

# WORKING P A P E R

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## Understanding Community Resilience in the Context of National Health Security

### A Literature Review

ANITA CHANDRA, JOIE ACOSTA,  
LISA S. MEREDITH, KATHERINE SANCHES,  
STEFANIE STERN, LORI USCHER-PINES,  
MALCOLM WILLIAMS, DOUGLAS YEUNG

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## INTRODUCTION

Building community resilience, or the capability to rebound from a disaster (Pfefferbaum et al., 2005), is a cornerstone of national health security. Recent regional meetings with stakeholders to develop the National Health Security Strategy (NHSS) revealed that questions remain unanswered as to how to develop and measure a community's resilience in the face of manmade and natural threats. To date, we have many theoretical models articulating factors that contribute to community resilience (Norris et al., 2008; Pfefferbaum et al., 2007; Pfefferbaum et al., 2008) such as community cohesion and the ability to marshal resources quickly, but we have less empirical evidence about what constitutes the integral components of resiliency. Despite a limited evidence base, enhanced resilience is considered critical to mitigating vulnerabilities, reducing negative health consequences, and rapidly restoring community functioning. According to the Homeland Security Presidential Directive-21 (HSPD-21), resilience is essential to limiting the need for prolonged assistance post disaster. In order to improve resilience, Bruneau (2003) argues that communities must build capabilities that are characterized by robustness (the ability to withstand stress), redundancy (resource diversity), and rapidity (the ability to mobilize resources quickly). These efforts ensure that communities (and especially those with resource poor neighborhoods) will have the ability during an event to respond quickly, even when critical parts of the community are severely impacted, and to return to normal functioning with little delay.

Despite an understanding that community resilience is critical, the stakeholders responsible for ensuring national health security (both government and non-governmental organizations) do not have a working definition or a clear understanding of how to measure resilience for health security. Further, we have limited information about key strategies to enhance resilience. This literature review synthesizes the existing evidence base on resilience to identify drivers for health-related emergency planning. The review lays a foundation for upcoming analyses that will provide a working definition of community resilience, identify activities for building resilience, and offer associated metrics. These activities and metrics will be integrated into the NHSS implementation plan.

### **A Framework for Community Resilience in the Context of National Health Security**

While several articles have been written describing what constitutes community resilience or what resilience means in the face of disasters (BENS 2009; SERRI/CARRI 2009), far less is understood about community resilience in the context of national health security (*National health security is achieved when the Nation and its people are prepared for, protected from, respond effectively to, and able to recover from incidents with potentially negative health consequences*). Further, many of the articles and reports are based on theoretical and somewhat complicated frameworks with less attention to core components that can be operationalized for action. Given the focus of the NHSS on strengthening resilience over the next four years, it is essential to consider the core components of resilience that may contribute to a community's ability to respond and recover from *health-related* incidents.

In the NHSS, we identified several draft capabilities that are critical for community resilience. These include: ability to address the physical and psychological health needs of the population before and after disaster (reconstitution of the medical and public health infrastructure, ability to provide case management support); public education to inform and prepare communities; effective public communication; citizen engagement in local preparedness decision-making (from all types of government and non-governmental organizations); and strong social networks for preparedness and resilience.

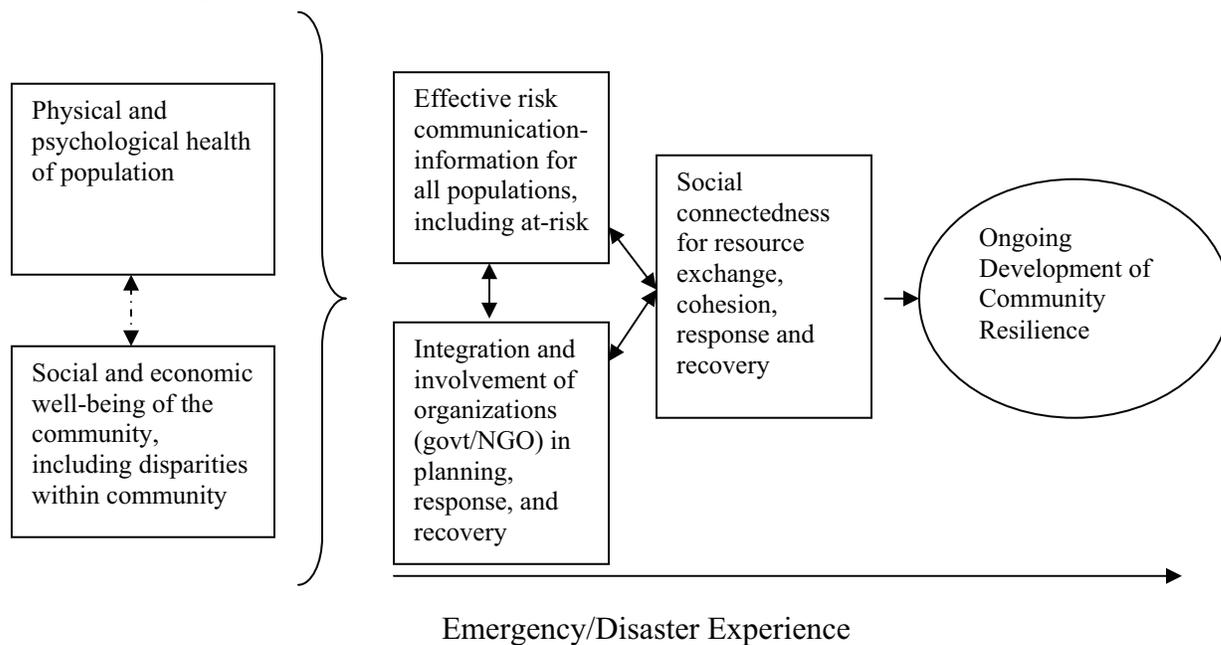
We used these draft capabilities as starting points to conduct an initial scan of the literature. We sought to identify factors that are correlated with community resilience in the specific context of enhancing health security or public health preparedness. Our literature analysis revealed five components that closely align with these capabilities. They are:

- ❖ Well-being of the population (both physical and psychological);
- ❖ Ability to address the underlying social and economic resources of that community;
- ❖ Ability of the community to use risk communication tools and strategies to enhance pre-event preparedness and post-event recovery;
- ❖ Involvement of government and non-governmental entities in planning, response, and recovery; and
- ❖ Ability of communities to engage social networks for moving information and resources.

Figure 1 is a rough schematic outlining how these components may fit together. In the figure, the underlying health and economic well-being of the community affect the ability of the community to respond and recover quickly. Next, the engagement of all types of local stakeholders in preparedness planning as well as efforts for communicating risk effectively is essential, particularly for sub-groups at greater risk. Finally, these factors contribute to the relative social connectedness of the community, a core component that is integral to the community’s ability to marshal resources, communicate with residents, and plan for infrastructure and human recovery. These five components contribute to the development of community resilience, which is further enhanced by continued learning that emerges from ongoing disaster experience.

Please note that the next phase of this study will identify activities and metrics related to community resilience; results of that analysis will inform revisions to the preliminary framework shown here in Figure 1.

**Figure 1. Core components of community resilience in context of national health security**



## METHODS

### Peer Reviewed and Grey Literature

We conducted a review of literature that aimed to define community resilience and/or provide information about one of the key components of community resilience. We included peer-reviewed articles, book chapters, and grey literature (material not formally published) written in English since January 1, 1996 from six databases<sup>1</sup>, resulting in 86 relevant citations (see Appendix A for a detailed description of inclusion criteria). Our review of the literature on community resilience and its relationship with preparedness and/or health security resulted in five components for further investigation (described earlier). We had started with six components (mitigation of neighborhood health risk was the sixth), but closer examination revealed that this factor could be subsumed under the *physical and psychological health* and *social and economic well-being* areas.

### Literature Review and Abstraction

We used a two tiered Data Abstraction Form (DAF) to facilitate a systematic evaluation of each document reviewed. Each citation was first reviewed using the criterion on the DAF1 (see Appendix A). If the citation met the criterion on the DAF1, the citation was further reviewed by the research team. The DAF2 was developed to record definitions of community resilience, ways to improve community resilience, gaps in the policy or research, or specific information about one of the key components of community resilience. For a detailed description of the development of the DAF2, see Appendix B.

Table 1 outlines the search strategy used to identify the peer-reviewed and grey literature and the relevant regulations and statutes. The table also describes the inclusion criteria used in our analysis.

**Table 1. Literature Review and Abstraction**

	Search and/or abstraction criteria	Number of items
Initial search	[community OR neighborhood] AND [resilience OR social capital OR collective efficacy OR social cohesion OR connectedness or community networks OR assets OR strengths-based OR teamwork OR supportive leadership OR measurements OR health Literacy OR health competence] AND [preparedness OR emergency OR disaster OR mitigation]	464 ↓
Criterion A	Does the article provide a definition of community resilience? OR Does the article provide information on one of the following factors of community resilience: social connectedness, level of social integration, health of community, effective risk communication, mitigation of health risk, or social and economic equity?	144 ↓
Criterion B	Does the article provide a definition of community resilience OR provide empirical or conceptual information that links resilience factors to community preparedness?	86

<sup>1</sup> Databases were: PubMed, Cumulative Index to Nursing and Allied Health Literature, PsycINFO, Social Science Abstracts, Scirus, and the Department of Homeland Security Digital Library.

From over 464 citations identified by our search strategy, 144 met Criterion A. These citations represented the broad literature on community aspects pertaining to social connectedness, social integration, physical and psychological health, risk communication, mitigation of health risk, and social and economic equity. To identify which of these specifically addressed community resilience or factors of community resilience and disaster preparedness, the review team conducted a second, more thorough abstract review of these 144 citations. Eighty-six were determined to substantially address community resilience or one of the six components thought to enhance resilience and represented the final literature sample for full review.

The citations that met criteria A and B were reviewed further for information about components thought to enhance community resilience and working definitions of community resilience. Of the 86 citations, 13 contained information about social connectedness, 12 contained information about social integration, 48 contained information about physical or psychological health of the community, 15 contained information about risk communication, 7 contained information about social and economic equity, and 3 contained information about mitigating neighborhood health risk. Sixteen citations contained additional information about community resilience that did not pertain specifically to one of the key components of community resilience. Seventeen citations contained a definition of community resilience.

### **References to Community Resilience in Federal Guidance**

In addition to peer reviewed and grey literature, we reviewed government or organizational reports referencing or addressing community resilience, by using the same key words from the main literature review. To identify relevant guidance documents, we conducted a targeted web search of federal agency websites. The following five documents were included:

- *Homeland Security Presidential Directive 21* (Department of Homeland Security, 2007)
- *Grand Challenges for Disaster Reduction* (Executive Office of The President & National Science and Technology Council, 2005)
- *All-Hazard Risk Mitigation Plan* (Department of Homeland Security Digital Library)
- *HHS Pandemic Influenza Plan* (U. S. Department of Health & Human Services)
- *Building community resilience for children and families* (Gurwitch et al., 2007)

## RESULTS

Our review of the literature included a brief summary of the existing community resilience definitions, a scan of current federal guidance that refers to community resilience, and a more thorough analysis of literature in each of the five components of community resilience.

### Existing Definitions of Community Resilience

Definitions of community resilience describe resilience globally or discuss resilience specifically in the context of disasters. Definitions could be categorized into two types: a) those that focus primarily on capacity-building or increase in resources or knowledge; and b) those that focus on capability enhancement or the ability to use information and resources to respond and recover (see Appendix C for a list of definitions). For capacity-building, definitions tend to emphasize at least one of four capacities:

- ❖ Level of community knowledge about threats
- ❖ Level of community engagement or empowerment to address risks
- ❖ Existence of social networks
- ❖ Existence of trust in government/public health

For example, Keim et al. (2008) argues that disaster resilience is composed of (1) the absorbing capacity, (2) the buffering capacity, and (3) response to the event and recovery from the damage sustained. Gilbert (2008) suggests that resilience is the capacity to find solutions, resist hardship, restore function, learn new skills, change, and survive. These definitions include many of the elements described above, including the ability to respond and recover from disaster.

Within the capability focus, definitions centers on at least one of five core capabilities:

- ❖ The capability of the community to absorb or resist the effects of the disaster
- ❖ The capability of the community to maintain basic functions during disaster
- ❖ The capability to respond
- ❖ The capability to recover from disaster, including the ability to engage in positive change and move on after a disaster
- ❖ The capability to mitigate health threats

Examples of capability-based definitions include one by Reissman (2005), which emphasizes social cohesion post-disaster: “*Resilience refers to the ability of a community to withstand adversity and maintain cohesion and healthy functioning.*” The Community and Regional Resilience Institute provides a comprehensive definition that outlines resilience through the stages of response and recovery: “*When a community is truly resilient, it should be able to avoid the cascading system failures to help minimize any disaster’s disruption to everyday life and the local economy. A resilient community is not only prepared to help prevent or minimize the loss or damage to life, property and the environment, but also it has the ability to quickly return citizens to work, reopen businesses, and restore other essential services needed for a full and swift economic recovery*” (Community and Regional Resilience Institute).

### References to Community Resilience in Federal Guidance

Table 2 provides a brief summary of the resilience content in each of the federal guidance documents we reviewed. In general, references to resilience underscore some of the elements of the five components to be examined in the next section -- ability to mitigate vulnerability and respond quickly, social networks, integration of resilience training into activities across a diverse group of organizations, and citizen knowledge of preparedness and ability to mitigate vulnerabilities. However, there is relatively little detail on how to operationalize these definitions into concrete activities.

**Table 2. Scan of Federal Documents with Reference to Community Resilience**

Reference Source	Definition or Other Reference to Community Resilience
Homeland Security Presidential Directive 21	<p><i>Where local civic leaders, citizens, and families are educated regarding threats and are empowered to mitigate their own risk, where they are practiced in responding to events, where they have social networks to fall back upon, and where they have familiarity with local public health and medical systems, there will be <b>community resilience</b> that will significantly attenuate the requirement for additional assistance. The Federal Government must formulate a comprehensive plan for promoting community public health and medical preparedness to assist State and local authorities in building <b>resilient communities</b> in the face of potential catastrophic health events.</i></p>
Grand Challenges for Disaster Reduction	<p><i>Communities must break down the cycle of destruction and recovery by enhancing their disaster resilience. There are four key characteristics of disaster <b>resilient communities</b>:</i></p> <ul style="list-style-type: none"> <li><i>-Relevant hazards are recognized and understood.</i></li> <li><i>-Communities at risk know when a hazard is imminent.</i></li> <li><i>-Individuals at risk are safe from hazards in their homes and places of work.</i></li> <li><i>-<b>Disaster-resilient communities</b> experience minimum disruption to life and economy after a hazard event has passed.</i></li> </ul>
All-Hazard Risk Mitigation Plan	<p><i>Risk can be used to evaluate and rank economies on their potential resilience during an economic downturn.</i></p> <p><i>Using the U.S. West Coast/Alaska Tsunami Warning Center, NOAA's tsunami mission is to provide reliable tsunami forecasts and warnings and to promote <b>communities' resilience</b>.</i></p>
HHS Pandemic Influenza Plan Supplement 11 Workforce Support: Psychosocial Considerations and Information Needs	<p><i>Delivery of psychosocial programs to improve family and personal <b>resilience</b> of workers and their families</i></p> <p><i>Special planning to address personal <b>resilience</b> of healthcare workforce</i></p>
Building community resilience for children and families (National Childhood Traumatic Stress Network)	<ul style="list-style-type: none"> <li><i>-Include all sectors of community in preparedness planning</i></li> <li><i>- Add '<b>resilience</b>' to the three r's of rescue, recovery, rebuilding</i></li> <li><i>-Address training programs in <b>resilience</b></i></li> <li><i>-Integrate information on <b>resilience</b> into existing training and educational programs related to crisis and disaster preparedness and response</i></li> </ul>

**Five Components of Community Resilience in the Context of National Health Security**

As described earlier, five components of resilience related to health security emerged. In the next sections, we provide more detail on why these components matter for health security, summarize key themes from the literature describing dimensions that are most critical to health security, and examine the knowledge gaps within each component (e.g., what questions remain unanswered, where is more research needed).

## Physical and Psychological Health

### Physical Health

#### *Overview*

Prior significant public health incidents have highlighted how the underlying physical health of the population (e.g., the number of residents with chronic conditions) can greatly affect the community's ability to respond and recover (Aldrich & Benson, 2008). For example, those with more health vulnerabilities may have difficulty evacuating, may need more health services at a shelter, and may necessitate more support during the recovery phase (Fernandez et al., 2002). These factors can impede the ability of the community to respond quickly and lengthens the recovery period, and in turn can have lasting effects on the requirements for local and external resources. Understanding the pre-existing health conditions of a community is critical for pre-event resource planning. In addition, this type of physical health vulnerability assessment has implications for recovery resource planning. Communities do not “start” at the same point pre-disaster with respect to their residents' health; therefore communities may take longer time to recover from disaster if they have to attend to the acute and chronic care needs of their population.

#### *Key Themes*

##### **Pre-event health of the population is critical to strengthening community resilience.**

One of the overlooked factors in developing community resilience is an understanding of the pre-event health of the community, including the prevalence and distribution of chronic disease and the ability of the population to access timely and appropriate preventive health services. Communities with a greater proportion of residents with chronic conditions, such as obesity, kidney disease requiring ongoing dialysis, or other conditions requiring durable medical equipment, will generally require more medical support before, during and after a disaster (Kailes & Enders, 2007; Ku & Matani, 2001). Further, we know some subpopulations, such as racial/ethnic minorities, generally suffer more from disease and injuries and have the lowest rates of health insurance (Centers for Disease Control and Prevention (CDC) & Office of Minority Health and Health Disparities (OMHD), 2009). Thus, considering the availability of health services that reduce access barriers for these groups can have a positive impact on a community's pre-event preparedness. As described in more detail in the section on social and economic well-being, we know that people with less income, education, and wealth are also more likely to lack health insurance. People without insurance tend to be sicker and as a result are less able to withstand the trauma of a health incident.

##### **Acknowledgement of community health vulnerabilities includes planning for health services and altered standards of care.**

The narrative of disastrous events during the last decade has illustrated the devastation that can be created as a result of significant health incidents, particularly for populations historically marginalized by physical vulnerabilities. Mechanic and Tanner (2007) define vulnerability as “the susceptibility to harm, which results from an interaction between the resources available to individuals and communities and the life challenges they face.” Populations are vulnerable in a public health incident if they have difficulty accessing or using resources that are offered as part of standard preparedness, recovery, and response plans (Norris et al., 2008). Further, residents are vulnerable as a result of factors such as poor health status and limited neighborhood health resources that may interact with the emergency risk to compound the likelihood of harm in the event (Andrulis, 2007; Fothergill et al., 1999). For example, disabled populations, the elderly, and others with functional limitations (disabilities associated with acute medical conditions, chronic diseases, and other health conditions) are vulnerable because of a reduced ability to see, hear, speak and understand, remember, move or walk independently, or respond quickly (Kailes & Enders,

2007). Such limitations may impede an individual's ability to recognize, understand, and independently escape from danger.

Given these issues, it is critical to consider the plans for populations who have health vulnerabilities that may place them at greater risk during and after an incident. This includes planning for home care and medications, particularly if health infrastructure is devastated by disaster and thus takes extensive time during recovery to rebuild. In addition, populations may need greater care during the event due to their frailties, and these accommodations must be accounted for in plans for shelters and at hospitals (National Council on Disability, 2005). For example, consideration is essential regarding whether there are plans for rapid health services for those most in need, quick health assessments of those most "at-risk," and financial contingencies for those evacuated (e.g., waivers on insurance) (Brodie, 2006). Without such plans, the community may spend additional resources that further delay its ability to rebound quickly and effectively.

### **Development of the medical workforce and hospital capacity for surge and recovery periods is critical.**

Prior experience with disasters has shown that medical personnel and facilities, particularly hospitals, play critical roles in emergency response and recovery. Three critical issues affect medical workforce preparedness with direct implications for community resilience: 1) competence and preparedness training of the medical community; 2) preparation of hospital facilities; and 3) capacity and capability to conduct ongoing health incident surveillance.

First, while emergency preparedness training has improved for medical professionals (e.g., doctors and nursing staff), gaps in training remain. Most medical personnel have not received education in the psychological impact of disaster-related events (Nielsen-Bohlman, Panzer, Institute of Medicine (U.S.), Committee on Health Literacy, & Kindig, 2004), but in many cases, they act as first responders, not behavioral health specialists. For example, a study of nursing home staff after Hurricane Katrina revealed difficulties in their ability to communicate with evacuee families, prevent dehydration among nursing home residents, and address both emotional and physical health issues with the same ease (Laditka et al., 2009). In addition, many health professionals do not have adequate background in hazard protection education, immunization, health surveillance, and pre- and post-exposure physical assessment (Rogers & Lawhorn, 2007).

A second issue is hospital integration into community emergency planning. Studies have identified concerns that hospitals are weakly linked to other community emergency planning entities (Gursky, 2004; Schultz et al., 2002). A study by Braun (2006) showed that the relationships between hospitals, public health departments, and emergency responders were not "sufficiently robust." In this analysis, only 27% of hospitals reported that their community was prepared for a national security event, less than half reported that their community emergency plan addressed laboratory testing, and only about half of the hospitals were linked to a state Health Alert Network for disease reporting.

This issue of disease reporting represents a significant concern for community resilience. If a community cannot adequately monitor disease incidence over the course of response, then its ability to recover quickly is compromised. For example, in a study of Kentucky's emergency preparedness, Williams (2008) showed that there are concerns about the ability of the state public health workforce to adequately monitor communities' health status. This ability was defined by a perceived need for training and level of confidence to recognize unusual events that might indicate an emergency situation, to follow procedures for a suspected emergency situation, and to report actual emergencies to the appropriate individual(s). Siström & Hale (2006) revealed that community and public health nurses are not well-utilized in outbreak investigation and, in some cases, are not as prepared as they could be to contribute to these investigations and to apply their skills to address disease spread.

### ***Knowledge Gaps***

While some studies highlight the challenges of addressing the health needs of at-risk populations and of examining the inadequacies of medical workforce training, we still have very little data linking the physical health of a community to the resilience of that community. For example, most of our analyses are retrospective and lack comparison sites to which we can assess the physical health factors that distinguish more or less resilient communities before and after disaster.

In addition to these methodological limitations that impede most of the community resilience literature described here and in later sections, there are questions that need to be addressed. First, we have limited understanding of what factors contribute to a community's ability to maintain the physical health of its population post-disaster. This includes monitoring health outcomes in the recovery period. Further, we have little information about continuity of care for those residents needing long-term follow-up services. Second, we do not know how improvements in resident knowledge regarding appropriate use of health services contributes to less stress on the system of care and ultimately a community that can rebound quicker after disaster. This issue of health literacy is described in greater detail in the section on effective risk communication. Finally, even if we know the pre-disaster physical health state of the community (e.g., percent with chronic conditions requiring home care), we do not have the plans yet to adequately incorporate those data into preparedness plans as well as into expectations for the length of a specific community's recovery period.

## **Psychological Health**

### ***Overview***

In addition to physical health, psychological health is both essential for and a desired result of community resilience. In order for a community to withstand and recover from a disaster, its members must be prepared to function to help themselves and others. It is therefore critical to sustain an overall level of mental health, or psychological wellness, which provides individuals with coping resources. Psychological wellness is defined as 1) the absence of psychopathology, 2) healthy patterns of behavior, 3) adequate role functioning at home, school, and/or work, and 4) high quality of life (Norris et al., 2008). Norris and colleagues, as well as Pfefferbaum et al. (2009), propose that population wellness, in measuring overall mental health and quality of life, serves as an appropriate indicator of community resilience and adaptation.

Disasters can have traumatic effects on individual psychological health and population wellness. Such events unleash a number of stressors, such as mass casualties, displacement, and loss of property or financial resources. The psychological implications of these stressors are to deplete coping resources, threatening individuals' social connections and destroying people's beliefs about the world's safety or predictability (Hobfoll et al., 2007).

The loss of these coping resources leads to psychological distress (Abramson et al., 2008), particularly affecting children (Joshi & Lewin, 2004) and vulnerable populations. For instance, after the 9/11 attacks, neighborhood-level income inequality was found to be associated with depression in lower-income people (Ahern & Galea, 2006). People with marginal levels of social support, such as the elderly, may also be at risk (Elmore & Brown, 2008; Hobfoll et al., 2007). Furthermore, first responders, health workers, and leaders – themselves often part of the affected community – may be impaired, as individuals' own distress may affect their decision-making and thus ability to function effectively (Comfort, 2005; Masten & Obradovic, 2008). Reissman et al. (2005) also note that the retention of a capable emergency workforce is heavily dependent on the psychological impact of stressful, continual health threats.

## ***Key Themes***

### **The availability of psychological resources is essential for reducing potential psychological distress during and after disaster.**

Individuals' available coping resources function as a buffer against psychological distress. Thus, a resilient community must have not only material or physical resources, but also sufficient psychological resources (Pfefferbaum et al., 2009). Material and economic resources are clearly important - their loss is associated with increased psychological distress (Benight et al., 1999). However, as Masten and Obradovic (2008) point out, psychological resources are needed, which specifically help residents cope with stressors associated with disaster (e.g., psychological first aid).

### **Rapid dissemination and implementation of these psychological resources is critical.**

Theoretical frameworks of post-trauma mental health suggest early psychological interventions after disasters are important in rebuilding coping resources. Riddell and Clouse (2004) note that in the immediate aftermath, disaster survivors may be too overwhelmed to act appropriately to take protective actions. They argue that, "at the point of impact, *orientation* is the critical protective factor in promoting recovery for survivors." To reduce psychological distress, resources to disaster victims must be provided to disaster victims as quickly as possible (Benight et al., 1999).

### **Fostering a sense of coping self-efficacy is integral to reducing the negative psychological impact of disaster.**

An important psychological resource is coping self-efficacy, or an individual's "perceived capability for managing posttraumatic recovery demands" (Benight & Harper, 2002). By motivating survival behaviors, these self-efficacy beliefs are necessary for adaptive functioning, and serve as an important mediator between resource loss and psychological distress (Benight et al., 1999). Low coping self-efficacy is associated with poor psychological health (Abramson et al., 2008), and may increase emotional distress and impair actual coping behaviors (Benight & Harper, 2002). Individual self-efficacy can also help build collective efficacy, and community networks. Families and communities can facilitate recovery and resilience by reorganizing social structures and "sharing acknowledgement of traumatic event, sharing experience of loss and survivorship" (Walsh, 2007). These social structures can then feed back into individual resilience. According to Steury et al. (2004), the efficacy of coping by talking with friends and family "hinges on the ability of the individual's environment and social network to respond to that call."

### **The content and availability of risk information/risk communication materials is vital for increasing coping self-efficacy before and during an event.**

Coping efficacy may also depend on the amount of useful information a person possesses. For example, knowledge about one's coping options in a disaster likely increases the chances that an individual will feel capable to act effectively. Accurate and timely information, perhaps disseminated by preemptively educating the public, may thus be an important psychological resource by increasing coping efficacy. Such knowledge can also influence risk appraisal (Reissman et al., 2005), or the perceived severity of stressors. Perceiving a traumatic event as less severe, or more easily manageable, may in turn lessen psychological distress (Norris et al., 2008).

### **Psychological interventions during and after a disaster should enhance a community's sense of mastery and efficacy.**

In the wake of a disaster, world views may be shattered, as people struggle with the "unfairness" of their losses. An important part of resilience is thus "regaining a sense of coherence, rendering the trauma experience more comprehensible, meaningful, and manageable" (Walsh, 2007). Benight et al. (1999) recommend interventions designed to allow people to feel mastery and a sense of control

over their situation (Benight et al., 1999). Hobfoll et al. (2007) propose five “empirically-informed” intervention principles to guide interventions after disasters and mass violence: sense of safety, calming, sense of self- and collective efficacy, connectedness, and hope. The authors suggest a number of possible ways to achieve these principles, such as how to work with media to communicate information that “conveys safety and resilience rather than imminent threat,” and working to quickly reconnect families and other social structures.

For children, a critical early intervention is to increase parental attention and also parents’ coping resources (Joshi & Lewin, 2004). It is vital for children’s mental health outcomes to reunite families efficiently, reduce exposure to media coverage and rumors, and provide the opportunity to understand the traumatic event (Joshi & Lewin, 2004). Importantly for interventions aimed at regaining control and coherence, however, Hobfoll et al. (2007) note that, “empowerment without resources is counterproductive and demoralizing.” Interventions for psychological wellness and coping resources to a certain extent depend on – and thus should not neglect – material and economic resources.

### ***Knowledge Gaps***

The literature on psychological health for community resilience contains some empirical and mostly conceptual work. This literature review identifies a number of areas that require further study. Few studies review empirical work and offer policy recommendations (Norris et al., 2008; Riddell & Clouse, 2004). While there are a number of empirical psychological studies after disasters (Abramson et al., 2008; Ahern & Galea, 2006; Benight et al., 1999; Mitchell et al., 2004), there are few “clinical trials or direct examinations” (Hobfoll et al., 2007). For obvious reasons, it is often difficult (and likely impossible) to obtain rigorous empirical evidence for psychological health interventions immediately following a disaster, such as from randomized controlled trials. Thus, many of the proposed interventions and findings are based on observation, or use convenience samples (Benight & Harper, 2002). For instance, Walsh (2007) lists cases of community-based family resilience programs for disasters/terrorism but no empirical support for their effectiveness.

To address these gaps, it may be necessary to begin simply by emphasizing the importance of psychological health in disaster planning (Kapila et al., 2005). Indeed, some empirical studies of disaster preparedness or management do not directly address psychological health (Ciottono et al., 2005; Maese, 2009). In addition, there is little to explain how resilience capacities, or “community resources,” may contribute to post-disaster population wellness (Norris et al., 2008).

Cultural diversity has also not been well-addressed with respect to constructs of resources and community (Hobfoll et al., 2007; Norris et al., 2008). The extent to which world views are influenced by traumatic events may differ by ethnic group (Walker & Chestnut, 2003). Some cultural backgrounds may stigmatize mental health problems, or have difficulty communicating psychological stress (Ng, 2005; Reissman et al., 2005). In times of need, these groups may turn to or trust varying sources (e.g., clergy rather than government; Ng, 2005). Disaster planning should thus involve cultural leaders and brokers, and additional research on this topic should seek to identify “non-traditional resources” that foster resilience in diverse cultural groups.

Following from this, further research should attempt to determine how psychological interventions or resources should be allocated, and delivered to specific (i.e., vulnerable) individuals or communities. Little is also known about the cost effectiveness of post-disaster psychological interventions, for instance in comparing the costs of preventive measures versus post-disaster efforts. Hobfoll et al. (2007) argue that, “post-disaster and mass casualty interventions must also be subjected to economic modeling, and cost-benefit analyses.”

Finally, advanced technologies may be leveraged to provide cost-effective methods of risk communication, promoting social connectedness, sense of safety, and other means of fostering community resilience. Internet resources or GPS-based location tracking could help maintain communications (Kopp et al., 2007), and a web-based emergency portal could serve as a virtual meeting point (Masten & Obradovic, 2008). The ability to maintain communications and social networks would increase public knowledge, and a sense of safety and control, bolstering psychological resources. Future research on community resilience would thus be well served to explore the use of such technologies to support psychological health and population wellness.

## **Social and Economic Equity/Well-Being**

### ***Overview***

A number of groups are vulnerable to significant health incidents because they are unable to take advantage of disaster preparedness planning, response, and recovery activities (Wingate et al., 2007). Some of these populations are vulnerable because of social and economic inequities. For them, life circumstances (e.g. a lack of economic, cultural, or social resources) are barriers to identifying opportunities for aid, and for using available support services (Cutter et al., 2000; Mechanic & Tanner, 2007; Norris et al., 2008). When these populations are concentrated in geographic regions, it becomes much more difficult for the entire community to develop and maintain resilience in the face of disasters (Morrow, 1999; Norris et al., 2008; Pfefferbaum et al., 2005). According to Norris and colleagues (2008), in order to build and maintain resilience, communities must engage in economic development and reduce social and economic inequities.

At the root of social and economic equity is socioeconomic status (SES). The core components of SES are education, income, occupation, and wealth (Mechanic & Tanner, 2007). Each of these elements of SES has a unique impact on vulnerability and community resilience. When a disaster occurs, people who will be hardest hit are those who are already struggling to meet the needs of their families (Norris et al., 2008). In a similar way, persons who are socially and culturally isolated from mainstream society, regardless of individual economic circumstances, face additional challenges due to poor communication, low trust, or low participation in standard disaster response activities (Andrulis et al., 2007; Beaudoin, 2007; Curtis et al., 2007; Cutter et al., 2003). It is also important to note that while some populations may be vulnerable to a disaster because of a single factor such as poverty, others are vulnerable because they face a number of challenges simultaneously such as poverty and cultural or geographic isolation (Kayman & Ablorh-Odjidja, 2006; Morrow, 1999). Thus, social and economic inequities (either individually or in combination) can lead to greater risks in exposure, response, and recovery to disasters.

### ***Key Themes***

#### **Low SES households are exposed to greater risk primarily because they have less capacity to prepare for emergencies ahead of time.**

People of low SES often live together in neighborhoods that are particularly vulnerable because of the increased impact some emergencies will have on housing of dense construction or of poor quality (Curtis et al., 2007). These conditions can increase the chances that an event will result in greater harm including increased mortality and greater economic and material losses (Norris et al., 2008; Morrow, 1999).

A number of authors note that addressing these economic inequities prior to a disaster can mitigate its impact and increase overall community resilience (Andrulis et al., 2007; Fothergill et al., 1999; Norris et al., 2008). According to Pfefferbaum (2005), resilience depends on ongoing investments in physical resources including schools, health facilities, job training and neighborhood development.

Mechanic and Tanner (2007) frame this idea in terms of changing the focus of disaster preparedness from short term remedies for specific vulnerabilities during and after a disaster to a longer term focus on addressing the underlying causes especially by targeting degraded communities with intensive efforts. They further suggest that this idea can be operationalized by expanding poverty policies like Social Security and the Earned Income Tax Credit, and expanding educational opportunities.

**Social and economic inequities may also reduce community resilience by reducing the capacity of individuals to use their own resources to respond to a disaster.**

In general, disaster response activities can include leaving an area ahead of a disaster and returning once the disaster has subsided. However, low-income populations may not own cars or have access to extra cash for temporary housing (Morrow, 1999). To combat this, public health and emergency managers can do several things including creating evacuation plans that do not rely on individual resources and providing premade home disaster kits for low-income populations (Morrow, 1999).

Low education and literacy make communicating appropriate response activities difficult for some populations. To combat this, messages can be tailored to persons with low literacy by using audio and visual aids and use multiple media to convey public health information, including radio, television, print, and the Internet (Andrulis et al., 2007; Chen et al., 2007; Fothergill et al., 1999; Shiu-Thornton et al., 2007).

At the broader community level, these and other difficulties in response related to social and economic inequity can be addressed by coordinating efforts with relevant community based organizations (Norris et al., 2008).

In addition to low SES, cultural and linguistic isolation can shape communication and meaning, perceptions of risk, and the capacity to understand public health messages making these individuals less likely or able to respond appropriately to a significant health incident (Andrulis et al., 2007; Carter-Pokras, Zambrana, Mora, & Aaby, 2007; Chen et al., 2007; Fothergill et al., 1999; Shiu-Thornton et al., 2007).

One implication of this is that some populations (racial and ethnic minorities, immigrants, rural populations) may rely more on news media, neighbors, friends, or family for critical information rather than government agencies. This may be especially true when those sources are of the same racial or ethnic background or speak the same language (Carter-Pokras et al., 2007; Chen et al., 2007).

Another implications is that these populations may also have lower trust in government/public health, making them less likely to cooperate in an emergency by heeding public health warnings or by complying with public health orders or recommendations (e.g., to become vaccinated, to evacuate, to shelter in place) (Blanchard et al., 2005; Brodie et al., 2006; Cordasco et al., 2007).

**Social and economic inequities affect the depth of the impact of a disaster on vulnerable populations and the length and quality of recovery efforts.**

Poor households and communities are likely to recover more slowly, and may not ever get back to pre-disaster functionality. This not only reflects current low resilience, but impacts their future resilience by making them more vulnerable to new hazards (Morrow, 1999; Pfefferbaum et al., 2005).

Low SES reduces the ability to absorb losses and recover (Cutter et al., 2003). Neighborhoods and communities that are poor prior to a disaster risk further decline during reconstruction due to the abundance of poorly built and inadequately maintained houses, vulnerable locations of housing such as in floodplains, the greater number of homeless persons, and their decreasing capacity to find homes after a disaster (Norris et al., 2008; Morrow, 1999). Morrow's (1999) review of the research related to the impact of neighborhood poverty on disaster recovery revealed additional factors that lead to slow or uneven recovery:

- Persons with unstable employment will have less access to jobs after a disaster either because the jobs are no longer available or they will not be able to travel to accept positions that are available. Low educated persons cannot take advantage of employment opportunities related to clean up and reconstruction, which require a specific skill set. Those who depend on the informal employment sector (e.g., domestic labor) also lose access to employment during recovery.
- Poor persons are likely to require substantial government assistance (e.g., refugee camps, mass shelters, and temporary houses) and tend to remain in these arrangements longer, draining resources away from other recovery efforts and increasing the vulnerability of the community. If longer term plans are not put in place to relieve the burden that poverty places on communities, it will be critical for planners to identify areas that will be high need in a health incident and plan for these longer term assistance arrangements. Planning for this is important.
- Poverty leads some families to “double-up,” but complex family arrangements can have greater difficulty getting appropriate assistance and less capacity finding new housing after a disaster. Emergency managers should understand the extent to which these family arrangements exist in their community and take steps post disaster to address their needs.
- Low education and skills can also make negotiating response and recovery processes (filling out forms) more difficult.

Similarly, low SES persons have more adverse physical (Morrow, 1999) and psychological consequences (Norris et al., 2008) after a disaster. Thus, further increasing their vulnerability to future disasters and highlighting their current lack of resilience.

In rural communities, low resources due to poverty and geographic dispersion mean that in the aftermath of a disaster, local public health departments, rural health centers, and other organizations may be stretched too thin or be inadequately equipped to handle the unique needs of their community (Dobalian et al., 2007).

Cultural differences can also affect recovery. They may cause misunderstandings about the nature and availability of recovery resources, or lead to mistrust between response agency workers and minority persons (Cutter et al., 2003; Morrow, 1999).

Low political power concentrated among poor persons may also be a source of constrained recovery (Morrow, 1999; Cutter et al., 2003; Norris et al., 2008). Since resiliency depends on family and community political power and since social and political structures are often not purely objective, the interests of poor persons and communities may not be understood or met. Renters, for example, have little say in whether their houses are protected. Unincorporated and rural communities may have too few advocates to be effective (Morrow, 1999).

### ***Knowledge Gaps***

While there is a relatively clear understanding that the social and economic issues of a community have an impact on its ability to respond and rebound quickly from health-related emergencies, we have not made concurrent investments in addressing these inequities as a strategy to enhance community resilience. Further, we have little evidence on what strategies will be the most effective. First, we need an examination of what short-term public policies and plans can be enacted during a health incident to mitigate the negative impact of low socioeconomic status, with attention to what has worked in prior events. Second, an analysis of how resilience planning can involve the economic and social service institutions in a community is merited. To date, these agencies have been more engaged during the recovery period, and even then, their involvement is somewhat limited. To truly strengthen a community's resilience, these social and economic determinants of health must be addressed in parallel.

### **Effective Risk Communication**

#### ***Overview***

Risk communication is broadly defined as the interactive process that involves the exchange of information between parties about a sensitive issue (Committee on Risk Perception and Communication & National Research Council, 1989). Key components of risk communication include the “message” that is being conveyed, the “messenger” who delivers the message, and the medium through which the message is delivered. According to Andrulis et al. (2007) effective risk communication means selecting messages, messengers, and strategies for delivery that succeed in disseminating risk information across the stages of a disaster. A large literature exists supporting the importance of risk communication for helping individuals prepare for, respond to, and recover from disasters. Far less literature focuses on the importance of risk communication as it relates to community resilience. Yet, effective risk communication is essential to resilience because on the most basic level, it protects physical health by providing accurate information about dangers and behavioral options for mitigation. It increases knowledge and therefore bolsters a community's adaptive capacity. In addition, effective risk communication builds trust and overcomes distrust, which can have important consequences for mental health, likely adherence to government recommendations, and social cohesion. Finally, messages and media shape how disaster is framed in ways that influence individuals' understanding of an event and consequently, their mental health following a disaster (Norris et al., 2008).

#### ***Key Themes***

**Communication strategies and content should acknowledge the individual beliefs and community norms that shape expectations of what is to be done before, during and after event.**

Paton et al. (2008) found that individual beliefs about risk and preparing for pandemic influenza are associated with how risk management strategies are developed by health agencies which, in turn, influence community resilience. Based on their analytic model, risk communication and public education strategies must address citizens' expectations, the social context (including level of participation and ability to problem-solve) as well as health agency empowerment and trust. Specifically, effective public health education and risk communication will be strengthened if strategies encourage a dialogue among members of the community about risks and how to best use resources and information to address the consequences. Also if trust in public health officials is low in the community, then approaches to build up that trust in advance of a disaster are necessary through community partnerships, lay health advisor training, and using appropriate channels for delivering risk information (Quinn, 2008).

**Strong communication networks are critical for resilience. These networks should rely on diversity of mode and content as well as ability to link social networks effectively.**

In our review of the community resilience literature, we identified nine articles that highlight features of risk communication within the context of community resilience. Of these articles, only three provide limited empirical evidence (Buckland & Rahman, 1999; Nates, 2004; Paton et al., 2008) through cross-sectional retrospective observation or case study. The other seven offer innovative ideas and identify promising strategies for building community resilience based on theory or critical review (Andrulis et al., 2007; Dawes et al., 2004; Norris et al., 2008; Quinn, 2008; Schoch-Spana, 2008; Steury et al., 2004).

The risk communication process begins *before an event occurs*. This is because it is necessary for a community to understand the public's needs, vulnerabilities, barriers, and corresponding knowledge about how to deploy the most effective communication strategies tailored to a variety of population subgroups. For example, if low literacy or language barriers are a particular vulnerability for a segment of a community, then it is necessary to use messengers who are trained to communicate with those who have special needs and to create messages appropriate for low literacy populations to comprehend. Translation of materials alone is not sufficient; adaptation and tailoring to meet the community's needs is necessary (Andrulis et al., 2007). Communications must be offered in multiple modes (using pictorial media and trusted messengers in addition to written materials) as well as in multiple languages.

Other risk communication strategies to strengthen community resilience that have been recommended in the literature include having a communications infrastructure in place beforehand (Norris et al., 2008). Nates (2004) provides specific examples of communications systems. These include considering a regionalized communications center and network plus having battery-operated internal and external communications systems readily available in the event of a power outage. Similarly, Schoch-Spana (2008) suggests having communication networks that integrate the judgment and wisdom of health care providers (e.g., physicians, emergency responders), health officials, representatives from diverse public groups, and trusted citizen representatives with appropriate risk communications training.

Risk communication also enables appropriate community response *during a disaster*. Effective risk communication increases compliance with recommended countermeasures and responses which, in turn, contributes to community resilience. Norris et al. (2008) contend that "good communication is essential for community resilience or capacity." This requires the development of commonly understood principles in a system that invites and values the needs and viewpoints of those in the community. Therefore, opportunities to build trust should include public involvement and open communication during a crisis (Dawes et al., 2004). Ideally, community representatives who are trusted in the community and trained in risk communication will be employed to deliver public health messages during a crisis. These messengers should provide timely and accurate information but not overwhelm the public with too much information at any given time, and keep the communication channels open (Norris et al., 2008; Paton et al., 2008; Quinn, 2008). Providing consistent information about risk is essential, and risk communication is a way to ensure that the messages are taken seriously. It is also critical to present the facts of a disaster in a balanced way and to include actions that can be taken to minimize risk. In particular, individuals and organizations need to establish and maintain effective interactions across networks particularly through collaboration and knowledge sharing (Dawes et al., 2004). Buckland and Rahman (1999) note that along with equal partnership, mutual respect between citizens of the community and government agencies and open, two-way communication are an essential ingredient of community effectiveness in disaster management.

Steury (2004) provide useful lessons and recommendations about the importance of risk communication for community resilience in the *aftermath and recovery phases of a disaster* in their review of crisis intervention and disaster mental health following the 9/11 terrorist attacks as well as the anthrax contaminations and sniper shootings in the District of Columbia. As in the pre-event and event phases, they suggest using trusted neighborhood opinion leaders who are resourced, informed, and cultivated to serve a role in inter- and post-event communications. They also emphasize the importance of long-term coping and mental health preparedness messages that are released and sustained over time through existing public health messaging channels such as community health fairs and public service announcements. It is also essential to accelerate communication systems after a disaster to facilitate coordination among different service agencies and the deployment of volunteers to help provide outreach and accommodate increased demand for recovery services (Norris et al., 2008). The time period following a disaster is also an ideal time to conduct formative research to identify those audiences most affected so that their needs can be addressed now as well as in future events (Quinn, 2008). Such research can be conducted in the form of public forums that engage community partners to discuss and evaluate communication efforts and after action reports to the community describing what worked well and where there is need for improvement. The aftermath of a disaster also presents opportunities for determining whether additional types of training are needed for messengers and for revising existing risk communication materials.

### **The underlying literacy, particularly health literacy, of the community supports its ability to process messages, take action, and plan for recovery.**

Experts have noted that literacy is critical for community resilience, especially for racial and ethnic minorities (Quinn, 2008). The negative consequences of low health literacy include compromised abilities to make informed decisions about health issues, to respond to emergency preparedness messages, and to mitigate environmental health threats. As a result, low health literacy leads to poorer health outcomes and greater environmental injustice at the community level (Zarcadoolas et al., 2007).

Because of these diverse consequences, population literacy is a distinct component of community resilience. Low literacy not only influences how individuals receive and process messages, but how they navigate complex disaster settings and the recovery environment. Nevertheless, the literature often discusses population literacy within the context of risk communication because effective, targeted risk communication can largely overcome problems associated with low literacy. Also, risk communication can be described on a continuum that begins with the crafting and release of the message and extends to the processing of the message on the part of the receiver.

According to the Institute of Medicine, approximately 90 million people in the U.S. have difficulty understanding and using health information (Nielsen-Bohlman et al., 2004). While the magnitude of this problem is large, public health officials can employ multiple strategies. In the pre-event stage, a key community resilience-building activity is to assess the health literacy of the community and variations among particular subgroups within the community. During the event itself, messages can be simplified and contextualized for low literacy populations. Finally, in the aftermath of disaster, communities can work to improve overall literacy through public education and policy.

### ***Knowledge Gaps***

While we have some understanding of the importance of risk communication in preparedness, we continue to have little empirical evidence that connects risk communication to community resilience. Most literature is based on concept or theory. However, there are two main gap areas. First, Andrulis et al. (2007) emphasize that resilience for diverse communities must use community engagement strategies to ensure that risk communication messages are properly disseminated. This approach will require agencies and providers to tailor public health messages, use trusted

messengers, and use channels that maximize knowledge and increase adherence. However, there is no study to date that has formally evaluated the effectiveness of these strategies on community resilience.

Second, while health literacy (both traditional and preparedness-specific) shapes how risk communication is received, processed, and acted upon, we have little analysis of how health literacy can be enhanced in order to strengthen community resilience.

## **Integration of Organizations (Government and Non-Governmental)**

### ***Overview***

The integration of organizations – from big to small, diverse to homogeneous, in the biggest city to the most rural locations – serves to strengthen the whole, to form a social system that can adequately prepare for, respond to, and recover from disasters. Unlike individual resilience, community resilience inherently involves a collection of individuals, groups, and organizations for which its integration and collaboration enhances the capacity for recovery. For community resilience, it is the case that the whole is bigger than the sum of its parts. Norris et al. (2008) charge that “community resilience is a process of linking a set of networked adaptive capacities” and that organizational linkages help build collective resistance.

As the field of health security expands its framework from one of “disaster vulnerability” (i.e., underlying susceptibility or potential for harm) to “disaster resilience” (i.e., ability of a social system to respond to a disaster) (Cutter et al., 2008), the concept of the role of organizations and community partnerships in disasters and the concept of adaptive capacities gain bigger attention. From an ecological system perspective, community resilience is inextricably tied to the integration of its organizations and people, in other words, its social fabric.

Before, during, and after a disaster, local organizations play a key role. In a pre-disaster phase, community partnerships should be developed, providing ongoing risk education, community engagement, and an opportunity to openly discuss policies and plans of action (Quinn, 2008). During a disaster, community organizations may be involved less so, but are an important conduit for receiving and distributing emergency risk communication information, providing increased capacity for response, and perhaps public-private partnerships would play a role engaging relevant supply chains (Quinn, 2008; Stewart et al., 2009). Post-disaster, community organizations continue to play a critical role in providing support services, increasing capacity, and allowing a forum for evaluation and improvement.

### ***Key Themes***

#### **Involvement and integration of government and non-governmental organizations can enhance response and recovery capacity, a key aspect of resilience.**

Integrating organizations that have not been part of disaster planning in the past can engage new partners into health security and increase capacity. Faith-based organizations and other NGOs are existing community entities with strong ties to the local community who may not have been a part of disaster teams (Baezconde-Garbanati et al., 2006; Pant et al., 2008). These organizations can help to engage local people who can be vital assets. In the case of a nursing school in Kentucky, a mock drill brought together the university with the community and now both students and areas on campus can be utilized in the case of a mass vaccination clinic (Wise, 2007). Other ways to involve new partners is in the area of public-private partnerships whereby we can increase critical infrastructure through memorandums of understanding prior to a disaster and improve the ability of a community to recover from a disaster (Stewart et al., 2009).

**The diversity of resources and availability of capital for strengthening resilience can be maximized by greater organization involvement.**

Loosely organized systems of groups, networks, or organizations increase both the volume of resources (by pooling them) and the diversity of resources (by the greater amount of variation) (Norris et al., 2008). This is perhaps the biggest benefit to having a cooperative system of organizations and coalitions to call on in a health incident. Groups who are organized ahead of time can play key roles in times of disaster and can provide important resources not otherwise had. For example, mental health agencies could support community resilience by providing critical psychological first aid. Resources could come in the form of personnel, land resources, community events, ways of reaching the wider community, and other in-kind or cash assets. Baezconde-Garbanati et al. (2006), in a study of 27 non-governmental organizations (NGOs) across 12 states in the National Alliance for Hispanic Health, discuss how grassroots organizations brought resources such as staff with increased bilingual language capacity and cultural awareness, new avenues for communication, and a strong contingency base. Norris et al. (2008) describe these types of organizational assets as “social capital” or the concept that “individuals invest, access, and use resources embedded in social networks to gain returns.”

**Integration of organizations can increase trust and knowledge, thus contributing to the ability of communities to enhance plans and speed recovery.**

Organizations within the community have oftentimes worked to gain the public’s trust through years of interaction and service that government may not have. A health department, for example, partnering with a local NGO might be able to better maximize participation in emergency readiness because community members, and more often minority communities, trust NGOs over local government. Community partners may also advise on creating a culturally proficient emergency plan which can increase trust as well as use forums and other channels to address health concerns (Baezconde-Garbanati et al., 2006; Quinn, 2008).

Increased collaboration brings not only resources but increased knowledge. Working with new partners adds to the collection of minds working on the same issue. Additionally, changes in attitudes towards other organizations may occur as individuals and organizations learn to work together. Disaster planners can also utilize community partners to provide feedback and evaluation of policies and procedures.

**Integration of organizations can enhance non-disaster collaboration, which improves community resilience and well-being.**

In the event of increased collaboration and integration among organizations, new community partnerships can be formed and leveraged with positive effects for the whole community. In the mock drill mentioned above, the university collected new contacts for clinical rotations, including mental health contacts, and connections were made between the community and university providing new guest speakers to the school of nursing and other departments (Wise, 2007). This demonstrates that partnerships can be leveraged not only for disaster planning but for larger health goals as well. This can be particularly important for making the case for funding collaboratives, coalitions, roundtables, etc. If resources to help increase community resilience can also boost regular public health activities its “dual use” may increase its funding stream.

Ultimately, engaging local groups and organizations in disaster efforts creates a “unified effort” which could be stronger under distress and result in increased community resiliency.

### ***Knowledge Gaps***

Collective involvement in planning, responding, and recovering from disasters will require new knowledge and understanding of local organizations. For example, how prepared or unprepared are community partners? That is, many community based organizations and NGOs have a high desire to be involved but may lack readiness, prior experience, or have disaster plans in place for a large-scale disaster (Baezconde-Garbanati et al., 2006; Pant et al., 2008). In one study of faith-based organizations that opened shelters in Mississippi in the aftermath of Hurricane Katrina, 75 percent did not have disaster plans in place prior to Katrina and yet made up a majority of shelters that remained opened for at least several weeks (Pant et al., 2008).

Many other areas command research attention as well. For example, how can we know what resources various networks or organizations can provide and how can we most effectively collect and disseminate that information to its best use? For those areas that are not involved already, what is the best way to build capacity and work with local partners? How formal or informal should these networks be? What is the best way to create public-private partnerships? How do you create clear roles? How can they best be leveraged? One strategy utilized among rural communities in Texas was a Rural Health Roundtable in which various communities came together to utilize their strengths and overcome resource deficits. The Roundtable format allowed them to collectively brainstorm ideas and needs, engage participants and different local organizations, do follow up evaluation with stakeholders, and overall use a community approach to enhance disaster preparedness (Pennel et al., 2008).

Lastly, in our understanding of the integration of organizations and community resilience, what are good ways to measure the effectiveness of organizational linkages? How do we know this is helping to achieve health security? Varda et al., (2008) begin to describe the challenge of evaluating the success of public health partnerships and propose a series of core dimensions of connectivity which can be used to measure progress (e.g., membership, network interaction, role of the health department, strategic value of partners, trust, reciprocity). That is, by measuring a set of relationship indicators over time we can perhaps do some “relationship budgeting” that can serve to both evaluate and improve collaborative partnerships.

### **Social Connectedness**

#### ***Overview***

Social connectedness refers to the personal (e.g., family, friend, neighbor) and professional (e.g., service provider, community leader) relationships among community residents. Relationships can vary in closeness (acquaintance vs. close friend), and can be with individuals that are similar in status (i.e., horizontal or parallel) or with individuals of varying status and power (i.e., vertical or hierarchical). When residents have relationships with other members of their community it increases their attachment to the community, access to real and perceived social support, social capital (i.e., feelings of trust and norms of reciprocity that develop as a result of relationship; (Putnam, 2000)) and promotes a sense of community (i.e., “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together,” (McMillan & Chavis, 1986). Research has shown that individuals who live in communities with these characteristics (i.e., healthy communities) have better psychological, physical, and behavioral health (Varda et al., 2009).

Disasters can damage social routines with organizations (e.g., churches, schools, restaurants) and disrupt the usual way in which people interact, changing the structure and composition of these social networks during and after a disaster. However, little is known about whether the same characteristics and capacities, that allow communities to thrive on a daily basis, can improve the

resiliency and security of communities and how changes in social networks that occur during and after a disaster affect communities' ability to keep residents healthy and safe.

During all phases of a disaster (pre, during, and post), community residents and organizations can use personal and professional relationships to send and receive informational messages (see section on Risk Communication), and for instrumental and emotional support (Magsino, 2009). However, social networks can also be leveraged when planning for, responding to, and recovering from a disaster.

Our literature review identified 20 articles that offer insight about how social connectedness and the structure and composition of social networks relate to community resilience. Of these articles, ten provided empirical support linking social connectedness to community resilience or disaster preparedness and response (Birmes et al., 2009; Buckland & Rahman, 1999; Eisenman et al., 2009; Haines et al., 1996; Hurlbert et al., 2000; Moore et al., 2004; Paton et al., 2007; Procopio & Procopio, 2007; Weems et al., 2007; Yong-Chan & Jinae, 2009). The majority of empirical literature relied on correlational data collected after a disaster through survey or interview methodologies. Only one of the ten empirical articles examined social connectedness pre- and post-disaster to determine changes in structure and composition, and how social connections were used during and after the disaster (Hurlbert et al., 2000). Four articles relied on case study methodology to describe the role of social relationships during disaster response and recovery (Aghabakhshi & Gregor, 2007; Baker & Refsgaard, 2007; Murphy, 2007; Schellong, 2007). And the final six articles presented critical analyses or theoretical models based on literature review and summary (Allenby & Fink, 2005; Dynes, 2006; Lahad, 2005; Magsino, 2009; Reissman et al., 2005; Varda et al., 2009). The remainder of this section discusses the relationship between social connectedness, community resilience, and health security.

### ***Key Themes***

#### **The interconnectivity of individuals and organizations contributes to the resilience of a community.**

A resilient community can be characterized by its interconnectivity – that is, the presence of strong horizontal and vertical relationships that exist between community residents (Allenby & Fink, 2005). A case study of power outages in the U.S. and Canada suggested that a sense of collective identity among residents and strong relationships based on shared community events before the power outages contributed to community resiliency (Murphy, 2007). There is evidence that both the sense of community created by these relationships and individual characteristics of the relationships (i.e., characteristics of those involved) help improve disaster preparedness. Research has shown that people connected to community organizations and other providers of knowledge and resources during an emergency, perceive themselves to be at higher risk and are therefore more likely to engage in preparedness activities before a disaster (Yong-Chan & Jinae, 2009). In addition, people with a greater sense of community are more concerned with maintaining their connections to the community and are therefore more likely to engage in preparedness activities (Yong-Chan & Jinae, 2009).

Knowing who interacts with whom can be critical for promoting situational awareness and developing coordinated emergency response plans before a disaster occurs. In order for this to happen, emergency planners need to involve local community members in response planning to determine what social networks exist and how to activate them during a disaster (Lahad, 2005). Planners should also be aware of existing social routines in the community and prioritize efforts to reinforce and restore these routines; such efforts have been shown to increase community resilience (Baker & Refsgaard, 2007). For example, planners should think in family, rather than individual

units, and plan accordingly so that shelters, evaluation plans, and even public assistance can be given to the family unit (Dynes, 2006).

### **Diversity and number of social connections can be used during a disaster to promote resilience.**

Research has suggested that communities with many social connections can more quickly mobilize needed resources (Maysino, 2009). Although involving local social networks in disaster response can complicate decision-making, coordination, and control, events such as the September 11, 2001 collapse of the World Trade Center have shown local social networks can serve as resources during a disaster (Haines et al., 1996). During the 9/11 response, co-workers helped each other out of the towers and assisted the police and fire on scene with evacuation and first aid (9/11 Commission Report). Research has suggested the decentralized and flexible structure of these local social networks allowed them to respond quickly – and that a centralized, rigid emergency response takes longer to mobilize and can delay the distribution of needed resources, ultimately reducing community resiliency (Baker & Refsgaard, 2007).

People with a greater sense of community also try to maintain their connection to people in their area by checking to see if they are all right during a disaster and offering them needed help (e.g., transportation, food) (Yong-Chan & Jinae, 2009). Research has suggested that being part of a healthy community (i.e., one with strong social networks and sense of community) can improve survival chances and safety of community residents during a disaster (Buckland & Rahman, 1999; Schellong, 2007).

### **Ability to restore community connections rapidly post disaster can facilitate coping and recovery.**

A community's ability to confront, cope with, and adapt to changes post-disaster is a core element of its resilience. Recovery is especially difficult for communities because over time social connectedness and social support among residents deteriorates (Moore et al., 2004). Having experience successfully confronting challenges within a normal context (i.e., day-to-day interactions where residents collectively confront and resolve problems), can help prepare a community to effectively deal with significant changes post-disaster and generate a collective feeling of confidence and efficacy among community members (Paton et al., 2007). Social networks also help to build resilience by acting as key providers of emotional and instrumental support (Aghabakhshi & Gregor, 2007; Dynes, 2006; Haines et al., 1996) and as bridges to support providers for their members (Hulbert et al., 2000). For example, research has found that cohesive social networks reduced symptoms of post-traumatic stress disorder among community residents immediately following a disaster (Birmes et al., 2009).

### ***Knowledge Gaps***

While there were a number of articles that describe how social networks are related to community resiliency and disaster response, empirical evidence is still limited.

First, no empirical studies demonstrate that building social connectedness among community resident results in community resilience. Although several case studies argue that social networks helped their community to be more resilient in the face of disaster, there are no empirical studies to support this claim. Without more research, it is difficult to conclude that social networks were the only or even the most important predictor of community resiliency.

Second, social network data is scarce and costly to collect. One way to measure social connectedness is by mapping out the social networks, or interactions between people and organizations, within a community. Social network analysis, mapping out these interactions, could be a useful tool for

measuring social connectedness and in planning for disaster response (e.g., what networks are in place, which need to be built, and how can they be used for communications). However, no secondary sources of this data exist and it can be costly to collect. To date, little research has been done in this area.

Finally, few interventions have been shown to improve social connectedness. Community context impacts how social networks are structured. For example, low socioeconomic neighborhoods have more horizontal relationships in their social networks, meaning that residents are less connected to figures in local government and community and organizational leaders (Weems et al., 2007). There is limited research on how this variation impacts health security, and given the variation it is difficult to design interventions to build social connectedness that are flexible enough to be appropriate for all contexts.

## CONCLUSIONS

This literature review summarizes the elements needed to strengthen community resilience in the context of national health security by distilling the five core components most relevant to ensuring a community's well-being before, during, and after disaster.

Our analysis reveals that the collective physical and psychological health of the population before an event can affect its resource needs and length of recovery period. The psychological health of the community, particularly its relative ability to cope and use tools to support that coping, is still not addressed adequately in the pre-disaster and post-disaster recovery phases. Further, the underlying social and economic well-being of a community has implications for the ability of its residents to actively engage in preparedness activities and the ability of the community as a whole to rebound after disaster. Planning for longer-term food, shelter, clothing, and medical needs of recovering low-income and minority populations is critical, for example. Further, preparedness and response programs must acknowledge how these social and economic issues relate to family structure and behavioral norms, given how these issues inform how preparedness programs are implemented (Fothergill et al., 1999).

This understanding of community norms and expectations also has an impact on the quality, content, and effectiveness of risk communication, another key factor of community resilience. In order to engage community members more in health security planning, as articulated in the NHSS, it may be important to strengthen programs that train and deploy non-traditional communication agents, such as health *promoters* and medical interpreters, to serve as messengers of public health information. These activities may actually increase the capacity of the local public health department to communicate information in a culturally competent manner and may assist in other key tasks, such as disease surveillance after disaster (Shiu-Thornton et al., 2007). Considering the health literacy of the population is also important, but not well-understood in terms of its role in cultivating improved health security knowledge and thus fostering better individual and community resilience in the face of disaster.

Substantial evidence exists to conclude that disasters really exist at the local level. As such, engaging individuals, groups, and organizations together in a robust and integrated way helps build community assets and fosters resilience in the face of disasters and undue stress on the social environment (Morrow, 1999). Leveraging the diverse resources of community organizations, through public-private partnerships, social or cultural networks, linking support services to those in need, re-engaging community members after a disaster, all help to allow a community to be more prepared for and fully recover from a disaster. Norris (2008) suggests that poor neighborhoods, in particular, may feel safer through collaborative efforts between city governments and community based groups to identify needs and develop a mutual approach to address these issues.

Finally, our analysis shows that social connectedness is important for health security because social networks can be used for information and resource exchange before, during, and after an event. Further, these networks are essential for restoring the community, both structurally and at the "human" level of recovery (Chandra & Acosta, 2009). The building of social networks, shared resources, increased understanding, and cross stimulation can move beyond health security and can solidify a community in many beneficial ways. New community partnerships can be formed and leveraged with positive effects for the whole community.

Although the existing literature provides critical insight into the factors necessary for building community resilience, there are significant research gaps. As described throughout this review, the literature disproportionately favors conceptual or theoretical analyses, with far less empirical studies. The few studies that do assess these topics tend to be retrospective and do not allow for comparative analysis. Without this research, there is a challenge of further defining and prioritizing the critical sub-components of resilience in the context of health security. Analyses are needed to identify and test those activities that will help communities strengthen their resilience. Given the ongoing issue of limited resources, crystallizing these priority activities is the next step to moving communities towards this NHSS resilience goal.

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**APPENDIX A. COMMUNITY RESILIENCE LITERATURE REVIEW,  
DATA ABSTRACTION FORM, PAGE 1**

**Title:** \_\_\_\_\_

**Citation:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**1. Does the article provide a definition of community resilience or information that would directly guide a definition?**

Yes  No

**2. Does the article provide information on one of the following 6 factors of community resilience: social connectedness, level of social integration, health of community, effective risk communication, mitigation of health risk, or social and economic equity?**

Yes  No

**3. Does the article provide empirical or conceptual information that links resilience factors to community preparedness?**

Yes  No

**Is the answer 'yes' to one of the three inclusion criteria indicating the article should be reviewed further?**

Yes  No

**APPENDIX B. DATA ABSTRACTION FORM 2 (DAF2)**

Location: \_\_\_\_\_ Time: \_\_\_\_\_

Factors: Social Connectedness: \_\_\_\_\_ Type: RCT: \_\_\_\_\_  
Level of Social Integration: \_\_\_\_\_ Observational: \_\_\_\_\_  
Health of Community: \_\_\_\_\_ Review: \_\_\_\_\_  
Mitigation of Health Risk: \_\_\_\_\_ Study (Empirical): \_\_\_\_\_  
Social and Economic Equity: \_\_\_\_\_ Theoretical: \_\_\_\_\_  
Risk Communication: \_\_\_\_\_ Opinion: \_\_\_\_\_

Other : \_\_\_\_\_

Definition: \_\_\_\_\_

Is it compatible with the definition of Health Security? \_\_\_\_\_

Gaps in Research and/or Policy: \_\_\_\_\_

Measurement or metrics: \_\_\_\_\_

Improving Resilience: \_\_\_\_\_

Limitations: \_\_\_\_\_

Summary: \_\_\_\_\_

Notes: \_\_\_\_\_

APPENDIX C. CAPABILITY AND CAPACITY-BASED DEFINITIONS OF COMMUNITY RESILIENCE

Capability-Based Definitions

Source	Capability Definitions	Element 1 Ability to absorb/resist a disaster	Element 2 Ability to maintain basic functions during a disaster	Element 3 Ability to respond	Element 4 Ability to recover, including ability to engage in positive change and move on after disaster	Element 5 Ability to mitigate threats
(Berke & Campanella, 2006)	<u>Achieving resiliency in a disaster context means the ability to survive future natural disasters with minimum loss of life and property</u> , as well as the ability to create a greater sense of place among residents; a stronger, more diverse economy; and a more economically integrated and diverse population.					X
(Bonanno, 2004)	Resilience reflects the ability to <u>maintain a stable equilibrium</u> .	X				
(Community and Regional Resilience Institute)	The <u>capability to anticipate risk, limit impact, and bounce back</u> rapidly through survival, adaptability, evolution, and growth in the face of turbulent change.	X		X	X	X
(Community and Regional Resilience Institute)	When a community is truly resilient, it should be able to <u>avoid the cascading system failures to help minimize any disaster's disruption to everyday life and the local economy</u> . A resilient community is not only prepared to help prevent or minimize the loss or damage to life, property and the environment, but also it has the <u>ability to quickly return citizens to work, reopen businesses, and restore other essential services needed for a full and swift economic recovery</u> .	X			X	X

Source	Capability Definitions	Element 1 Ability to absorb/resist a disaster	Element 2 Ability to maintain basic functions during a disaster	Element 3 Ability to respond	Element 4 Ability to recover, including ability to engage in positive change and move on after disaster	Element 5 Ability to mitigate threats
(Dawes et al., 2004)	The capacity of a human community, whether a city, a region, or some other collectivity, to <u>sustain itself through crises</u> that challenge its physical environment and social fabric.	X				
(Gilbert, 2008)	Resilience is capacity to <u>find solutions</u> , resist hardship, care, restore function, learn new skills, change, and survive.	X		X	X	
(Keim, 2008)	Vulnerability to natural disasters has two sides: the degree of exposure to dangerous hazards (susceptibility) and the capacity to cope with or recover from the consequences of disasters (resilience). <u>Disaster resilience is composed of (1) the absorbing capacity, (2) the buffering capacity, and (3) response to the event and recovery from the damage sustained.</u>	X		X	X	X
(Manyena, 2006)	[D]isaster resilience could be viewed as the <u>intrinsic capacity of a system, community or society predisposed to a shock or stress to adapt and survive by changing its non-essential attributes and rebuilding itself.</u>	X			X	
(Masten & Obradovic, 2008)	In ecology, resilience [refers to] "the capacity of a <u>system to absorb disturbance</u> and reorganize and yet persist in a similar state". This definition emphasizes persistence or recovery to a similar state.	X	X		X	

Source	Capability Definitions	Element 1 Ability to absorb/resist a disaster	Element 2 Ability to maintain basic functions during a disaster	Element 3 Ability to respond	Element 4 Ability to recover, including ability to engage in positive change and move on after disaster	Element 5 Ability to mitigate threats
(National Research Council, 2009)	Resilience can be understood as a response to stress and can be considered as (1) a theory that guides the understanding of stress response dynamics; (2) a set of adaptive capacities that call attention to the resources that promote successful adaptation in the face of adversity; and (3) a strategy for disaster readiness against unpredictable and difficult to prepare for dangers.			X		
(Pfefferbaum et al., 2009)	Resilience refers to the ability to adapt successfully to adversity, trauma, and threat. It involves attitudes, behaviors, and skills that can be cultivated, taught, and practiced...It is not the absence of adversity and distress that characterizes resilience; rather, it is the ability to recover and progress that is its hallmark. Resilience is not an end state but a dynamic process of interdependent forces - at the individual, family, group, and community levels - that continually shape and reshape the organism. <u>Community resilience [is] the ability of social units to mitigate the effects of hazards and to initiate recovery activities that limit social disruption and the effects of future events.</u> More than individual coping, community resilience involves interaction as a collective unit...consists of both reactive and proactive elements that join recovery from adversity with individual and group efforts to transform their environments to mitigate future problems or events...implies a potential to grow from adversity that derives, in part, from deliberate, meaningful cooperation and action...in some situations, failure to change could represent a lack of resilience.				X	X

Source	Capability Definitions	Element 1 Ability to absorb/resist a disaster	Element 2 Ability to maintain basic functions during a disaster	Element 3 Ability to respond	Element 4 Ability to recover, including ability to engage in positive change and move on after disaster	Element 5 Ability to mitigate threats
(Reissman et al., 2005)	Resilience refers to the <u>ability of a community to withstand adversity</u> and maintain cohesion and healthy functioning.	X	X			
(Schoch-Spana, 2008)	In hazards research, the definition of resilience is refined to mean the <u>ability to survive and cope with a disaster</u> with minimum impact and damage. It incorporates the capacity to reduce or avoid losses, contain effects of disasters, and recover with minimal social disruptions.				X	X
(Schoch-Spana, 2008)	Community resilience is the ability of a community to <u>rebound from a disaster with a new focus on recovery and mitigation</u> and a renewed sense of <u>trust in government</u> and other community leadership.				X	X
(Steinberg & Ritzmann, 1990)	Whereas resistance refers to the capacity of a system to maintain homeostasis, resilience refers to the capacity to implement early effective adjustment processes to alleviate strain and to return to homeostasis.	X		X	X	
(Twigg, 2007)	The capacity to <u>absorb stress or destructive forces through resistance or adaptation</u> ; to manage or maintain certain basic functions and structures during disastrous events; and to recover or 'bounce back' after an event.	X	X		X	

## Capacity-Based Definitions

Source	Capacity Definitions	Element 1 Level of community knowledge about threats	Element 2 Level of community engagement/ empowerment to address risks	Element 3 Existence of social networks for response and recovery	Element 4 Existence of trust in government or public health
(Berke & Campanella, 2006)	Achieving resiliency in a disaster context means the ability to survive future natural disasters with minimum loss of life and property, as well as the ability to create a greater sense of place among residents; a stronger, more diverse economy; and a more economically integrated and diverse population. <u>Resiliency also applies to the process of recovery planning in which all affected stakeholders—rather than just a powerful few—have a voice in how their community is to be rebuilt.</u>		X		
(Pfefferbaum et al., 2007)	Community resilience is grounded in the <u>ability of community members to take meaningful, deliberate, collective action to remedy the effect of a problem</u> , including the ability to interpret the environment, intervene, and move on. Community resilience building is a population-based prevention approach with implications for individuals and groups within the community.	X	X		
(Schoch-Spana, 2008)	Where local civic leaders, <u>citizens and families are educated regarding threats and are empowered to mitigate their own risk</u> , where they are practiced in responding to events, where they have <u>social networks to fall back upon</u> , and where they have <u>familiarity with local public health and medical systems</u> , there will be community resilience that will significantly attenuate the requirement for additional assistance.	X	X	X	
(Schoch-Spana, 2008)	Community resilience is the ability of a community to rebound from a disaster with a new focus on recovery and mitigation and a renewed <u>sense of trust in government</u> and other community leadership.				X