	Pueblo	II
21	Centura Health-St Thomas More Hospital	Canon City	IV
22	Centura Health-Summit Medical Center	Frisco	III
23	Colorado Plains Medical Center	Fort Morgan	III
24	Community Hospital	Grand Junction	IV
25	Conejos County Hospital	La Jara	IV
26	Delta County Memorial Hospital	Delta	IV
27	Denver Health Medical Center	Denver	I
28	East Morgan County Hospital	Brush	IV
29	Estes Park Medical Center	Estes Park	IV
30	Exempla-Saint Joseph Hospital	Denver	NonD
31	Exempla Good Samaritan Medical Center	Lafayette	III
32	Exempla Lutheran Medical Center	Wheatridge	III
33	Family Health West Hospital	Fruita	NonD
34	Grand River Medical Center	Rifle	IV
35	Gunnison Valley Hospital	Gunnison	IV
36	Haxtun Hospital District	Haxtun	IV
37	Heart Of The Rockies Regional Medical Center	Salida	IV
38	Keefe Memorial Hospital	Cheyenne Wells	IV

39	Keystone Medical Clinic	Dillon	V
40	Kit Carson County Memorial Hospital	Burlington	IV
41	Kremmling Memorial Hospital District	Kremmling	IV
42	Lincoln Community Hospital	Hugo	IV
43	Longmont United Hospital	Longmont	III
44	McKee Medical Center	Loveland	III
45	Melissa Memorial Hospital	Holyoke	IV
46	Memorial Health System	Colorado Springs	II
47	Memorial Health System North	Colorado Springs	NonD
48	Mercy Regional Medical Center	Durango	III
49	Montrose Memorial Hospital	Montrose	IV
50	Mt San Rafael Hospital	Trinidad	IV
51	National Jewish Medical & Research Center	Denver	NonD
52	North Colorado Medical Center	Greeley	II
53	North Suburban Medical Center	Thornton	IV
54	Parkview Medical Center	Pueblo	II
55	Parkview Pueblo West Emergency Services	Pueblo West	NonD
56	Pikes Peak Regional Hospital	Woodland Park	IV
57	Pioneers Medical Center	Meeker	IV
58	Plains Medical Center	Limon	NonD
59	Platte Valley Medical Center	Brighton	IV
60	Porter Adventist Hospital	Denver	NonD
61	Poudre Valley Hospital	Ft Collins	III
62	Presbyterian/St Luke's Medical Center	Denver	NonD
63	Prowers Medical Center	Lamar	NonD
64	Rangely District Hospital	Rangely	IV
65	Rio Grande Hospital	Del Norte	IV
66	Rose Medical Center	Denver	NonD
67	San Luis Valley Regional Medical Center	Alamosa	IV
68	Sedgwick County Memorial Hospital	Julesburg	IV
69	Sky Ridge Medical Center	Lone Tree	III
70	Southeast Colorado Hospital	Springfield	NonD
71	Southwest Memorial Hospital	Cortez	IV
72	Spanish Peaks Regional Health Center	Walsenburg	IV
73	St Mary's Hospital	Grand Junction	II
74	St Vincent General Hospital District	Leadville	IV
75	Swedish Medical Center	Englewood	I
76	Swedish SW ER	Littleton	NonD
77	The Children's Hospital	Aurora	I
78	The Medical Center Of Aurora	Aurora	II
79	The Memorial Hospital	Craig	IV

80	University of Colorado Hospital	Aurora	II
81	Vail Valley Medical Center	Vail	III
82	Valley View Hospital	Glenwood Springs	III
83	Weisbrod Memorial County Hospital	Eads	NonD
84	Wray Community District Hospital	Wray	IV
85	Yampa Valley Medical Center	Steamboat Springs	IV
86	Yuma District Hospital	Yuma	IV

Note: The trauma center map layer is maintained by CDPHE and the level of trauma center is defined within the data file.
http://www.cdphe.state.co.us/em/trauma/statetraumalevels.html

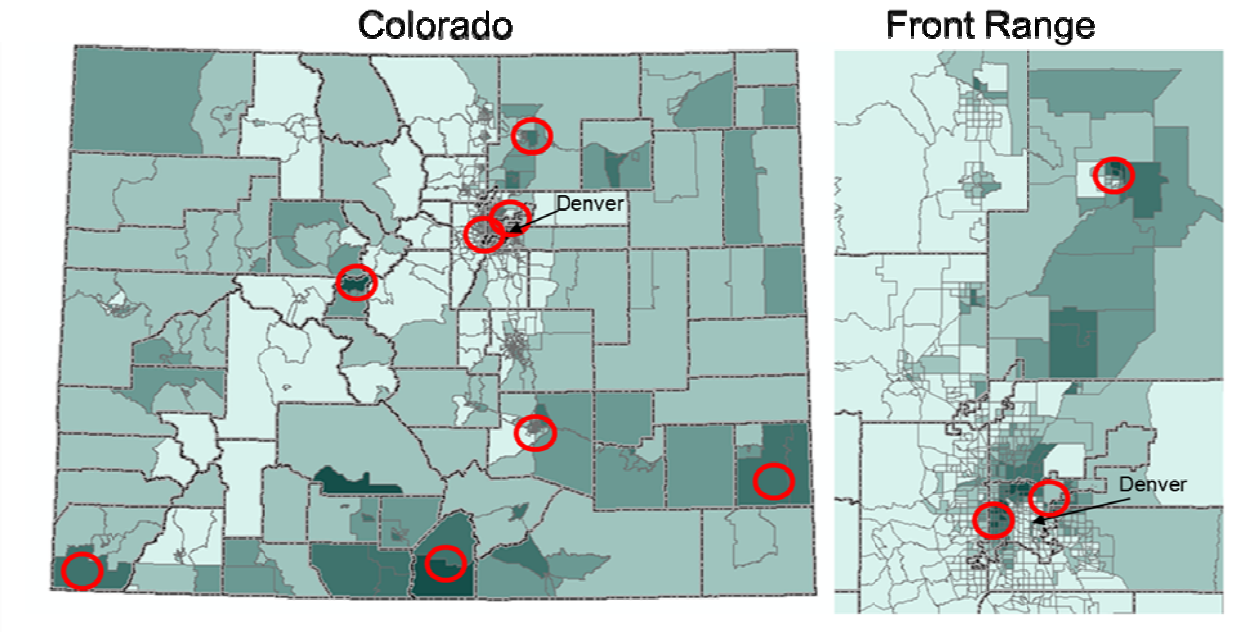
Figure 1. Trauma Centers (2009) and Geographic Service Areas Mapped by Population.



Informing Selection of Communities for Conducting Focus Groups

Several of the variables coalesce together (Figure 2) in the statistical analysis, including Hispanic, linguistical isolation, low median household income, high poverty, and no high school diploma. Several areas across the state emerged with higher potential vulnerability (circled on the maps in Figure 2): Montezuma (southwestern portion of the county), Pueblo (most of the central, eastern and northeastern parts of the city), Prowers (the rural areas outside of the city), Denver (western Denver around to the northern side, including Elyria, Swansea, Globeville), Weld (northeastern sections of Greeley), Lake (rural area north of Leadville), Arapahoe/Adams (northern part of Aurora, to a lesser degree Commerce City), and the San Luis Valley. Even though a statewide vulnerability analysis is informative, it can mask specific pressures, constraints, opportunities, and views that exist within a particular community. Therefore, the areas highlighted informed the selection of communities for the in-depth focus group phase of the study.

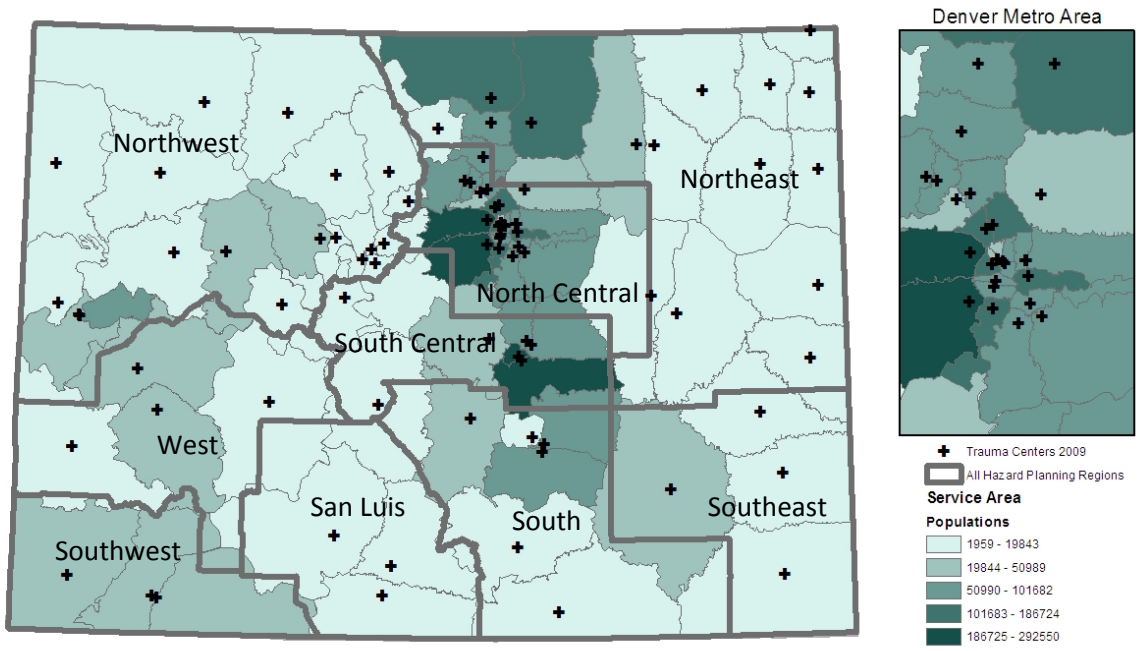
Figure 2. Distribution of Hispanic, Linguistically Isolated, Low Median Household Income, High Poverty Populations, No High School Diploma.



Hospital Trauma Center Geographic Service Areas and Emergency Management Geographic Boundaries

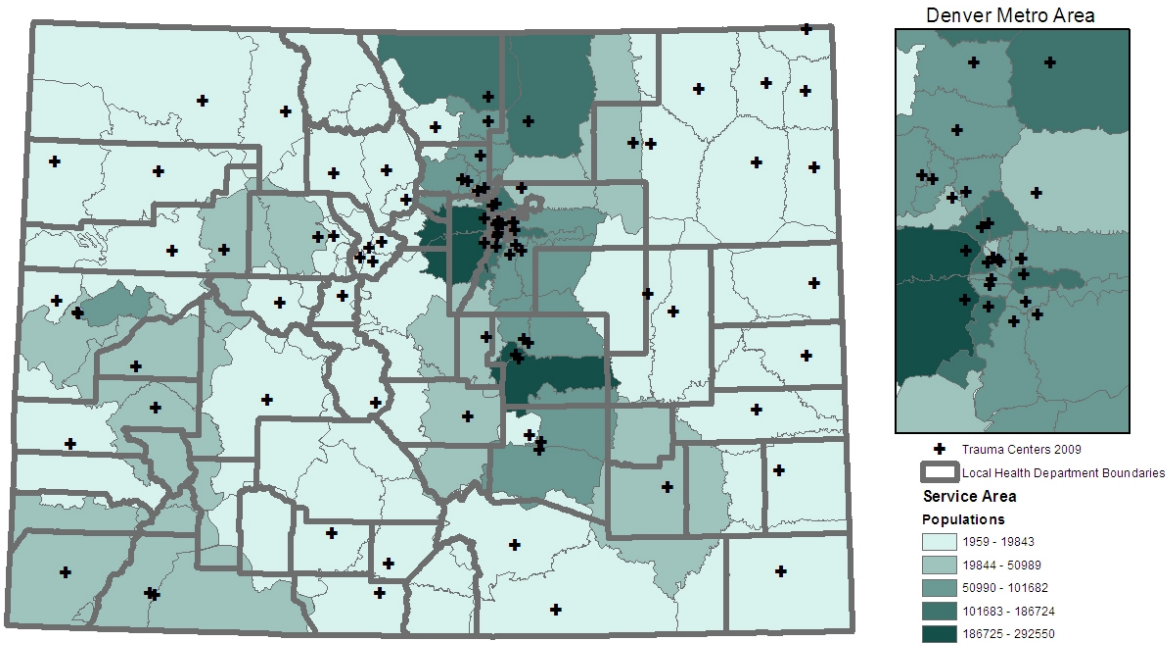
Integrated hospital disaster planning requires understanding the configuration of trauma centers with geographic boundaries of emergency management and public health regions. As the principle state agent for disaster management, the Colorado Division of Emergency Management (DEM) has organized the state into nine regions in an effort to organize all-hazards mitigation, preparedness, response, and recovery activity (Colorado Division of Local Affairs, 2011). Figure 3 depicts the DEM hazard regions and where each hospital service area falls in relation to each of the nine regions. In several cases, a hospital service area may intersect with more than one hazard region, which is valuable information for coordination purposes.

Figure 3. Hospital Service Areas in Relation to Colorado Division of Emergency Management All-Hazards Planning Regions.



Public health services in Colorado are primarily defined at the local level by one of the state's local health departments (Figure 4). Identifying the linkages between hospital service areas and health department boundaries is helpful in synchronizing health resources and improving cooperation between agencies during disaster planning and response.

Figure 4. Hospital Service Areas in Relation to Colorado Local Health Department Areas of Responsibility.



Statewide Population Distributions

Groups in High Need of Services

Children refer to all persons age 14 and younger (Figure 5 and Figure 6). Studies have shown that children are highly vulnerable to the impacts of disasters and that hospitals must plan deliberately for the special needs of children during post-disaster events. Specific vulnerabilities of children include their inability to "self-identify [medical conditions] and provide reliable exposure and medical history; a need for constant adult supervision to avoid harm; fear of staff in personal protective equipment; and unable to consent to medical care" (Cooper, 2009).

Figure 5. Children by Statewide Assessment.

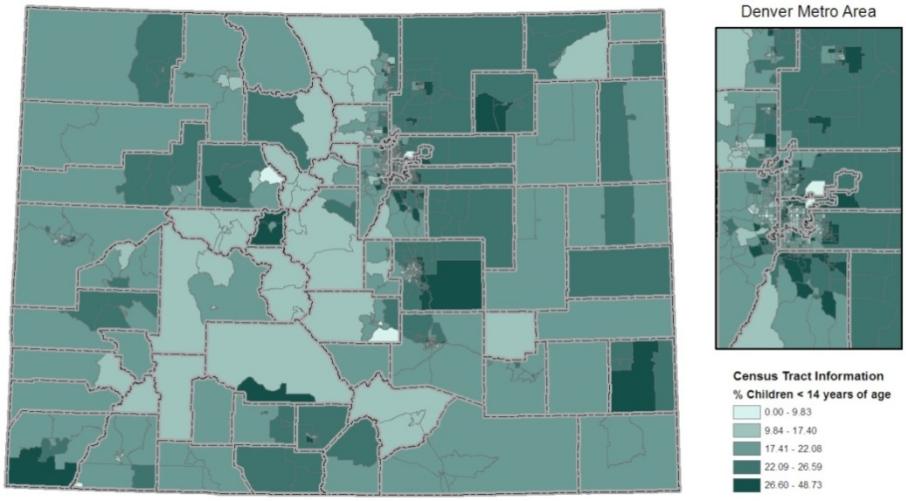
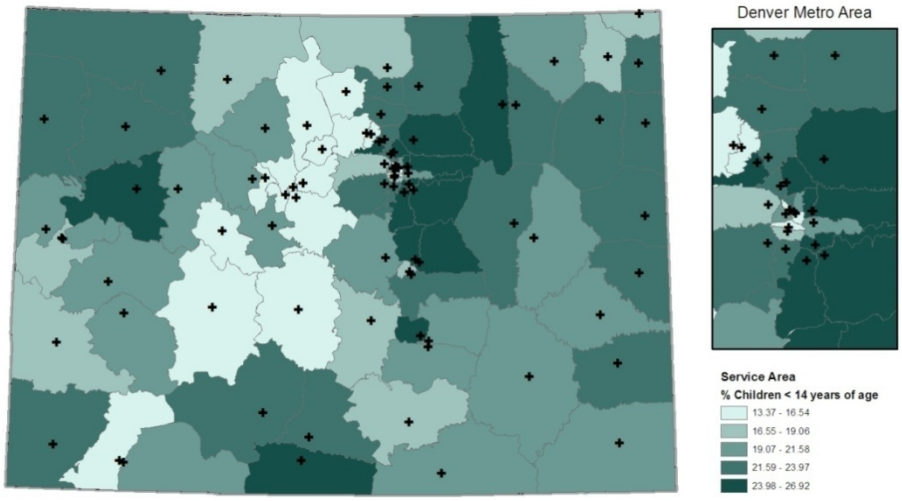


Figure 6. Children by Hospital Service Area.



Seniors are classified as individuals 65 years of age or older (Figure 7 and Figure 8). This group was included because risks of illness, as well as associated care and assistance needs, increase with age (Sorensen & Pinquart, 2000). Therefore, it is likely that areas with significantly larger populations of persons over the age of 65 may pose a greater resource strain on health services during and after a disaster.

Figure 7. Seniors by Statewide Assessment.

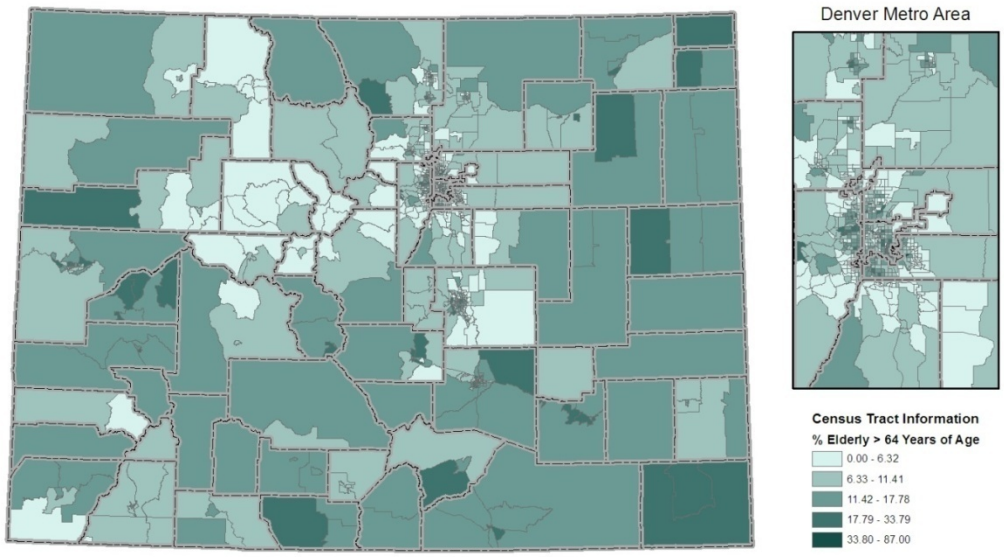
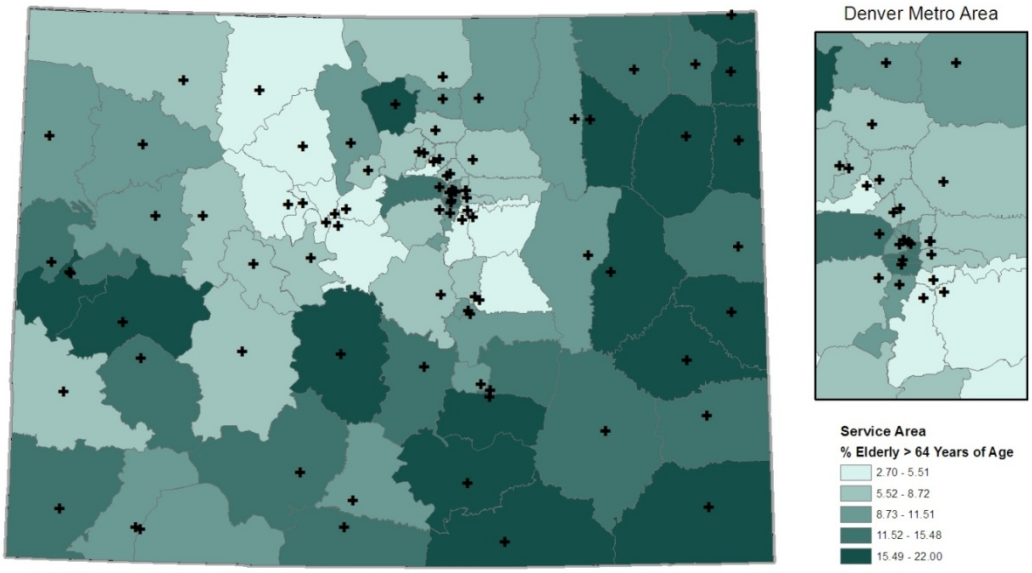


Figure 8. Seniors by Hospital Service Area.



Women of reproductive age include all women ages 15 to 44 years who may become pregnant and have children (U.S. Census Bureau, 2000). This variable was chosen because the number of women of reproductive age in an area is indicative of how prepared an infrastructure would potentially need to be in order to adequately care for and provide help to pregnant women. Women of reproductive age may also reflect the potential for increased numbers of children in a given location (Figures 9 and 10).

Figure 9. Women of Reproductive Age by Statewide Assessment.

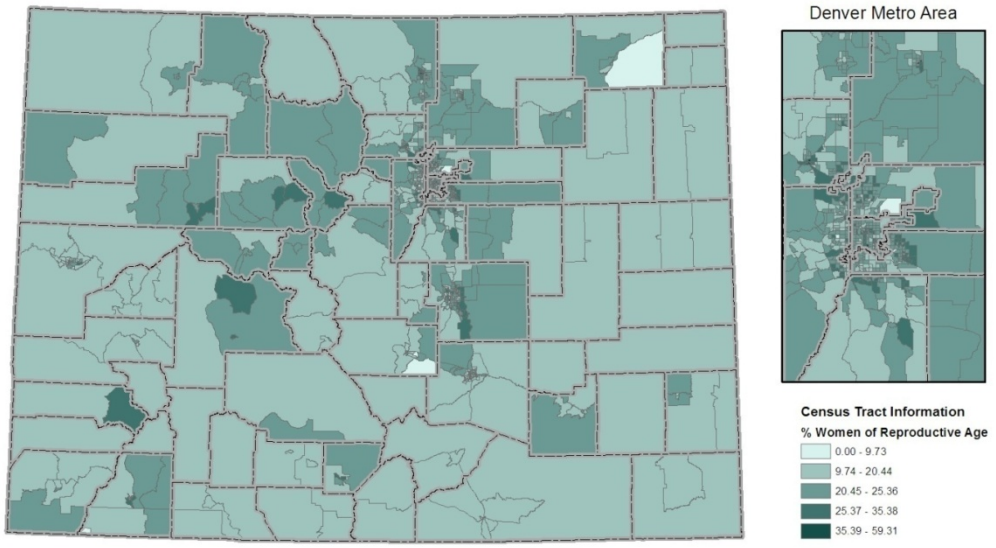
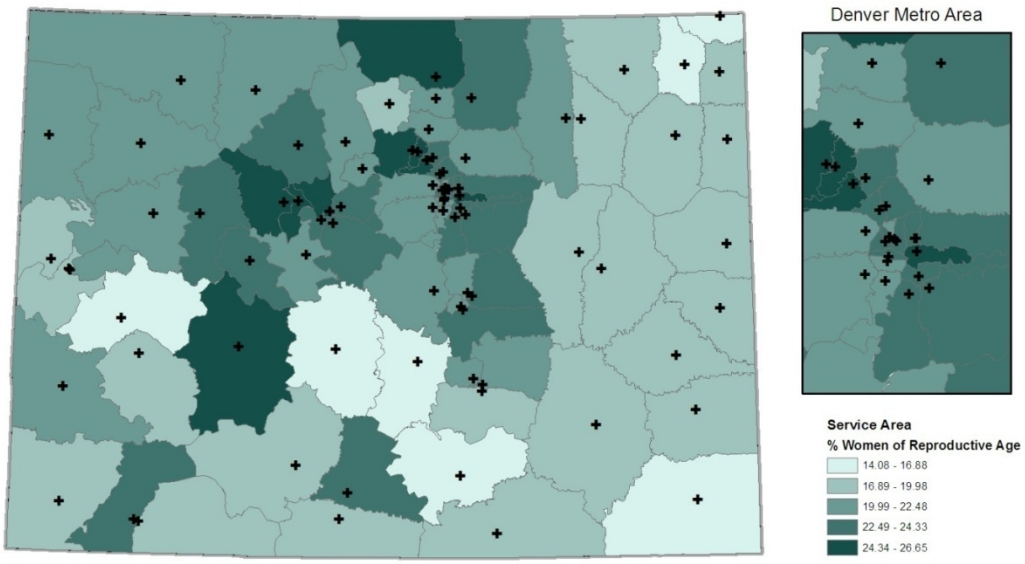


Figure 10. Women of Reproductive Age by Hospital Service Area.



Group quarters are classified by the U.S. Census Bureau as "all people not living in households, in institutional (correctional facilities, nursing homes and mental hospitals) and non-institutional (dormitories, military barracks, group homes, missions and shelters)." These populations include individuals with long-lasting physical or mental illness, and emotional trauma. These groups were considered as they already have a higher dependence upon hospital resources and, in most cases, already require some governmental support for health needs. Therefore, it is logical that this need would increase proportionally during and after a disaster event. Disability is not included in this variable, as it is not collected in the U.S. Census at the tract scale. However, it would be useful to include the percentage of individuals with disabilities who live at home, as they will also have increased vulnerability to disaster events (Figures 11 and 12).

Figure 11. People Living in Group Quarters by Statewide Assessment.

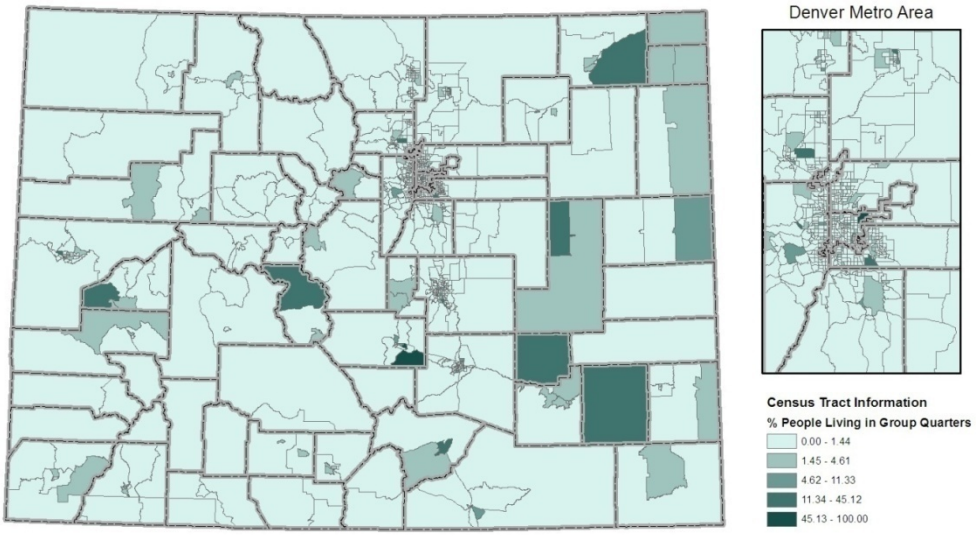
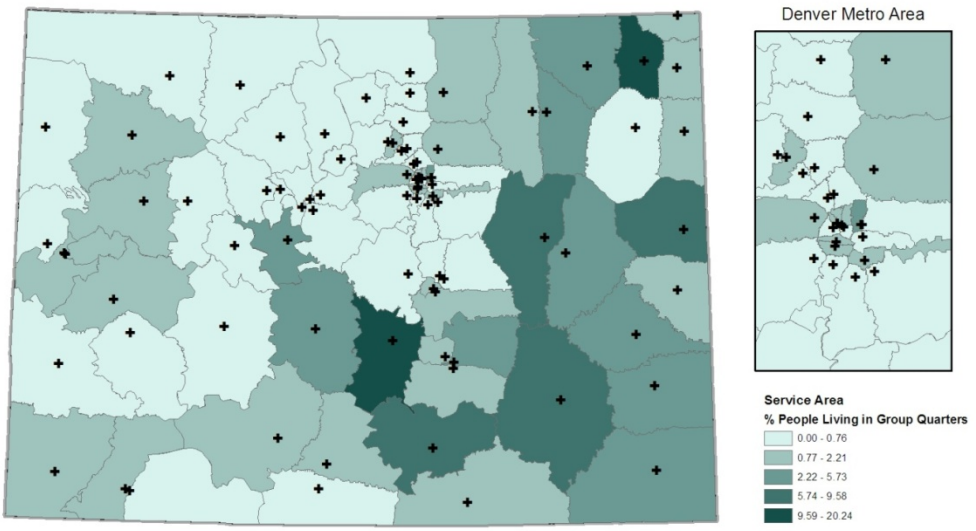


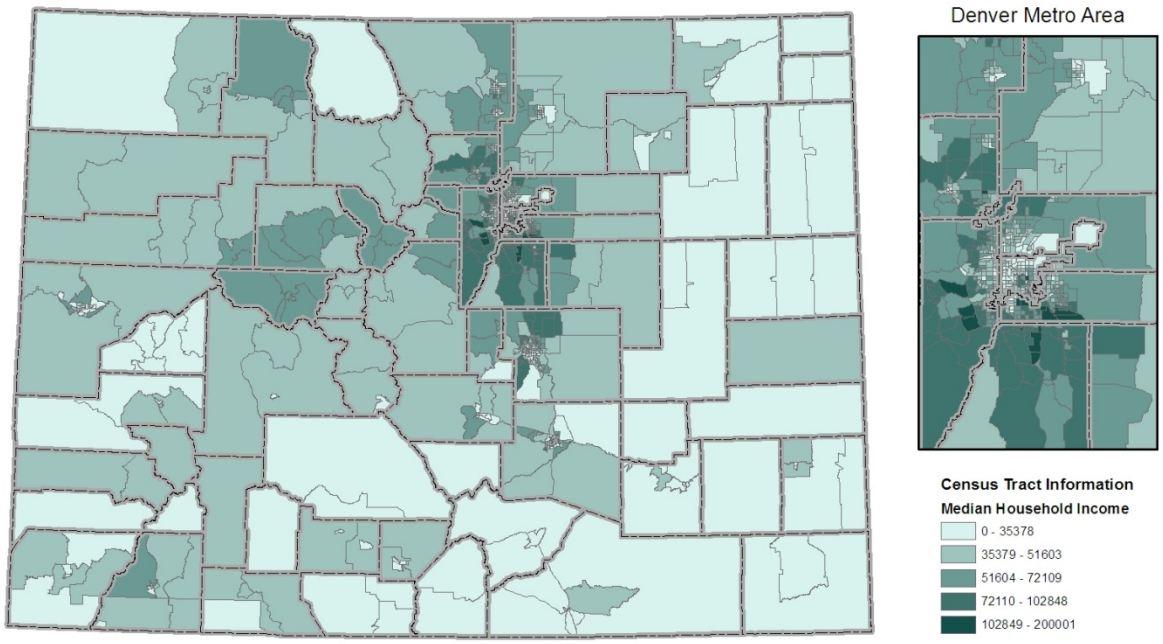
Figure 12. People Living in Group Quarters by Hospital Service Area.



Socio-economic Status

Median household income: According to the U.S. Census Bureau, a family household is a home that consists of two or more related people residing together. The U.S. Census gathers income information about all types of households (families and unrelated individuals, etc.) in a given area and identifies the middle income (50 percent above and 50 percent below) (U.S. Census Bureau, 2008). This information can guide public service agencies to understand which areas have access to more resources. Americans of low-income status are more likely than others to report problems with access to healthcare (Blendon, 2000). There is a correlation between income and access to transportation, employment, healthcare, and education; and income may limit the ability to personally prepare to, respond to, and recover from a disaster (Adger, 2003; Andrulis, 1998). Figure 13 illustrates that the majority of high-income households in Colorado are in Metro area suburbs or near ski resorts. On the other hand, most low-income households are located in rural southeast and southwest counties, and in Northeast Denver Metro area and along Federal Boulevard. While it was not possible to aggregate this variable by hospital service area because it is reported as a median calculation instead of a raw number that can be added together, the income distribution across the state is still informative. Percent of households in poverty can provide some additional insights since this captures the lowest income levels. However, it would be possible to have a Census tract with a high percentage of households in poverty with a higher median household income if pockets of wealth exist within the tract; these higher incomes would bring up the median household income. So, while patterns of median household income and poverty are likely related, there are certainly places where they vary as well.

Figure 13. Median Household Income by Statewide Assessment.



Households in poverty: Poverty is determined using an established threshold based upon household size and composition (U.S. Census Bureau, 2010). These statistics are defined by the Social Security Administration (SSA) and do not vary with geographic location. However, they do account for inflation through the Consumer Price Index (CPI). This helps public service agencies to identify need based on factors like family size, number of children, and the gender of householder (U.S. Census Bureau, 2010). There is a distinct connection between poverty and decreased access to healthcare (Andrulis, 1998). Poverty has been shown to negatively affect child development and health along many dimensions throughout the child's lifetime (Aber et al., 1997).

Non-family households are either households with persons living alone or a householder that does not live with relatives, but exclusively with unrelated household members. Poverty for non-family households is defined by the same determinants as family households (U.S. Census Bureau, 2010). Child health experts confirm that excess morbidity in all individuals is related to low-income counties and concentrated poverty in both urban and rural environments (Auchincloss & Hadden, 2002). This suggests that urbanized areas with more non-family households also indicate lower levels of access to healthcare, quality nutrition, and safe environments (Aber et al., 1997) (Figures 14 and 15).

Figure 14. People Living in Poverty by Statewide Assessment.

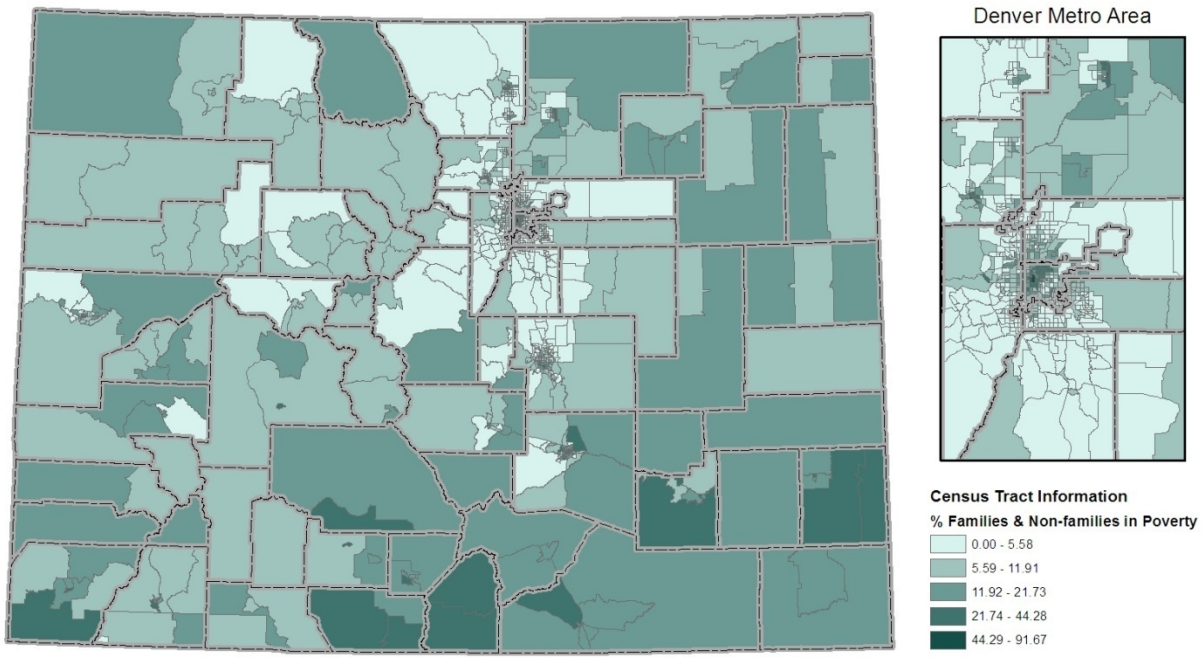
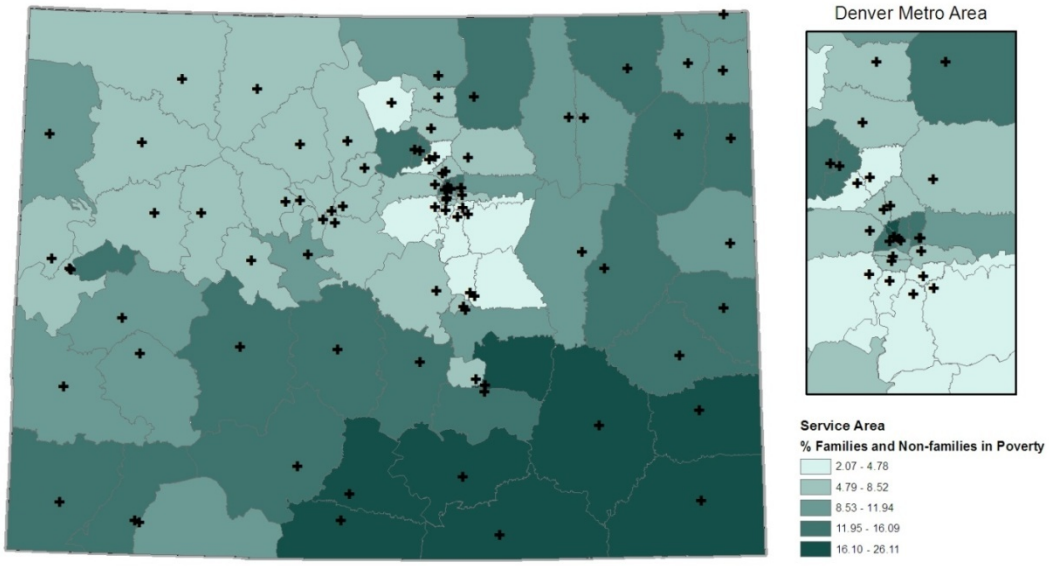


Figure 15. People Living in Poverty by Hospital Service Area.



Female householders: When determining who has a greater share of household responsibilities in a community, the U.S. Census Bureau refers to the householder, or owner or renter (U.S. Census Bureau, 2010). Children in families headed by single mothers are more likely to be in fair or poor health, less likely to be vaccinated, less likely to receive preventive and illness-related health services, more likely to be disabled, and are less likely to have health insurance (Bauman, Silver & Stein, 2006). This indicates that households with female householders are a significant variable that affects health condition. Households with a female householder concentrate in the Denver Metro area in Colorado, as shown in Figures 16 and 17.

Figure 16. Female Householders by Statewide Assessment.

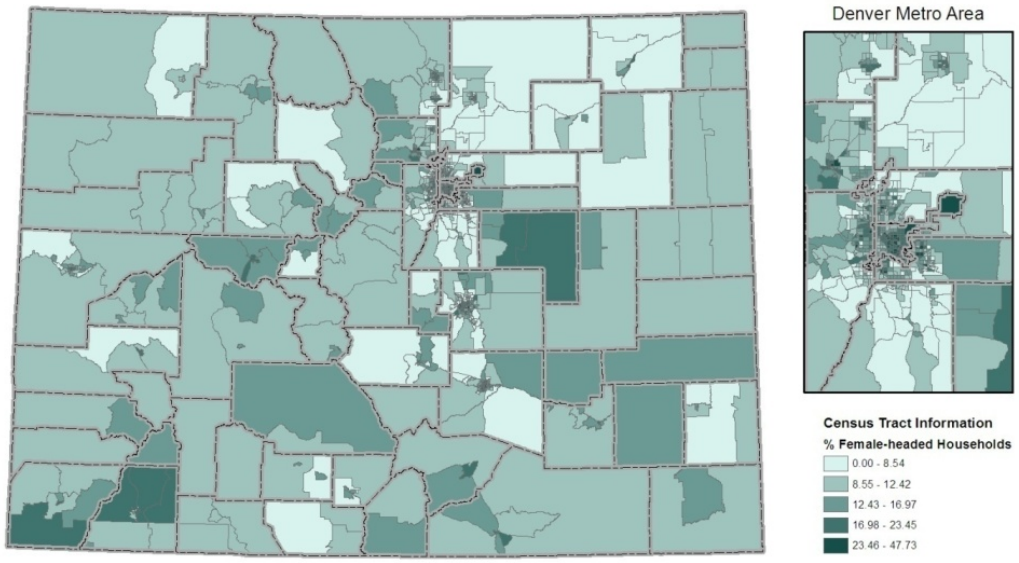
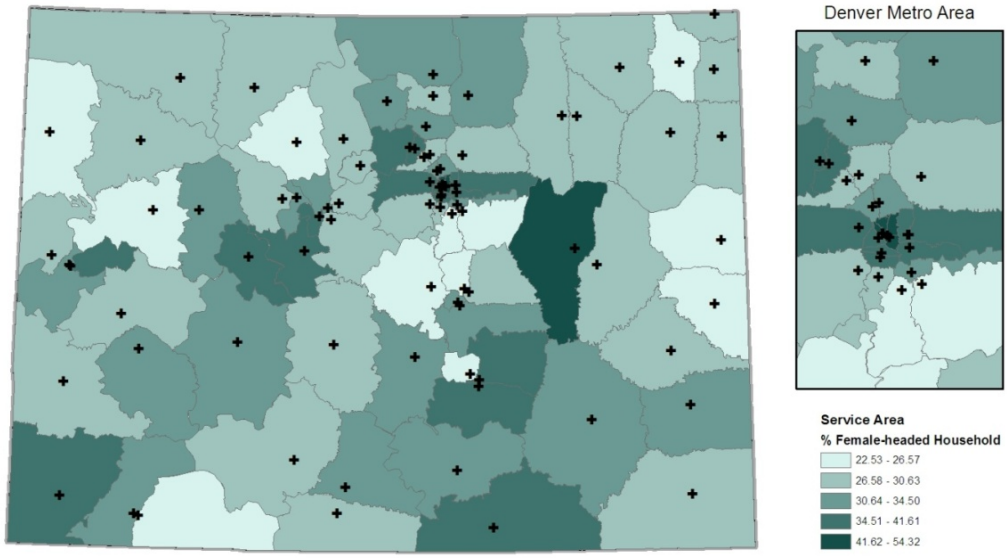


Figure 17. Female Householders by Hospital Service Area.



Owner occupied housing: To calculate the number of homeowners in Colorado, the following categorical information was downloaded from the 2000 U.S. Census on a statewide tract basis: Occupied Housing Units: Total; Occupied Housing Units: Owner Occupied; and Occupied Housing Units: Renter Occupied. The number of Owner Occupied was then divided by the Total of Occupied Housing Units and multiplied by 100. These results are illustrated in Figures 18 and 19. By identifying where home ownership is low (i.e. a high number of rental housing units), we can speculate that those areas are more prone to a higher level of social vulnerability. As the maps indicate, the lowest percentages of homeowners are typically located in urban areas and the highest numbers of homeowners are those in rural or suburban areas.

Figure 18. Homes Occupied by Owners by Statewide Assessment.

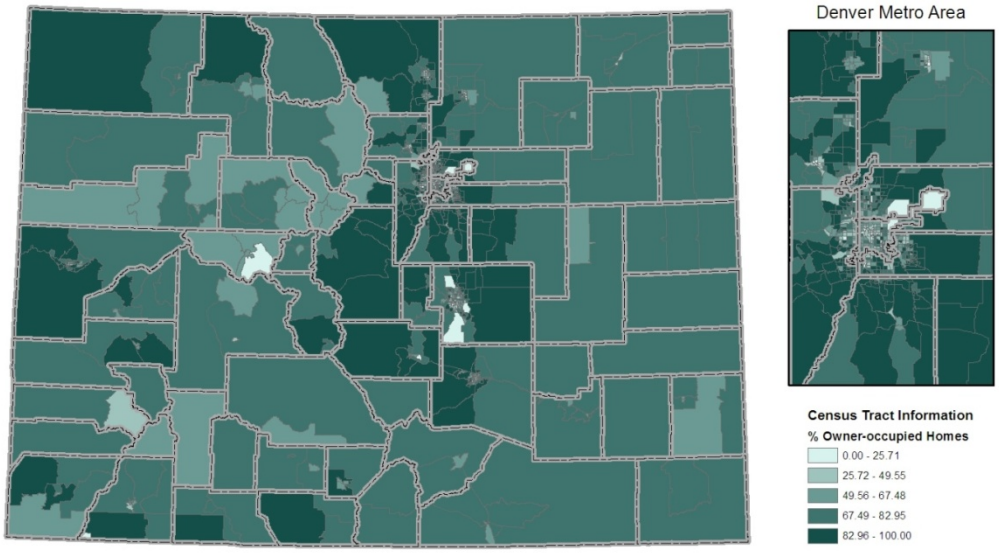
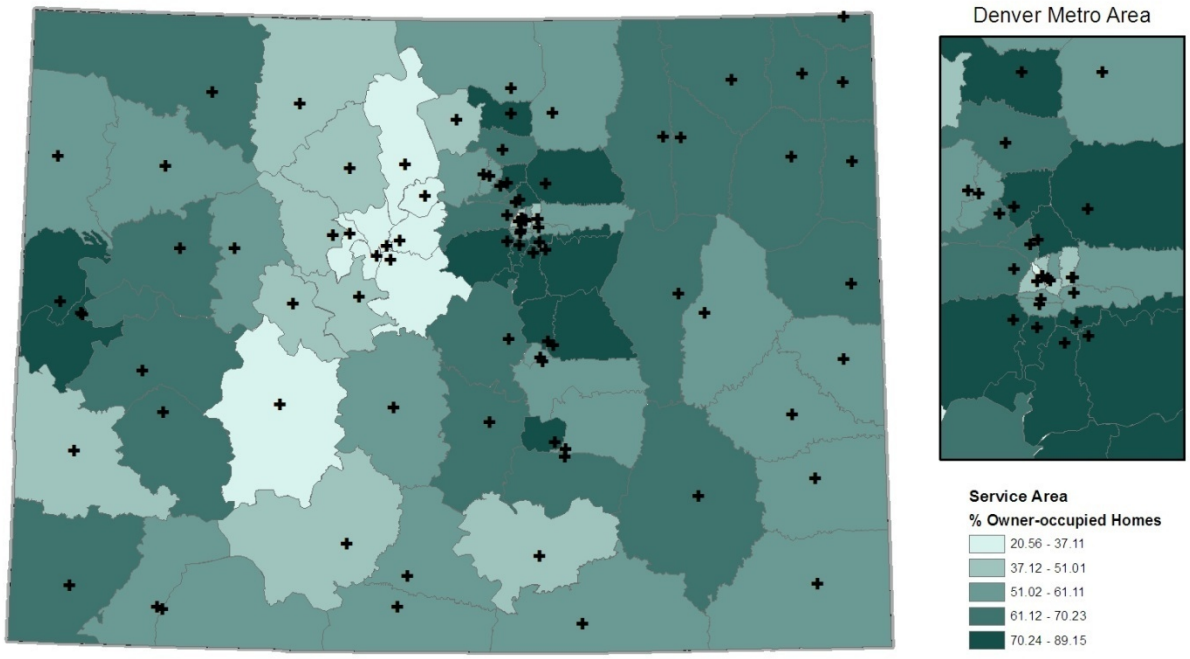


Figure 19. Homes Occupied by Owners by Hospital Service Area.



Indicators of Deprived Environment

Households without basic amenities: In order to determine households without basic amenities, we combined two different factors found in the U.S. Census data: households without complete plumbing facilities and households without complete kitchen facilities. Both variables were collected by U.S. Census tracts. According to the U.S. Census Bureau, "a household includes all the people who occupy a housing unit as their usual place of residence." U.S. Census data include plumbing information from houses that are both occupied and vacant. In order to have a complete plumbing facility, U.S. Census data require three elements: "(1) hot and cold piped water; (2) a flush toilet; and (3) a bathtub or shower. All three facilities must be located in the housing unit" (U.S. Census Bureau, 2010). These variables were chosen because they are strong factors in considering household basic amenities. They are vital because a house that lacks basic resources cannot provide adequate elements (such as water and nutritious food) for people to recover from a disaster. Figures 20 and 21 depict U.S. Census 2010 housing data and illustrates that houses without complete kitchens or plumbing are primarily in the mid-west section of Colorado on either side of the Rocky Mountains.

Figure 20. Households without Basic Amenities by Statewide Assessment.

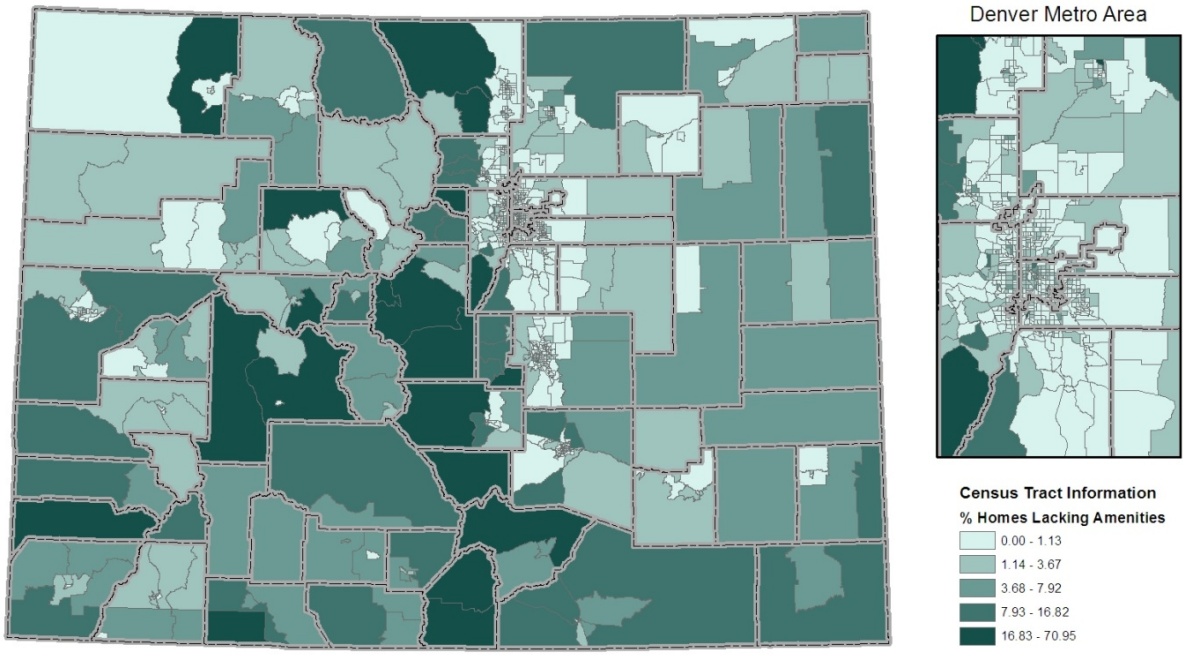
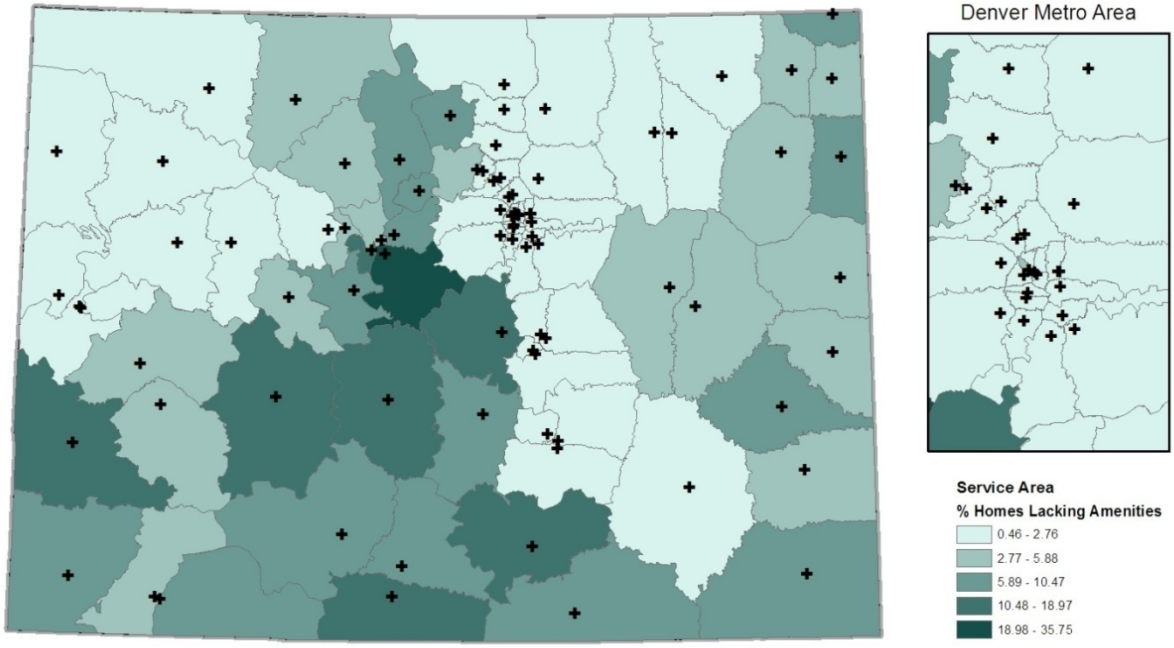


Figure 21. Households without Basic Amenities by Hospital Service Area.



Households with more than one occupant per room: To evaluate overcrowding, data were downloaded for households with more than one occupant per room. The number of occupants per room is derived from dividing the number of people in an occupied housing unit by the number of rooms in that housing unit. Data from the 2000 U.S. Census were utilized to determine the percentage of homes with more than one occupant per room in Colorado. The data were separated into two categories: owner occupied and renter occupied. These categories were further broken out into subcategories by number of occupants per room in 0.50 increments. Percentages were arrived at by adding together all subcategories with 1.01 occupants per room and greater, and then adding together both subcategories. This number was divided by the total number of occupants per room. This element was important for this study as homes with more than one occupant per room have increased risk of: multiple infections, disease transmission, severity of infection, long-term negative impacts of infections, and case to fatality ratio, as well as prolonged intensive exposure to infections (Lawrence, 1996). A high percentage of homes with more than one occupant per room generally concentrate in inner-city neighborhoods and more sporadic across the state (Figures 22 and 23).

Figure 22. More than One Occupant per Room by Statewide Assessment.

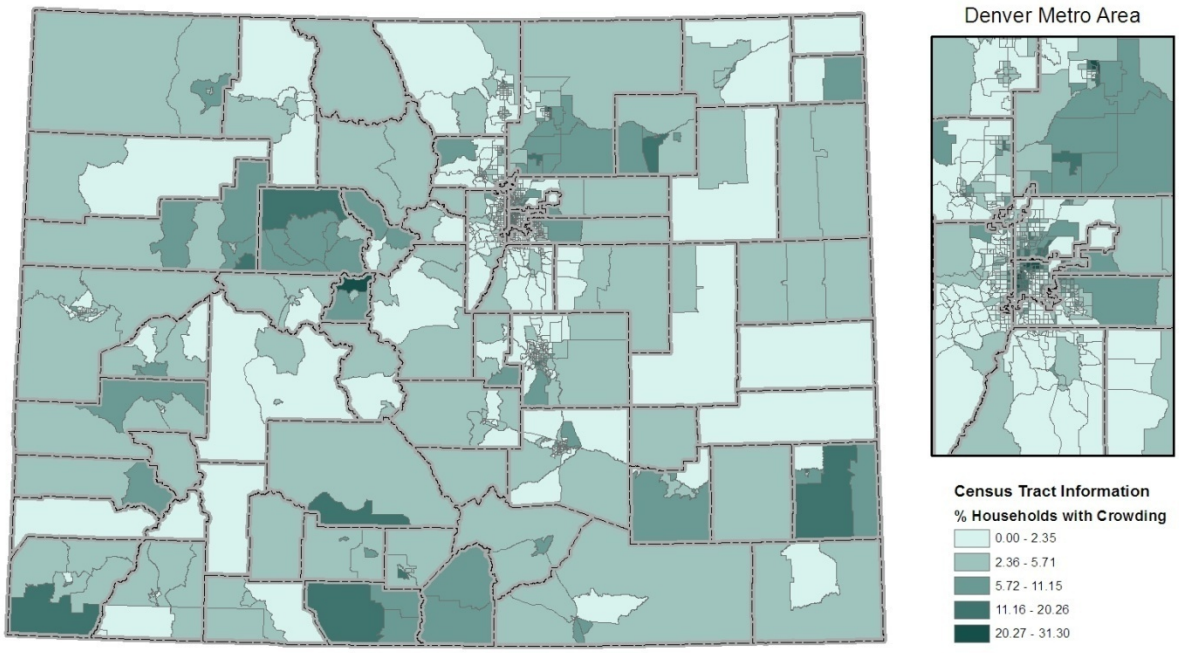
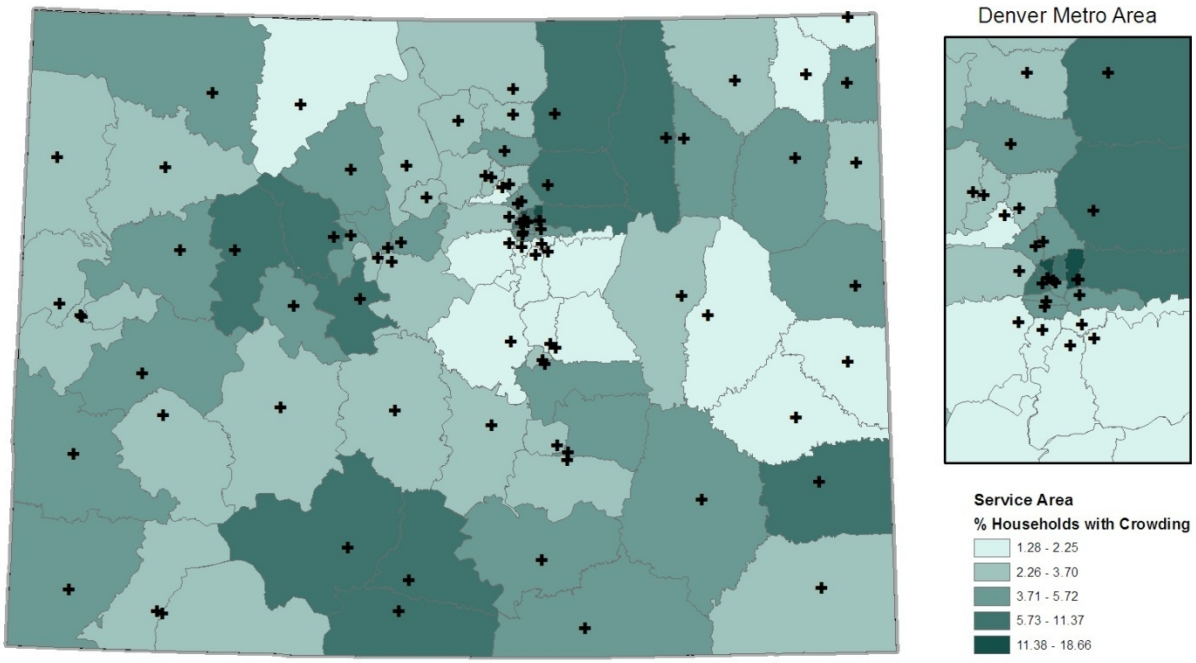


Figure 23. More than One Occupant per Room by Hospital Service Area.



Indicators of Cultural and Linguistic Barriers and Awareness

Minority populations: The 2000 U.S. Census identified the terms "Hispanic" or "Latino" as those people who classified themselves in one of the specific ***Hispanic or Latino*** categories ("Mexican," "Puerto Rican," or "Cuban"), as well as those who classified themselves as "other Spanish," "Hispanic," or "Latino" (U.S. Census Bureau, 2010). ***Non-white minorities*** included all individuals who did not classify themselves as "White" on the 2000 survey. The percentages for each category were calculated by comparing the total number in each category (Hispanic/Latino or non-white minority) to the total population. These results are illustrated in Figures 24-27. It was important to identify these particular populations, because ethnic minority groups are classified as vulnerable populations. They are likely to suffer from more acute and chronic diseases, sustain traumatic injuries and are less likely to have health insurance (Chandra et al., 2010).

Figure 24. Non-white Minorities by Statewide Assessment.

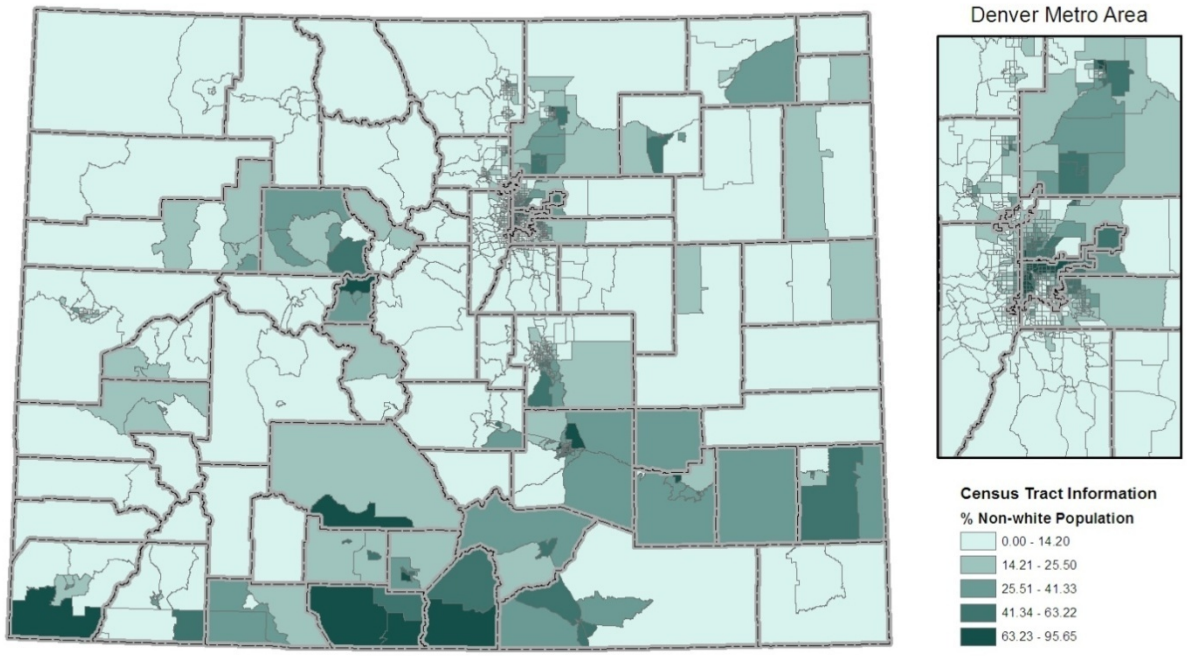


Figure 25. Non-white Minorities by Hospital Service Area.

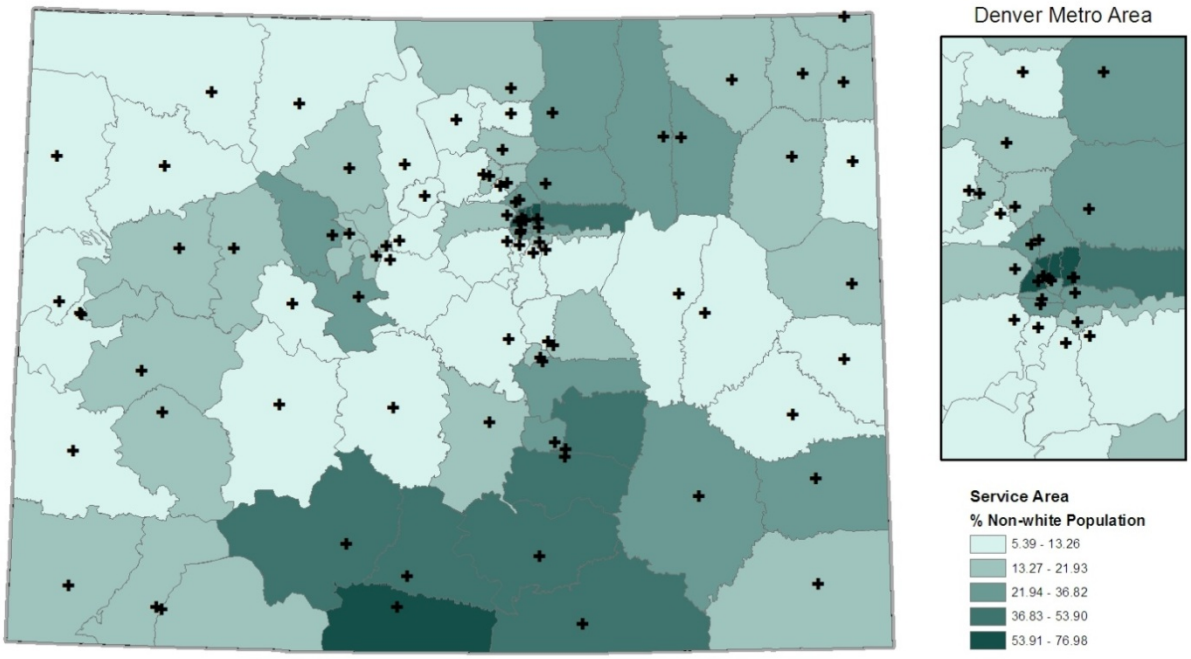


Figure 26. Hispanic Populations by Statewide Assessment.

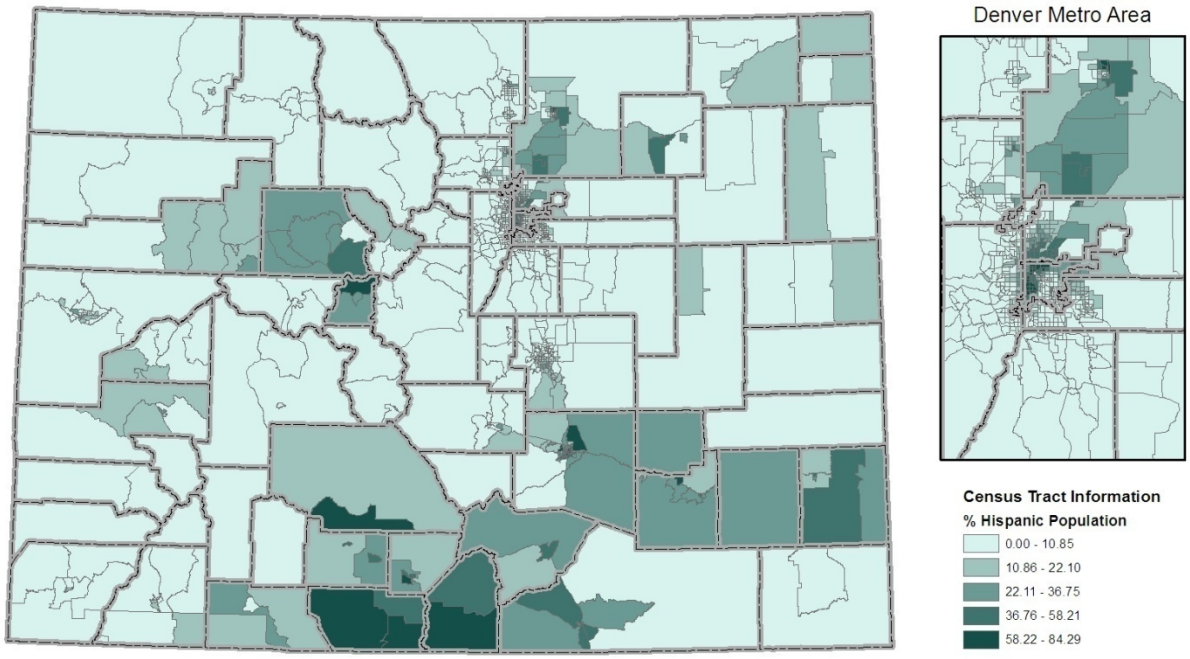
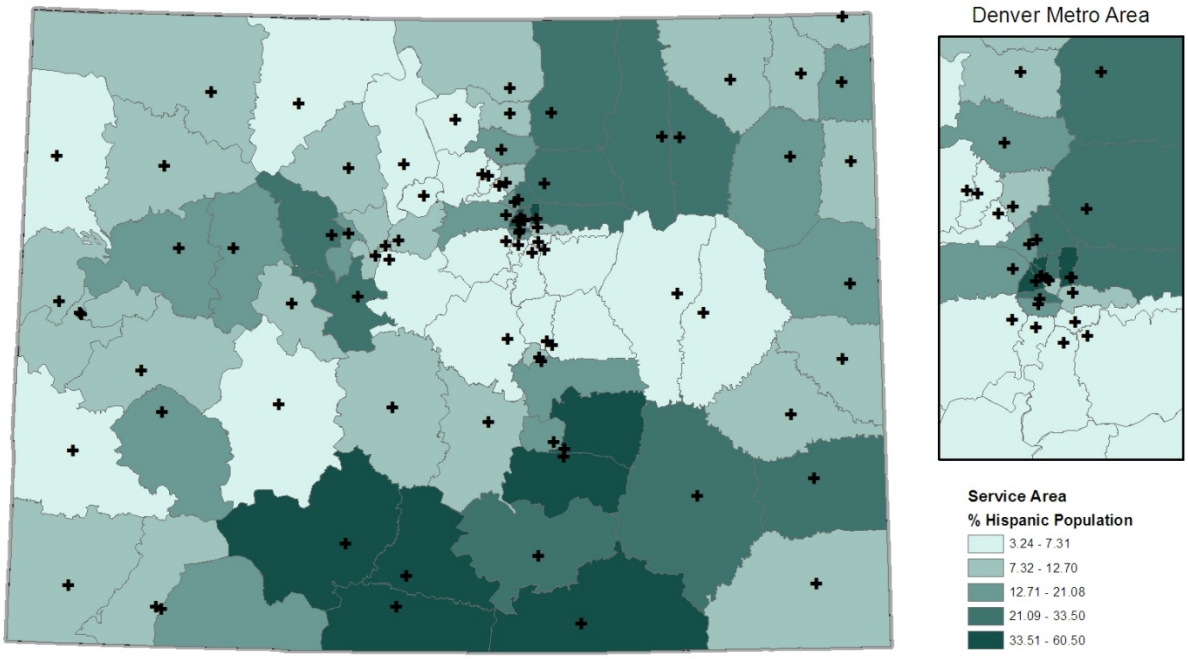


Figure 27. Hispanic Populations by Hospital Service Area.



Linguistic isolation: Primary household language was used as in indicator of linguistic isolation. Language is a critical factor in communication and communication is vital in order to adequately receive health services, particularly in an emergency situation. Linguistically isolated households are those "in which no one 14 years old and over speaks only English or speaks a non-English language and speaks English 'very well.' All members of the household 14 years old and over have at least some difficulty with English" (U.S. Census Bureau, 2000). This limitation could be an issue in reading signage or warning materials, expressing concerns, and understanding emergency announcements. According to the mapping results, the locations with the most linguistically isolated populations are sporadic throughout the state with a larger pocket just north of Denver and some rural areas near the Southern border (Figures 28 and 29).

Figure 28. Linguistically Isolated Populations by Statewide Assessment.

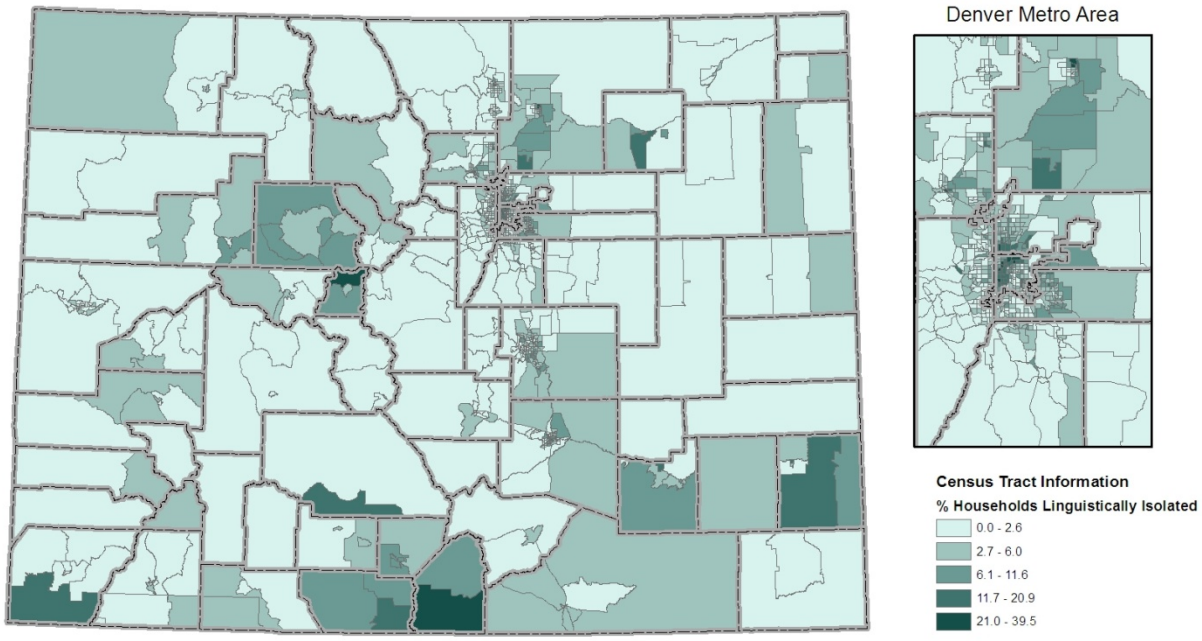
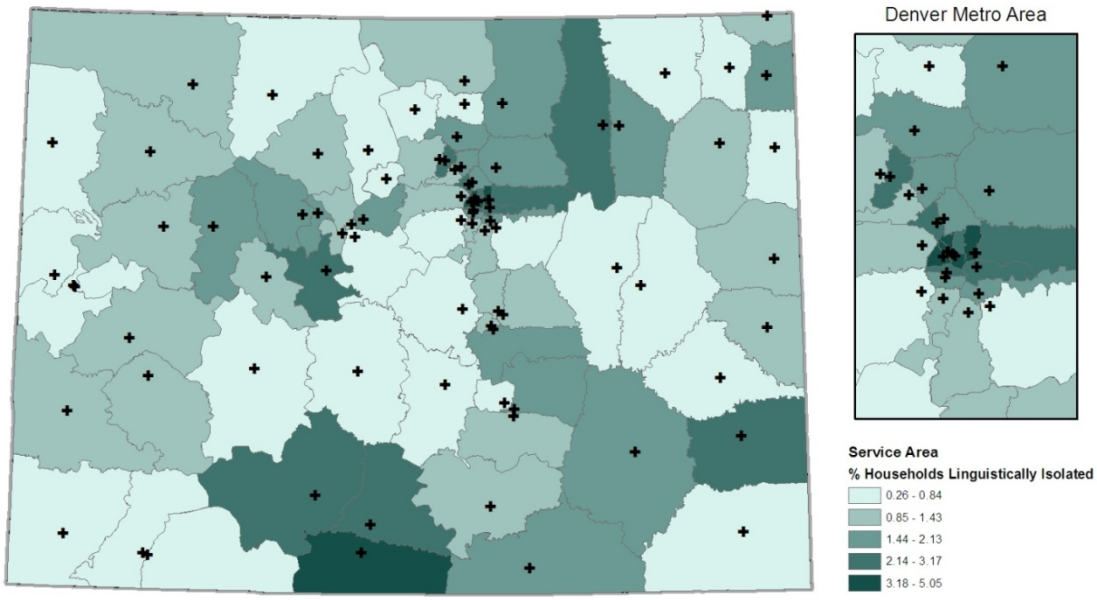


Figure 29. Linguistically Isolated Populations by Hospital Service Area.



No high school diploma: Percent without a high school diploma was used as an indicator for educational attainment. The number of people who had not earned a high school diploma was obtained from the U.S. Census and then divided by the total population in order to determine the percentage of population without a high school diploma. The U.S. Census "includes schools with either the ninth through the twelfth grade or the tenth through the twelfth grades" as schools that can confer a high school diploma (U.S. Census Bureau, 2010). Based on the mapping results, highly rural and urban areas in Colorado are the most likely to have a population without high school diplomas (Figures 30 and 31).

Figure 30. Population Lacking High School Diploma by Statewide Assessment.

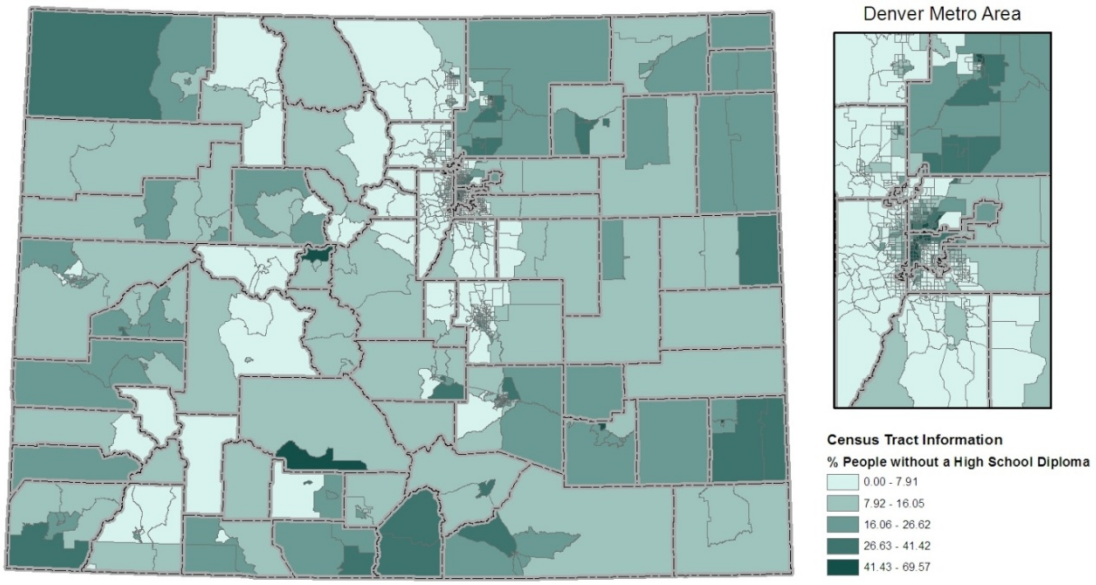
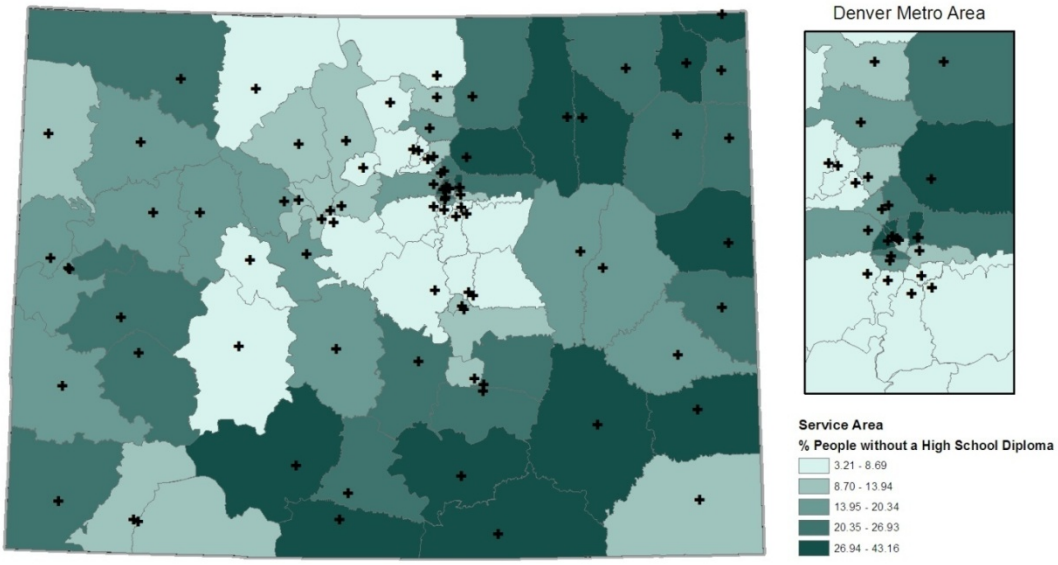


Figure 31. Population Lacking High School Diploma by Hospital Service Area.



Transportation Mobility

The number of households with "no vehicles available" was also collected by dividing the number of households with no vehicles by the total number of households. Even though a hospital may have the capacity to attend to a multitude of individuals during a disaster, their transport systems are likely to be constrained. Therefore, those lacking their own transportation will likely have a higher vulnerability resulting from limited access to a medical facility or to evacuate from the area affected by disaster (Figures 32 and 33).

Figure 32. Households without a Vehicle by Statewide Assessment.

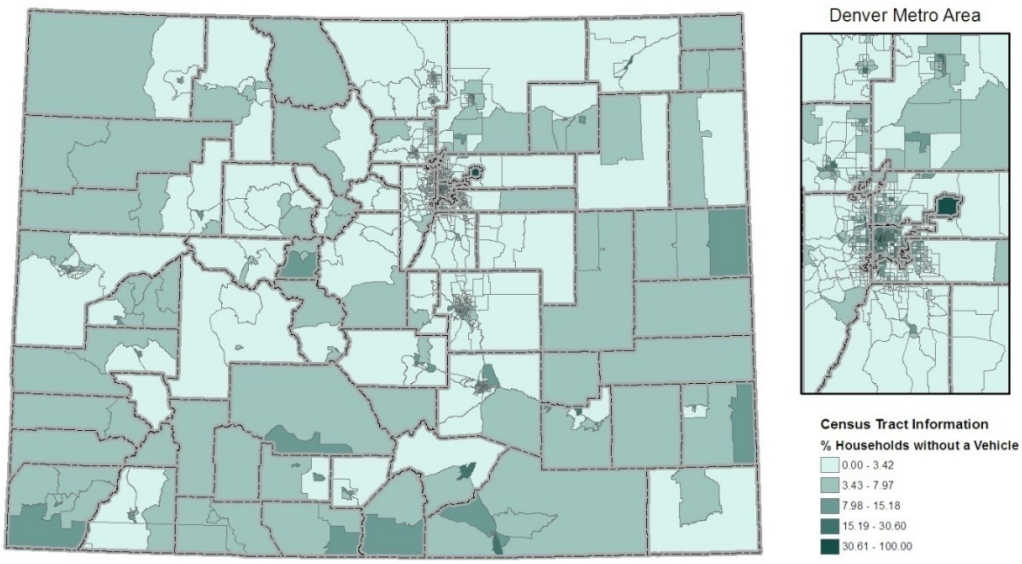
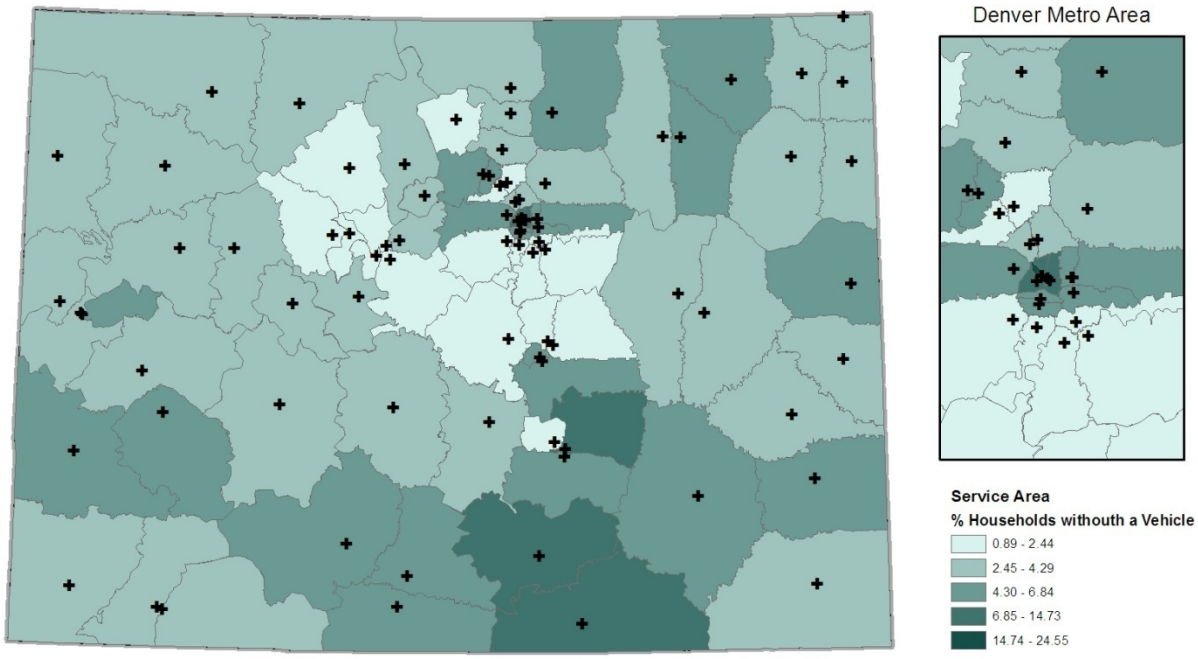


Figure 33. Households without a Vehicle by Hospital Service Area.



The data that drive the maps can also be compiled by trauma center. Table 3 identifies trauma centers that reflect the highest levels of vulnerability for each of the indicators. Ultimately, each trauma center could access the data for every variable to understand its community and also compare where it falls in the context of the entire state. The hospital service area analysis provides broad vulnerability results based upon the patterns revealed in the statewide census tract assessment. The service area estimates reveal that a few specific hospitals possess high levels of vulnerability along multiple indicators. Three hospitals fall in the highest tier of three for five of the variable, including Presbyterian/St. Luke's Medical Center, Denver Health Medical Center, and Conejos County Hospital. Presbyterian/St. Luke's Medical Center, for example, has a high percentage of people who are in poverty, Hispanic, non-white, living in crowded conditions, and with limited transportation in its geographic service area.

Table 3. Trauma Centers Possessing the Highest Levels of Vulnerability by Indicator.

Indicator	Trauma Center	Percent	Total Population or the Number of Households
Children	Centura Health-Parker Adventist Hospital	26.9	17,891
	Sky Ridge Medical Center	26.8	21,638
	University of Colorado Hospital	26.3	21,414
Seniors	Sedgwick County Memorial Hospital	22.0	446
	Southeast Colorado Hospital	21.0	1,169
	Delta County Memorial Hospital	18.4	5,935
Women (Reproductive Age)	Boulder Community Hospital	26.6	16,153
	Poudre Valley Hospital	25.7	41,818
	Boulder Community Hospital-Foothills Campus	25.7	18,703
People Living in Group Quarters	Haxtun Hospital District	20.2	726
	Centura Health-St. Thomas More Hospital	18.5	8,531
	Plains Medical Center	9.5	885
People Living in Poverty	Conejos County Hospital	26.1	1,045
	Presbyterian/St. Luke's Medical Center	20.5	2,450
	San Luis Valley Regional Medical Center	20.3	1,371
Low Percentage of Owner Occupied Homes	Centura-St. Anthony at Copper Mtn.	20.5	532
	Centura Health-Summit Medical Center	24.3	1,702
	Vail Valley Medical Center	27.5	1,095
Female householders	Plains Medical Center	54.3	140
	National Jewish Medical & Research Center	45.7	1,597
	Rose Medical Center	45.0	1,077
Households lacking Basic Amenities	Breckenridge Medical Clinic	35.7	2,070
	Centura-St. Anthony at Copper Mtn.	18.9	176
	Heart of the Rockies Regional Medical	18.4	1,349
Households with Overcrowding	University of Colorado Hospital	18.6	4,781
	Presbyterian/St. Luke's Medical Center	16.0	1,914
	Denver Health Medical Center	11.3	6,905
Non-white Minorities	Presbyterian/St. Luke's Medical Center	76.9	26,131
	University of Colorado Hospital	72.8	59,144
	Conejos County Hospital	62.6	6,807
Hispanic	Conejos County Hospital	60.5	6,576
	Presbyterian/St. Luke's Medical Center	50.4	17,118
	Denver Health Medical Center	49.8	73,074
Linguistic Isolation	University of Colorado Hospital	16.0	4,098
	Conejos County Hospital	12.5	500
	Presbyterian/St. Luke's Medical Center	12.0	6,807
No High School Diploma	Presbyterian/St. Luke's Medical Center	43.1	14,651
	Denver Health Medical Center	38.9	57,089
	Conejos County Hospital	35.1	3,818
No Transportation	Exempla-Saint Joseph Hospital	25.5	9,831
	Denver Health Medical Center	14.7	21,570
	Presbyterian/St. Luke's Medical Center	10.6	3,613

Summary

While a statewide vulnerability assessment does not provide a comprehensive understanding of the needs and capacities of marginalized populations in the context of disaster planning, it does offer systematic baseline information that gives planners a general sense of their service populations. This initial assessment can inform decisions about where hospitals should target additional information gathering efforts, conduct focused community outreach, and identify community and organizational partners for achieving comprehensive, integrated disaster planning. Of course, places change over time, which is revealed by the release of the 2010 Census and updates in the trauma center inventory by CDPHE; consequently, this particular evaluation can, and should, now be updated to present a more current representation of vulnerability.

COMMUNITY-BASED FOCUS GROUPS OF LINGUISTICALLY VULNERABLE POPULATIONS

Individuals seeking medical care enter the hospital with a unique set of needs. These "need sets" often encompass more than the clinical symptoms that require medical attention.

> *"As patients move along the care continuum, it is important for hospitals to be prepared to identify and address not just the clinical aspects of care, but also the spectrum of each patient's demographic and personal characteristics. As cultural, communication, mobility, and other basic patient needs go unmet, hospitals will continue to put themselves and their patients at risk for negative consequences. To improve the overall safety and quality of care provided in hospitals nationwide, health care organizations should aspire to meet the unique needs of their patients—patient by patient." (TJC, 2010).*

Community-based participatory (CBP) approaches in support of disaster preparedness engage directly with people at the local level and provide much more detailed information about the complexities and nature of community vulnerability and capacity. These processes can have numerous positive outcomes beyond gathering a more comprehensive understanding of communities, including increasing awareness, knowledge, communication, and relationship building. Although not fully inclusive of CBP techniques, focus groups are one mechanism for garnering more detailed community views related to community experiences, behavior, response and access to healthcare during disasters and emergencies. The goal of this phase of the project was to gather more in-depth data from multiple communities related to the complex social and cultural interactions with hospitals, specifically during disasters or emergency events.

Importantly, community engagement offers a rich opportunity, but can also be extremely challenging in a variety of ways. For example, an event recently occurred in Greeley, Colorado that exemplified the erosion of trust between a community and service institutions. In 2006, Immigration and Customs Enforcement officers raided the Swift meat packing plant in the town of Greeley and they arrested hundreds of undocumented workers for deportation. The event affected a vast number of immigrant households and was traumatic to the entire community, which resulted in widespread feelings of apprehension among many community members with respect to assembling openly and personal safety. Trust and relationships are cornerstones to meaningful community engagement far beyond the context of this project and if conducted inappropriately, these processes can also erode trust.

Methods

Focus groups were conducted in seven Colorado communities identified by the Colorado Social Vulnerability Assessment. One focus group was conducted at each site, including Lake County (Leadville), San Luis Valley (Alamosa), Greeley, West Denver, North Aurora, Montezuma County (Cortez) and Prowers County (Lamar). The Colorado Multi-Institutional Review Board reviewed and approved this study.

Organization and Participant Recruitment. For the purposes of this project, recruiting participants to engage openly in this process presented a challenge, given the high demographic presence of low-income households, undocumented immigrants, and others who may not have high levels of trust for government or institutions viewed as authority structures. The UCD project team addressed the

challenge of trust by taking a "trusted social networks" approach to participant recruitment. Rather than putting out open calls or posting participation flyers in public places, the team identified a number of local, reputable community-based organizations that interact daily with community members who fit the target participant population. At each location, these local organizations assisted with the recruitment of participants by tapping into their social and professional networks. The organization also identified and arranged the place for hosting the focus group, which was extremely important for having participants in places considered safe and comfortable to immigrant community members. This all contributed to creating a situation and an environment in which participants were able to candidly describe their experiences and views. Admittedly, the recruitment and hosting process created a bias in the responses since most of the participants were associated with the same organization. However, this still presents an important expansion of the vulnerability assessment and illustrates what it can offer in a comprehensive approach to hospital disaster planning.

Participants. Any person with the following characteristics was eligible for inclusion in the study: 1) limited-English proficiency, 2) Spanish-speaking, 3) lived in one of the seven communities, and 4) was at least 18 years of age. Each focus group was comprised of 10-15 adults. An honorarium of $50 per participant was provided as an incentive and to compensate people for their time. This strategy was highly successful as all sites were able to recruit the desired number of minimum participants for each focus group.

For the *West Denver* and *North Aurora* focus groups, the organization *Padres y JovenesUnidos* assisted in recruiting community participants. *Padres y JovenesUnidos* is a Latino community organizing group in Denver, Colorado that focuses on urban education reform and social justice. As an active organization within communities of West Denver and North Aurora, two of their community organizers made outreach calls to community contacts including church pastors, community health workers, public school parents and other trusted immigrant community members. The West Denver Focus Group was held in a community church and the North Aurora Focus Group was held in the home of a respected immigrant community leader.

The *San Luis Valley Immigrant Resource Center* (SLVIRC) is an organization that provides a diversity of resource and referral services to the regional immigrant community including legal assistance for immigrants applying for legal status in the United States, and community-based public health education. The organization works closely with both immigrant and non-immigrant communities as immigrant integration is central to their work. They are also closely connected to a large base of Guatemalan immigrants from the Q'anjob'al tribe who have settled in the area. The Executive Director of the SLVIRC communicated the focus group opportunity to the organization's board members, many of who are trusted figures in both the Mexican and Guatemalan immigrant communities. The focus group was held at the SLVIRC office in Alamosa, Colorado and was comprised of roughly half Mexican immigrants and half Q'anjob'al immigrants.

Full Circle of Lake County Youth & Family Services is a community social services organization that works closely with low-income families from all ethnic groups in Lake County, Colorado. The organization supports specific outreach programs that work with the Latino community on parent education and immigrant integration activities. The town of Leadville is unique in that it is one of the only towns with low-income housing options in Lake County, a region largely dominated by resort communities. Many immigrant workers who work in the resort towns are forced to commute long distances to their homes in Leadville. *Full Circle's* Latino Services Coordinator conducted recruitment and outreach to their client base in Leadville. Their outreach activity focused largely on a large mobile home community with a high

concentration of Latino immigrant residents. The focus group was held in the community room of one of the mobile home parks where *Full Circle* also has an established outreach and service center.

Latinos Unidos of Northern Colorado is a Latino advocacy group in northern Colorado. The organization is involved in immigrant integration work but is best known for community organizing specifically around immigrant rights. They are an all-volunteer, grass-roots organization and their members participate actively in several foundation-funded immigrant integration community collaboratives. Three of their volunteer board members spearheaded community outreach and focus group recruitment efforts in Greeley, Colorado. As mentioned previously, distrust of outsiders runs high in the Greeley community and the leadership of trusted community members in focus group recruitment efforts was vital. The focus group was held in a meeting room at a local community center that focuses many of its programs and resources on serving Latino families.

In planning and conducting the focus group in Montezuma County, Colorado, the project team worked closely with a local organization called *Compañeros*. *Compañeros* is a program supported by the San Juan Citizens Alliance (headquartered in Durango, Colorado, with offices in Cortez, the seat of Montezuma County). *Compañeros* describes itself as part community organizing group and part immigrant resource center. Many of its programs are geared toward helping immigrant families work towards financial stability and self-sufficiency along with adult education on how to navigate local systems to fulfill their own needs sustainably. The program manager for *Compañeros* reached out to their network of limited English proficiency families. The families recruited for the focus group were identified from past *Compañeros* work in and around Cortez on education access for low-income families. The focus group was held at the San Juan Citizens Alliance office on the historical main street in Cortez, Colorado.

Prowers County, Colorado, is distinct from several of the other focus group sites by virtue of its geographically isolated location in the southeastern plains of Colorado. Lamar, Colorado, is a rural town with a largely agricultural economy. In planning and conducting our focus group in Lamar, the project team partnered with a local, all-volunteer organization called *VocesUnidas*. *VocesUnidas* is part of the Lamar Chamber of Commerce and was started by non-immigrant Latino leaders in the community to promote Hispanic cultural heritage and to engage more Latinos in community events. A tribute to their open approach to community outreach, *VocesUnidas* has been successful at engaging a number of non-Latino community members as active volunteers in their work and is broadly viewed as a unifying force in the community. One of their leadership volunteers, the Language Coordinator at the Prowers County Medical Center, organized the members of the *VocesUnidas* steering committee to reach out to their networks as a method for recruiting limited-English proficiency individuals for the focus group. The focus group was held at the Fraternal Order of Eagles Lodge in Lamar, Colorado.

Facilitation. All focus groups sessions were conducted in Spanish. The focus group facilitator used a discussion guide to ask participants to share their perceptions and experiences with disasters and emergencies, their household plans for action during a crisis event, and their expectations of local emergency health services in disaster events during each 2-hour session. The facilitation also elicited responses and spurred conversations about anticipated actions during various disaster events, as well as personal past experiences and attitudes regarding disasters and access to emergency care.

After the first five focus groups, the project team modified the discussion guide to garner more specific information about participants' experiences with disasters. Interview questions were re-phrased to elicit more details about participants' personal experiences with disasters and interactions with the

healthcare system. After the interview guide was modified, the final two focus groups were conducted in the communities of Cortez and Lamar, Colorado, to obtain additional data on thematic issues that were not fully developed in the previous focus groups. All sessions were audiotaped.

Analysis. Audiotapes of each focus group session were transcribed and then translated into English by an experienced transcriptionist and translator. Participant identifiers were removed from the final transcripts.

The project team created a codebook using an inductive approach with themes and categories that emerged from the data. Codes were assigned to the transcripts by the project team as a group, reaching agreement through discussion. Qualitative data analysis software, NVivo (version 8), was used to organize the codes and text.

Focus Group Results

The analysis of the focus groups revealed that the manner in which populations access care during normal circumstances influences behaviors during an emergency or disaster situation. Ultimately, the following five themes emerged from the suite of focus groups (see Appendix 1 for the themes and categories):

1. Amplification of baseline vulnerabilities during disaster
2. Role of trust
3. Personal agency and structural considerations
4. Collectivism versus individualism
5. Not all disasters are alike

Baseline Vulnerabilities Amplified During Disasters

Participants involved in the focus groups indicated that baseline community vulnerabilities are magnified during disaster events. Multiple participants made this point across the community focus groups. Some participants described the magnification of community vulnerabilities as a function of limited resources.

> *"We're a really small community with few economic resources," said one participant. "It's well known that the community hospital isn't equipped for most things. And they can't handle most situations, and I think that in a disaster there really isn't much they could do."*

Not only are healthcare facilities seen as highly underequipped by the community, but there was also a general level of powerlessness expressed by a number of focus group participants.

> *"It's impossible to argue with them [the hospital], because even if they haven't given you the service, they're charging you and they're going to win. And this is so unfair, because most people here don't speak English, first of all, and second, they don't know how to defend themselves, they don't know how to demand the rights they're entitled to."*

Limited English proficiency and the inability to navigate the healthcare system emerged as important driving factors in community members' decisions to access care or go to an emergency room before, during or after a disaster:

> *"Many times [people] do hold back a little to go to the health center or the hospital to ask for help if they feel bad. Even with the doctor because many times the doctors know very little Spanish. You have to take your own interpreter for them to be able to treat you."*

The results from the focus groups also suggested that existing vulnerabilities (including limited economic resources and English language ability) do not affect community members equally across entire social groups. Social hierarchies and diversity exist within groups and, ultimately, this creates a spectrum of vulnerabilities. Some focus group participants described being cut off from their social networks, a situation that left them feeling alone and highly unprepared in the event of a disaster. *"I don't know where to go, I truly have no idea,"* responded one participant when they were asked about their potential decisions and behavior during a disaster. *"I have no family here. And friends, I have only a few and they all live in the area, so I imagine they would also be evacuated. I have no idea."*

The focus group results illustrate how coping capacities and resources can vary between neighborhoods and between families. Within each focus group, some participants identified vulnerabilities that were of no concern to other members of their group. *"What we would need here is somewhere to protect ourselves, those of us that don't have basements. Truthfully we don't have resources to build a basement."* In addition to a lack of community support people and emergency shelters, focus group respondents also identified inability to get insurance, immigrant status and language barriers as highly important vulnerabilities that vary in significance for individuals and families across their communities.

Issues of Trust

The community's level of trust (or distrust) of local organizations and service providers was another theme that emerged from the focus group analysis. Levels of trust appear to be important in influencing the decisions people make about accessing care during disaster situations. *"Right now there's no disaster and they don't attend to you,"* commented one participant. *"Imagine if there was a disaster. Unfortunately, if we don't have documents they're not going to treat us. They're going to let us die I think."*

In addition to lack of insurance and documentation, many respondents were skeptical that hospitals and clinics could respond effectively to a surge in patients in the event of a disaster. *"I don't think [the medical system] has the capacity here […] I don't think it has the capacity to respond to a disaster."*

Focus group participants expressed their tendency to seek medical care from trusted (and more affordable) avenues.

> *"Well, if I see that it's something small I'll go to a 'curandero' [native healer]. It's cheaper"*

> *"The Red Cross is open; it is always available to anyone. I mean, they don't pay attention to race, origin, if you come from another country of whether you have papers or not. In any case, they always serve everyone."*

Trust, related to both quality of service and equity, was identified as a highly important factor in the decision making of focus group participants.

Agency and structural considerations describe the overarching organizational contexts that define a community. These contexts impact levels of personal agency within vulnerable populations and in turn

affect their interactions with care providers. One focus group participant described their personal experience during an earthquake in their hometown in Mexico:

> *"There were a lot of people that were getting supplies, water, canned goods, and also acted on their own behalf, it wasn't because of the government, because the government took a long time to react and the people took the initiative to help, help us."*

The skepticism about the way the government and healthcare systems respond to disasters in Mexico can carry into the perceptions the residents have about U.S. disaster response.

Personal Agency and Structural Considerations

In the context of local agency and structural considerations, focus group participants expressed great dissatisfaction with the wait times in hospital emergency rooms.

> *"So, of course, if you feel sick, you know, the first thing is…for me the easiest thing and the fastest thing is, nine-one-one. Because they'll send an ambulance and that's the only way you're seen fast. But in my experience if you go to the hospital, I've waited for five hours in emergency."*

In addition, cultural insensitivity of healthcare organizations was described as a key factor in the negative experiences of vulnerable populations during their attempts to access care.

> *"Perhaps if all of us had papers, all of us that are here illegally and spoke English, perhaps they wouldn't be so bad, so racist, and they'd help us more. […] That way so many people, so many people wouldn't die. Because I've seen on TV people that are sitting there waiting, pregnant to be treated or people that really need help. And they don't treat them for the same reason."*

Analysis of the focus groups reflects a general sentiment within certain vulnerable communities that the organization of the Colorado healthcare system limits personal agency and that this phenomenon would only be exacerbated in the event of a disaster.

Collectivism versus Individualism

A community's spirit of collectivism or individualism can affect decision making during disaster events. For example, the focus groups revealed that in communities where collectivism plays an important role in the social and cultural fabric of the group, family considerations took high propriety in decision-making.

> *"In the event of an earthquake or natural disaster, like you said, I would take my family, […] because of safety reasons so that we can be all together. You know that we Latinos have very tight-knit families. No matter what happens we are always together."*

Similar comments were made in the majority of the focus groups, although participants recognized the importance of responding in appropriate ways depending on the nature of the disaster event. In general, there was a strong sense of collectivism expressed by the focus group respondents.

> *"In the event of an epidemic, [I would] avoid putting others at risk [or] spreading the infection. But if it is a disaster we have to be together, that's our nature, that's how we Latinos behave."*

"See I think that in these disasters it would be much better that the family stayed together. In any disaster, an earthquake, a flood, any of those disasters. I think the family should be together, the whole family together. It doesn't matter if it's in the hospital or wherever. That's what I think."

"Well, I think to be united as a community and help one another like the brothers that we are. Help as many as you can, whatever is within our reach."

Not All Disasters are Alike

Finally, analysis of the focus groups revealed that community members acknowledge that not all disasters are alike. Overall, focus group participants acknowledged that the scope and type of the event would influence their decision making during a disaster. However, respondents' disaster response and preparedness literacy was limited for those events that did not offer any warnings.

"Honestly, I don't know what I would do different because they're things that you don't know when they're going to happen. Like earthquakes, they don't send a warning or anything. Conversely when there is a tornado yes. A snow storm, also yes. Now with computers and everything, you can inform yourself and prepare right? Prepare yourself with food and medicine in the house. [...]But those things, I think them, but I don't do them."

The focus groups results also illustrated that members of the study communities use discretion based on the nature of the disaster event when making response decisions.

"If it isn't something critical, if we are alright and healthy we have to carry on, right? Because hospitals become overcrowded. Just look at what happened with [the] new flu. Lots of people were hysterical and overcrowded the hospitals with just a simple cold."

Summary

The focus groups were conducted in an effort to better understand community views of health services in a disaster context and to provide insights into a vulnerable population's decision-making in "non-disaster" times. The perceptions of care access during a disaster is a critical component in directly enabling hospitals to more effectively reduce risk by: a) identifying readiness levels as they relate to serving vulnerable populations, b) choosing and prioritizing cost effective, community-based and sustainable interventions, and c) increasing community and healthcare systems resilience through broadening risk awareness and culturally appropriate planning.

The focus groups reveal the richness of information that can be obtained through community engagement. Even though the focus group phase was fairly narrow in scope given the emphasis on Spanish-speaking, linguistically isolated populations in only seven communities across the entire state and only one focus group in each of those, the themes that emerged still reveal many incredibly insightful and relevant considerations for incorporation into hospital disaster preparedness plans. Most importantly, the results convey an incredibly nuanced relationship with the local hospital in the context of pre-existing community vulnerabilities. The ways in which this community institution is viewed, and past experiences with it, certainly colors how community members say they would utilize it as a resource in a disaster scenario. Perceptions and understandings of various disaster types also influence the use of a hospital emergency room.

Ultimately, this phase of the project clearly highlights the need for community engagement in the hospital disaster planning process and the potential for forming partnerships and building relationships with local community-based organizations. No matter who ends up on the hospital doorstep in a disaster, the goal should be to deliver the best care possible with cultural sensitivity to varied populations.

COLORADO HOSPITAL AND COMMUNITY VULNERABILITY SURVEY REPORT

Since the focus of the UCD-CVAP is on hospital disaster preparedness and response planning, the hospital perspective is fundamentally important to a robust appreciation of the complexities of inclusionary plans and meeting the operational needs of the institution. Thus, any comprehensive hospital cultural vulnerability assessment necessitates adding this perspective directly to the equation. The purpose of the survey, conducted by the Colorado Hospital Association through a contract with the Colorado Department of Health and Environment, was to establish and assess baseline levels of awareness and importance given to the needs of culturally vulnerable populations during emergency and disaster planning in hospitals across Colorado.

Methods

A cross-sectional email survey was conducted that targeted all hospital emergency planners throughout Colorado. The survey was conducted during a 5-week period between March 1, 2010 and April 5, 2010. Survey responses were captured through the use of Yes/No questions, Likert scales and open-ended questions to gather rich information about hospitals' specific planning initiatives. Survey questions were compiled from *Conducting a Cultural Competence Self-Assessment* (Andrulis et al., 2000*)* and were designed to capture information on planning efforts across different communities and a diverse range of groups. The survey tool contained questions specific to four areas of emergency planning for culturally diverse and limited-English proficiency communities: special meals, translation and interpretation, signage and written materials, and other areas (miscellaneous). The survey also asked for respondents' estimations of their service community's cultural and linguistic diversity, as well as estimates of administrative support for culturally competent care measures. Space was provided at the end of the survey for respondents to offer any additional thoughts or opinions regarding emergency planning. Their open responses to the final survey question, combined with previous narrative responses (and expressed willingness to participate in further discussions) were used to select a group of participants for in-depth, key informant interviews.

Data analysis occurred in three steps. First, descriptive statistics were calculated to determine the characteristics of participating hospitals as well as awareness and importance given to the needs of culturally and linguistically vulnerable populations in disaster planning efforts. In the second step of the analysis, bivariate analyses were performed to test for associations between hospital characteristics and perceptions about disaster planning efforts. The chi-square test for categorical data and Pearson's correlation test for continuous data were used to test for significance of associations. All analyses were conducted in SPSS (version 18). Participants' responses to open-ended questions can be seen in Appendix 2.

Survey Results

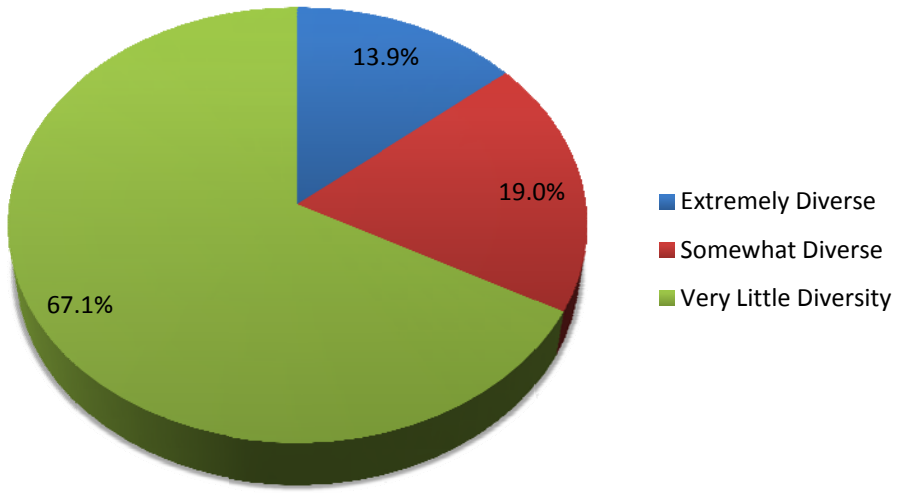
Of the 153 Colorado hospital emergency planners who were surveyed, 91 responded for a response rate of 59.5 percent. Question specific response rates ranged from 85.4 to 100 percent. More than half of the hospitals were located in rural or frontier areas (54.7%), slightly less than half were acute care facilities (43.8%), and about a quarter were members of a larger healthcare system (24.7%; see Table 4).

Table 4. Characteristics of Participating Hospitals.

	n (%)
Member of Healthcare System	22 (24.7%)
Facility Type Acute Care Critical Access Other: Behavioral, long-term care, etc.	 39 (43.8%) 33 (37.1%) 17 (19.1%)
Rural or Frontier	47 (54.7%)

When asked to rate the linguistic and cultural diversity of the hospital's service area population, 19.0 percent of participants reported that their hospital's service area had very little diversity, 67.1 percent said their hospital's service area was somewhat diverse, and 13.9 percent said their hospital's service area was extremely diverse (see Figure 34). Responses did not differ significantly by facility type, rural location, or membership in a healthcare system.

Figure 34. Hospital Emergency Planners' Perception of the Linguistic and Cultural Diversity of Their Hospital's Service Area Population.



The majority of participating hospitals reported involving the community of their service area in emergency planning activities (92.1%). Five of the seven hospitals that did not currently involve the community in emergency planning activities reported having plans to involve communities in future planning initiatives.

Less than half of hospitals identified limited-English proficiency communities or languages spoken in their service community as part of their emergency planning activities (40.2%). Only 10.5 percent of hospitals reported currently working on any emergency or disaster planning efforts specifically related to or involving the needs of culturally and linguistically vulnerable populations, and even fewer (2.4%) participating hospitals had defined projects underway in that area. Few hospitals had established community partnerships (4.9%) or received funding (1.2%) to support their planning efforts (see Table

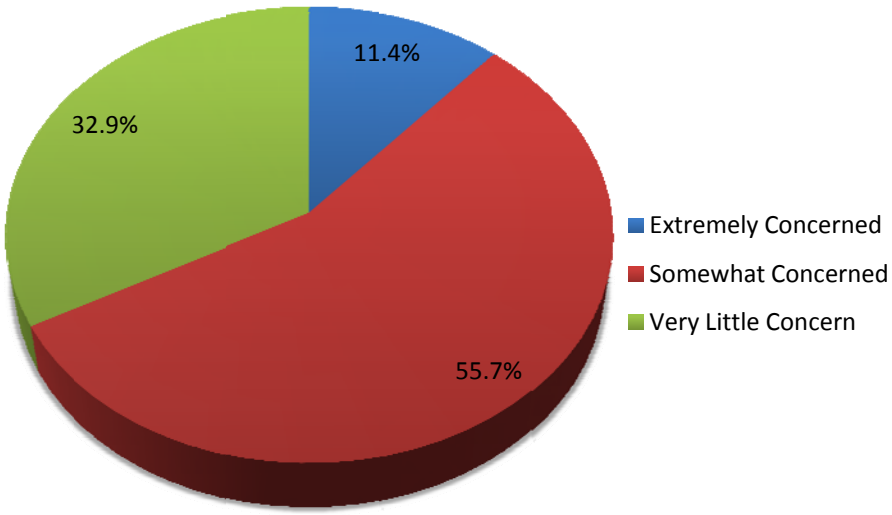
5). Responses did not significantly differ by facility type, rural location, or membership in a healthcare system.

Table 5. Hospitals' Self-reported Emergency Preparedness.

The Hospital:	n (%)
Involves the community in emergency planning activities	82 (92.1%)
Identifies Limited English Proficiency communities or languages spoken in service community as part of its emergency planning activity	35 (40.2%)
Currently works on emergency planning efforts specifically related to or involving the needs of culturally and linguistically vulnerable populations	9 (10.5%)
Currently has a defined project that addresses the needs of culturally and linguistically vulnerable population underway	2 (2.4%)
Has arrangements to meet the needs of culturally and linguistically vulnerable patients in the event of a disaster or emergency in the following areas: Translation and Interpretation Signage and General Information Materials Special Meals Other Areas	 64 (77.1%) 30 (37.0%) 15 (18.3%) 9 (11.4%)
Provides a patient advocate to assist culturally and linguistically diverse populations	51 (63.8%)
Has an organized way to collect data on the cultural and linguistic characteristics of patients	31 (39.2%)
Has any defined projects related to cultural and linguistic competency and delivery of care	14 (18.4%)

When asked to rate the degree to which the senior hospital administration has identified linguistic and cultural competency as a concern, 32.9 percent of participants said that their hospital's administration had very little concern about linguistic and cultural competency, 55.7 percent said that their hospital's administration was somewhat concerned about linguistic and cultural competency, and 11.4 percent said that their hospital's administration was extremely concerned about linguistic and cultural competency (see Figure 35). Responses did not significantly differ by facility type, rural location, or membership in a healthcare system.

Figure 35. Hospital Emergency Planners' Perception of Their Hospital Administration's Concern for Linguistic and Cultural Competency.



There was a significantly lower proportion of identifying limited-English proficiency communities in the service community as part of hospital emergency planning activities among participants who reported that their hospital administrators had very little concern about linguistic and cultural competency (19.2%) in comparison to those who reported that their hospitals' administration was at least somewhat concerned about linguistic and cultural competency (50.9%). The degree of senior hospital administration concern with linguistic and cultural competency also correlated with the participants' perception of the diversity of the hospitals' service area (Pearson' R = 0.392, p=0.000, see Table 6).

Table 6. Diversity of Service Area by Hospital Administrator Concern for Cultural and Linguistic Competency.

	Hospital Administrators' Concern about Cultural and Linguistic Competency		
	Extremely Diverse	Somewhat Diverse	Very little Diversity
Extremely Concerned	5 (45.5%)	4 (7.5%)	0 (0.0%)
Somewhat Concerned	3 (27.3%)	36 (67.9%)	5 (33.3%)
Very Little Concern	3 (27.3%)	13 (24.5%)	10 (66.7%)

Pearson' R = 0.392, p=0.000

About one-third (39.2%) of participants said that their hospitals have an organized way of collecting data on the cultural and linguistic characteristics of their patients (Table5). Of those hospitals, 83.9 percent said that they use those data to address translation needs, 69.0 percent said the data are used to address appointment scheduling, 57.1 percent said that the data are used to prepare appropriate meals for their patients. Responses did not significantly differ by facility type, rural location, or membership in a healthcare system.

Summary

This survey sought to collect data on hospital disaster planning inputs, what resources currently are being leveraged and which are not, and to understand this information within the context of community perspectives. Much of the data collected show conflicts both in perceptions and resource utilization. The data are intended to be investigative in an effort to show needs and gaps in planning and resources and not yet generalizable to other facilities.

Results indicate that hospital disaster planning efforts do not sufficiently address the needs of the culturally vulnerable populations they serve. Respondents reported that hospitals lack adequate data about the populations living in their service areas and that there is great room for improvement in increasing their efforts to partner with culturally and linguistically vulnerable populations during the emergency planning process.

Hospitals do not yet account for the potentially catastrophic effects that a surge from a large vulnerable population with complex medical, linguistic or cultural needs could have on their delivery of services. Ultimately, hospital emergency planners should strive to understand the diverse makeup of their service areas, part of which includes having meaningful interactions with local communities prior to disasters to more effectively provide services that are appropriate and equitable during and after an event. Not only will this contribute to a decrease in local vulnerability and health disparities, but it will also contribute to the ability of hospitals to operate efficiently as critical infrastructure.

CONCLUSIONS

The UCD Cultural Vulnerability Analysis Project (UCD-CVAP) demonstrated a comprehensive approach for integrating social vulnerability, cultural competency, and hospital disaster preparedness. Using a mixed-method methodology that included a literature review, a systematic vulnerability assessment, hospital disaster planners' views, and community experiences, the four-pronged project provides a prototype for moving beyond current facility-level planning to robust community-hospital based disaster planning.

The U.S. currently suffers from extensive health disparities perpetuated by conditions in which too many people in need do not have access to adequate healthcare; these disparities are magnified by disasters and mass casualty events. As such, it is vital that healthcare providers and emergency mangers work closely with vulnerable communities to identify needs, resources, and experiences at all levels. With limited resources to assist hospitals in linking their disaster preparedness activities with broader community vulnerability and capacity concerns, taking an integrated approach augmented with strategic in-depth follow-up with specific community groups, offers a mechanism to establish relationships, garner information, and connect with communities they serve. At the same time, thoroughly understanding the demands and priorities of hospitals within this context also adds a necessary dimension.

The statewide vulnerability assessment provides systematically-collected baseline information that can offer hospital planners a general sense of their service populations. This information can inform decisions about where hospitals should target additional information gathering efforts, conduct focused community outreach, and identify community and organizational partners for achieving comprehensive, integrated disaster planning. The service area results reveal that a few specific hospitals possess high levels of vulnerability along multiple indicators. This analysis illustrates the necessity for the development of hospitals disaster plans that are highly sensitive to the socially vulnerable populations that make up their disaster service areas.

The five themes that emerged during the focus groups include: the amplification of baseline vulnerabilities during disasters; the impacts of trust or the lack thereof; personal agency and structural considerations; collectivism versus individualism; and not all disasters are alike. This portion of the study was aimed at understanding vulnerable community behavior and experiences as a way of addressing cultural competency concerns. The focus group process can be combined with a systematic data analysis and employed by hospitals to inform preparedness planning and to improve service for rapidly diversifying service populations.

The results of the hospital preparedness interviews reveal that current hospital disaster planning efforts in Colorado are not sufficiently addressing the needs of the culturally vulnerable populations they serve. Respondents claimed that hospitals lack adequate data about the populations living in their service areas and that strides must be taken in fostering partnerships between hospitals and culturally and linguistically vulnerable populations during the emergency planning process. Moreover, Colorado hospitals do not yet account for the potentially catastrophic effects that surges from a large vulnerable population with complex medical, linguistic or cultural needs could have on their delivery of services.

The comprehensive vulnerability assessment carried out by the UCD-CVAP supports and illustrates a path for integrated disaster preparedness planning, which aligns with CLAS standards (HHS, 2001), The Joint Commission's *Roadmap for Hospitals* (TJC, 2010), and integrated disaster planning for community

resilience. Ultimately, hospital emergency planners should strive to understand the diverse makeup of their service areas, a process that involves meaningful interactions with local communities prior to disasters to more effectively provide services that are appropriate and equitable during and after an event. Not only will these interactions contribute to decreases in local vulnerability and health disparities, but they will also contribute to the ability of hospitals to operate efficiently as critical infrastructure during disasters. As hospitals take a more deliberate approach to identifying and understanding the diverse needs of service populations, the benefits extend beyond improved disaster preparedness to potentially increasing efficiencies in daily operations.

In alignment with the National Security Strategy and the Department of Homeland Security's (DHS) Quadrennial Homeland Security Review (QHSR), FEMA's mission and priorities explicitly commit to support community resilience (Fugate, 2010). As asserted in a recent RAND report, community resilience in the context of health security represents "a unique intersection of preparedness/emergency management, traditional public health, and community development, with its emphasis on preventive care, health promotion, and community capacity building" (Chandra et al., 2011). Adopting clear and consistent measures of community resilience is critical in future disaster planning. Such measurements will allow planners to better assess their efforts, establish the link between inputs and outcomes, and lead to increased efficiency in disaster planning so that existing activities and resources can be leveraged most effectively. This is important from a cost-benefit perspective for hospitals already struggling to address resource shortages. Integrated disaster management that links emergency management, public health, and health delivery services and incorporates all of the various populations, organizations, and businesses is paramount to building a disaster resilient community.

To better prioritize state and local investment in national health security, it is necessary to first identify the key health security risks we are faced with today. The NHSS defines risk as the multiplicative product of "threat," "vulnerability," and "consequences." Risk-based resource allocation must consider assessing the "weakest links" implying targeting the highest risks issues, addressing resource allocation, and policies guidance must be made with knowledge of the health security risks faced by both different constituency groups and planning jurisdictions including local, state, territorial, and tribal (NHSS 2010). Assessing vulnerability and risk provides a cornerstone in implementing the NHSS.

Most current assessment and planning efforts continue to focus on disaster preparedness and response for the general public. This approach of focusing on the "many and ignoring the few" disregards the impact on a significant portion of the U.S. population—those with disabilities and those included in high-risk populations and the resulting impacts on the community as a whole. Although federal and state agencies have now raised the importance of improving disaster planning for at-risk populations, no baseline assessment process has been implemented to collect community-based perspectives from these populations and incorporate them into the planning process.

Historically, the at-risk population has been required to develop its own means to prepare for, evacuate, and recover from a disaster. This is no longer an accepted view. Today, there is a National recognition that the potential catastrophic effect on first response resources, access to care, and effective recovery demands that healthcare facilities more effectively understand those in their community and their "medical need sets" pre-event for planning and mitigation.

Currently, disaster planning models are not fully effective and inclusive because we do not completely understand the "levers for action" and factors that facilitate rapid community recovery (Chandra, et al., 2011). A community's ability to collect and analyze data is critical to this process and can help fill glaring

gaps in the evidence-base related to critical subcomponents. The lack of this knowledge base, and thus of adequate planning for people with disabilities and at-risk populations during disasters, has highlighted the ineffectiveness of our nation's health preparedness across all levels of society.

Traditional approaches to risk assessment are based on being able to identify threats, estimate vulnerabilities, and then estimate consequences if the threat were manifested. One starting point for the effort should be to leverage and integrate existing, established practices of hospital hazard vulnerability assessments (HVA) and community health assessment (CHA), merging the collection of hazards and vulnerability with data on the demographics and health status indicators of a specific community to identify the primary health problems faced by that community and how they might amplify risk and resource needs during a disaster.

Next Steps

The results of this study generally support the idea that disaster planning and culturally competent care for at-risk populations are not functionally integrated in Colorado. Next steps would include expanding and adapting the above pilot study across the state of Colorado. Ultimately this statewide analysis would include a more robust vulnerability assessment, expanded numbers of focus groups addressing a diverse population mix, and a more extensive survey with follow-up informational interviews. The developed model could be used to transfer to other states in the FEMA/HHS region for implementation. The overall regional data (FEMA Region 8, for example) could be analyzed to generate an integrated regional approach using this vulnerable population system assessment model.

Going hand-in-hand with the NHSS, this demonstrated process could be extended into the development of a tool aimed at hospital administrators and planners that would effectively link facility concerns with the community at large. A decision-support tool would ultimately enable hospitals to more effectively connect with vulnerable populations and would address a disconnect revealed in the UCD-CVAP between hospitals and their communities, particularly vulnerable, disadvantaged, and marginalized populations.

WORKS CITED

Ahern, J., Galea, S., Hubbard, A., & Kaprti, A. (2008). Population vulnerabilities and capacities related to health: A test of a model. *Social Science Medicine,* 66 (3), 691-703.

Albanese, J., Birnbaum, M., Cannon, C., Cappiello, J., Chapman, E., Paturas, J., & Smith, S. (2008). Fostering disaster resilient communities across the globe through the incorporation of safe and resilient hospitals for community-integrated disaster responses. *Prehospital and Disaster Management*, 23, 385-390. Retrieved from http://pdm.medicine.wisc.edu/Volume_23/ issue_5/albanese.pdf.

Allen, H., & Katz, R. (2010). Demography and public health emergency preparedness: Making the connection. *Population Research and Policy Review, 29*(4), 527-539.

American College of Emergency Physicians. (2005). Health care system surge capacity recognition, preparedness, and response [policy statement]. *Annals of Emergency Medicine, 45* (2):239.

American Hospital Association. (2007). The 2007 state of America's hospitals – Taking the pulse: Findings from the 2007 AHA survey of hospital leaders. Retrieved from http://www.aha.org/aha/research-and-trends/health-and-hospital-trends/2007.html

Andrulis, D., Delbanco, T., Avakian, L., & Shaw-Taylor, Y. (2000). *Conducting a cultural competence self-assessment.* SUNY/Downstate Medical Center.

Barbera, J., Yeatts, D., & Macintyre, A. (2009). Challenge of hospital emergency preparedness: Analysis and recommendations. *Disaster Medicine and Public Health Preparedness*, 3 (1), S74-82.

Barbisch, D. & Koenig, K. (2006). Understanding surge capacity: essential elements. *Academy of Emergency Medicine*, 13(11), 1098-1102.

Birkmann, J. (Ed.). (2006). Measuring vulnerability to natural hazards: Towards disaster resilient societies. New York: United Nations University.

Berkes, F. (2005). Understanding uncertainty and reducing vulnerability: Lessons from resilience thinking. *Natural Hazards, 41*, 283-295.

Boos, J., Boyd, G., Mobley, L, & Wheaton, W. (2009). *The American community survey and enhanced community-level social vulnerability assessment* [Research brief]. Retrieved from https://www.ihssnc.org/portals/0/PubDocuments/IHSSResearchBrief_Boos.pdf

Braun, B. I., Wineman, N. V., Finn, N. L., Barbera, J. A., Schmaltz, S. P., & Loeb, J. M. (2006). Integrating hospitals into community emergency preparedness planning. *Annals of Internal Medicine, 144*, 799-811.

Brooks, N., Adger, N., & Kelly, P. (2004). The determinants of vulnerability and adaptive capacity at the national level and the implications for adaptation. *Global Environmental Change, 15,*151-163.

California Department of Health Services (2007). *Surge*. Retrieved from http://bepreparedcalifornia.ca.gov/epo/cdphprograms/publichealthprograms/emergencypreparednessoffice/epoprogramsservices/surge/surge.htm.Accessed April 12, 2010.

Chandra, A., Acosta, J., Meredith, L., Sanches, K., Stern, S., Uscher-Pines, L., Williams, M. & Yeung, D. (2010). Understanding resilience in the context of national security: A literature review (working paper): RAND Corporations.

Chandra, A., Acosta, J., Stern, S., Uscher-Pines, L., Williams, M., Yeung, D., Garnett, J. & Meredith, L. (2011). Building community resilience to disasters: A way forward to enhance national health security: RAND Corporations.

Collander, B., Green, B., Millo, Y., Shamloo, C., Donnellan, J., & DeAtley, C. (2008). Development of an "All-Hazards" hospital disaster preparedness training course utilizing multi-modality teaching. *Prehospital and Disaster Management*, *23*, 63-67. Retrieved from http://pdm.medicine.wisc.edu/Volume_23/issue_1/collander.pdf

Canton, C., Wilkins, C. & Anderson, J. (2007). People who experience long-term homelessness: Characteristics and interventions. *Paper presented at the National Symposium on Homelessness Research, March 1-2, 2007.* Retrieved from http://aspe.hhs.gov/hsp/homelessness/symposium07/caton/report.pdf.

Colorado Department of Public Health and the Environment (2009). 2009 Colorado Trauma Centers [Data file]. Retrieved from http://emaps.dphe.state.co.us/gis/download_data.html

Colorado Division of Emergency Management (2011). Colorado Department of Local Affairs. Retrieved from http://dola.colorado.gov/dem/aboutus.htm

Colorado Division of Emergency Management (2010). Colorado's Nine All-Hazard Regions. Retrieved from http://dola.colorado.gov/dem/fieldservices/regions.htm

Community-Based Emergency Management Roundtable, Joint Commission on Accreditation of Healthcare Organizations (2005). *Standing together: An emergency preparedness guide for America's communities.* Retrieved from http://www.jointcommission.org/NR/rdonlyres /FE29E7D3-22AA-4DEB-94B2-5E8D507F92D1/0/planning_guide.pdf

Cutter, S., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E. & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change, 18,* 598-606.

Cutter, S., Boruff, B., & Shirley, W. (2003). Social vulnerability to environmental hazards. *Social Sciences Quarterly*. 84(2):242-261.

Daub, E. (2002). Hospital emergency preparedness assessment: A framework for integrated bioterrorism planning and response (pp. 1-7). Retrieved from http://www.stchome.com/media/white_papers/WHP032A.pdf

Davis, R., Cook, D. & Cohen, L. (2005). A community resilience approach to reducing ethnic and racial disparities in health. *American Journal of Public Health, 95,* 2168-2173.

Department of Emergency Medicine (2007). *Financing Hospital Disaster Preparedness.* Retrieved from http://pdm.medicine.wisc.edu/Volume_22/issue_5/delorenzo.pdf

Department of Health and Human Services (HHS) (2001). *National standards for culturally and linguistically appropriate services in health care (CLAS): Final report* (Report). Washington, DC: U.S. Department of Health and Human Services, OPHS, Office of Minority Health.

Department of Health and Human Services (HHS) (2009). *National Health Security Strategy of the United States of America.* Retrieved on Feb 12, 2011 from http://www.phe.gov/Preparedness/planning/authority/nhss/strategy/Documents/nhss-final.pdf

Department of Health and Human Services (2010). *HHS fact sheet: FY10 hospital preparedness program.* Retrieved on Feb 12, 2011 from: http://www.phe.gov/Preparedness/planning/hpp/Pages/fy10hpp.aspx

Department of Homeland Security (DHS) (2008). *National response framework.* Retrieved from http://www.fema.gov/pdf/emergency/nrf/nrf-core.pdf

Diamond, L.C., Wilson-Stronks, A., & Jacobs, E.A. (2010). Do hospitals measure up to the national culturally and linguistically appropriate service standards? *Medical Care*, 48(12): 1080.

Emergency Preparedness Roundtable, Joint Commission on Accreditation of Healthcare Organizations (2003). *Health care at the crossroads: Strategies for creating and sustaining community-wide emergency preparedness systems.* Retrieved from http://www.jointcommission.org/NR/ rdonlyres/9C8DE572-5D7A-4F28-AB84-3741EC82AF98/0/emergency_preparedness.pdf

Farmer, C. & Carlton, P. (2006). Providing critical care during a disaster: The interface between disaster response agencies and hospitals. *Critical Care Medicine.34,* S56-S59.

Flax, L., Jackson, R., & Stein, D. (2002).Community vulnerability assessment tool methodology. *Natural Hazards Review,* 3(4),163-176.

Flint, C. & Luloff, A. (2004). Natural resource-based communities, risk, and disaster: An intersection of theories. *Society and Natural Resources*, 18:399-412.

Fugate, W. Craig. FEMA Administrator's Intent for Building the FY 20 12-20 16, February 23, 2010. Retrieved from http://www.fema.gov/pdf/media/2010/fema_intent_fyhs_12_16.pdf

Gaillard, J.C. (2010). Vulnerability, Capacity and Resilience: Perspectives for Climate and Development Policy. *Journal of International Development,* 22:218-232.

Health Resources and Services Administration– National Bioterrorism Hospital Preparedness Program (2007). http://www.hrsa.gov/bioterrorism/. Accessed April 12, 2010.

Hodge, J., Gostin, L., & Vernick, J. (2007). The pandemic and all-hazards preparedness act: Improving public health emergency response. *Journal of the American Medical Association*, 297, 15, 1708-1711.

Hospital Preparedness Program (2010). Colorado Department of Public Health and Environment Accessed April 19, 2010 from http://www.cdphe.state.co.us/epr/Public/HPP/index.html.

The Joint Commission on Accreditation of Healthcare Organizations (2006). Surge hospitals: Providing safe care in emergencies. Retrieved from http://www.jointcommission.org/NR/rdonlyres/802E9DA4-AE80-4584-A205-48989C5BD684/0/surge_hospital.pdf.

The Joint Commission. *Advancing Effective Communication, Cultural Competence, and Patient- and Family-Centered Care: A Roadmap for Hospitals*. Oakbrook Terrace, IL: The Joint Commission, 2010.

Kaiser Family Foundation (2010). *Voices of the Storm: Healthcare Experiences of Low-Income Katrina Survivors*. Retrieved from http://www.kff.org/uninsured/Telluride Medical Center Strategic Plan 2010-2013. Retrieved from http://tellmed.org/about-us/strategic-plans/2010-2013.

Kaji A, Koenig K.,& Bey, T. (2006). Surge capacity for healthcare systems: a conceptual framework. *Academy of Emergency Medicine*, 13(11): 1157-1159.

Messias, D. & Lacy, E. (2007). Katrina-related health concerns of Latino survivors and evacuees. *Journal of Health Care for the Poor and Underserved,* 18 (2): 443-464.

Lurie, N., Jung, M., & Lavisso-Mourey, R. (2005). Disparities and quality improvement: Federal policy levers. *Health Affairs*, 24(2): 354-364.

Morrow, B. (1999). Identifying and mapping community vulnerability. *Disasters*,23(1):1-18.

Nelson, C., Lurie, N., Wasserman, J., & Zakowski, S. (2007). Conceptualizing and defining public health emergency preparedness. *American Journal of Public Health,* 97: 9-11.

O'Brien, G, O'Keefe, P., Rose, J., & Wisner, B. (2006). Climate change and disaster management. *Disasters*, 30(1):64-80.

San Miguel County Emergency Services (2005). *San Miguel County Colorado All-Hazard Mitigation Plan 2005*. Retrieved from http://dola.colorado.gov/dem/mitigation/sanmiguelpdm_plan.pdf.

Tekeli-Yeşil, S. (2006). Public health and natural disasters: disaster preparedness and response in health systems. *Journal of Public Health,* 14: 317–324.

The Joint Commission (TJC) (2010). *Advancing effect communication, cultural competence, and patient-and family-centered care: A roadmap for hospitals.* Retrieved from http://www.jointcommission.org/assets/1/6/ARoadmapforHospitalsfinalversion727.pdf.

Thomas, D., Stephens, P., & Goldsmith, J. (2010). Measuring and conveying social vulnerability. In B. Phillips, D. Thomas, A. Fothergill, & L. Blinn-Pike (Eds.), *Social vulnerability to disasters* (pp. 323-344). Boca Raton, FL: CRC Press.

Tobin, G. (1999). Sustainability and community resilience: the holy grail of hazards planning? *Environmental Hazards,* 1:13-25.

U.S. Department of Health and Human Services. The Hospital Preparedness Program (HPP). http://www.hhs.gov/aspr/opeo/hpp/. Accessed on April 12, 2010.

The White House. *National Security Strategy*, May, 2010. Retrieved from http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf

World Health Organization (2009). Save lives: Make hospitals safe in emergencies. *World Health Day 2009* (pp. 1-36). Retrieved from http://www.who.int/world-health-day/2009/en/index.html.

Yeo, S.A. (2004). Language barriers and access to care. *Annual Review of Nursing Research*, 22(1): 59-73.

Appendix 1. Major Themes and Categories from Focus Groups in Seven Communities

Theme	Sub-categories
Amplification of Baseline Vulnerabilities During Disaster	1. Limited Resources
	2. Powerlessness
	3. Language Barriers
	4. Non-Uniform Distribution of Vulnerabilities
Trust	1. Lack of Trust
	2. Skepticism of Prepared Response
	3. Organizations that Can be Trusted
Personal Agency and Structural Considerations	1. Long Wait Times
	2. Cultural Insensitivity
Collectivism versus Individualism	1. Family as Priority
	2. Benefits of Responding as a Community
Not All Disasters are Alike	1. Type of Disaster
	2. Magnitude of Disaster
	3. Dependency on Warning Systems

Appendix 2: Survey Response Questions and Selected Verbatim

Question 6: Is your hospital currently involved in any defined projects related to cultural/linguistic competency and delivery of care?

Selected Verbatim (of 14 replies)

Newborn home visits routinely takes interpreter along for those non-English speaking parents

Annual cultural diversity sensitivity training.

Most of the ER physicians and staff are able to speak limited Spanish. They are sending a few people to get certified in medical translation.

Board Directed/CEO led effort to reach out to local Hispanic community. Includes work with a representative group of Hispanic community leader volunteers, business leaders, school system, social services, etc.

Info in Spanish being handed out for our new rural health clinic

- Our Performance Excellence Director is working on translation and sign language availability in an unrelated project.

Question 7: Is your hospital currently working on any emergency/disaster planning efforts specifically related to or involving the needs of culturally/linguistically vulnerable **populations?** ***Please briefly describe your efforts:***

Selected Verbatim (of 7 replies)

- We work with the local public health department and their emergency planning on language barriers.
- Integration of culturally/linguistically vulnerable populations into existing plans (i.e. identification of language resources, mental health plans that address faith based needs, etc).
- Our upcoming drill will test communications with vulnerable populations in an evacuation of the community scenario. Our certified translators in the community are identified in our disaster plan; we utilize Telelanguage interpreter services regularly and would use them in an actual event. They interpret for approximately 150 languages via phone.
- We have addressed the Spanish speaking community in our disaster plans, specifically the language barrier and a large family base.

Question 12: Does your hospital have arrangements to meet the needs of culturally/linguistically vulnerable patients/clients in the event of a disaster/emergency in the area of SPECIAL MEALS? Please briefly describe your efforts:

Selected Verbatim (of 9 replies)

- The hospital has employed in dietary personnel from a variety of cultural backgrounds
- Community based soup kitchen, meal boxes at local churches
- Signs for hearing impaired, interpreters for different languages, kosher meals as well as gluten free food and other dietary specific food is available.
- We have a language resource officer for translations Food Services routinely prepares culture specific meals
- Our food service will be able to provide the same type of special meals as on day to day basis. Also, we have a language line/multimedia that can access any language if we have internet access. Also we have a Spanish speaking liaison that is on staff
- We have onsite food service that can provide special meals as needed. We also have interpreter phones as well as translators.

Question 14: Does your hospital have arrangements to meet the needs of culturally/linguistically vulnerable patients/clients in the event of a disaster/emergency in the area of TRANSLATION/ INTERPRETATION? Please briefly describe your arrangements:

Selected Verbatim (of 53 replies)

- We have several interpreters within the facility and several interpreters within the community that we access if need be. We also have the cyra-phone system in place within the facility
- Interpreter Program-- Spanish in house
- Use of in house interpreters, use of telephone translation lines. Some signs are in Spanish.
- Language Telephones Staff
- We have 2 trailers full of supplies purchased with the HRSA grant.
- Some employees within the hospital, as well as in the community can provide this service as our population in nearly 50% Hispanic.
- Interpreter boxes, sign up sheet for community supporters
- Trained staff and EMS that are bilingual.
- Language Line In-House Interpreters Family Members Dual Language Collateral
- 24/7 interpreters 24/7 phones to reach interpreters for specialty languages
- We utilize Language Line, and have Sign Language services through a local contract. Language line is a service that is 1-800 based and can be accessed through any working phone. Sign Language would be dependent on the persons being able to respond to the facility
- Contract with interpretation services - MOU with county Public Health for personnel and resources - Identification of personnel who are multi-lingual

Question 16: Does your hospital have arrangements to meet the needs of culturally/linguistically vulnerable patients/clients in the event of a disaster/emergency in the area of SIGNAGE AND GENERAL INFORMATION MATERIALS? Please briefly describe your arrangements:

Selected Verbatim (of 24 replies)

- Various signs and brochures in Spanish
- Information printed in Spanish. Signage with recognizable graphics and Braille.
- Signage that is ADA compliant
- Signage in English and Spanish, written resources also in Spanish (primary population served). Also have capability in printing instructions in other languages as well through meditech
- We have multiple employees who are fluent in ASL.
- All of our signage is in Spanish which is our most common second language