Resilience Roundtable
Pre-Meeting Discussion Paper

Conference hosted by the Robert Wood Johnson Foundation,
convened in collaboration with RAND Corporation.

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Please note that the white paper that describes the proceedings from the Resilience Roundtable will list all meeting attendees (names and affiliations) unless otherwise noted by that participant, but will not attribute any comment or quote to a particular attendee. If you would not like to be listed, please email Clara Aranibar at *aranibar@rand.org*. We will employ Chatham House rules to the convening proceedings as well, ensuring that meeting attendees can truly speak freely and in some cases, critically about the direction of resilience science and practice.

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Introduction

Consider a community, working to help its residents achieve good health and prosperity, while struggling with the challenges of limited opportunity, chronic violence, a history of inequity, and other stresses. Add in the potential for a crisis such as a natural disaster and a picture emerges of the challenges many U.S. communities face daily. That same community, however, may benefit from cultural diversity, thriving and connected sectors, and success weathering previous challenges, all of which are critical for creating *resilience*.

Resilience can be broadly defined as the capacity of a dynamic system to anticipate and adapt successfully to challenges. In turn, community resilience can be thought of as the sustained ability of a community to prepare for, withstand and recover from adversity. In recent years, the range of social and physical stresses people and communities experience have multiplied. Declarations of natural, manmade, and technological disasters in the United States (and globally) have increased in the past decade. For example, from 2000 to 2014, the number of U.S. disaster declarations increased dramatically—65 major declarations per year on average and a total of 1,907 declarations overall.[1] Income inequality is at the highest level for the past 50 years, with the richest 10 percent of the population making over nine times more than the poorest 10 percent.[2] Climate change is creating sea level rise (expected to be 7–23 inches before the end of the century)[3] and increasing temperatures—with 2014 being the hottest year on record.[4] Further, there is compounding of these acute events with the stress and strain affecting many populations and communities chronically. For example, using 2011–2012 National Survey of Children's Health data, we know that 48 percent of U.S. parents report that their child has experienced one or more adverse childhood experiences (e.g., physical abuse, sexual abuse). In this context, the science and practice of how to foster resilience for both individuals and communities has grown in scope. Much of this work has centered on the factors that make individuals and communities more resilient and the interventions that can build resilience. Identifying what might make a community more likely to be resilient can be a powerful tool for determining what policies, programs, and research are needed to creating healthier and more robust communities that use resources more efficiently.

Today, many researchers, policymakers and practitioners are leading and funding efforts to determine the most effective ways to build resilience capacity and capability of individuals and organizations. Researchers and practitioners have begun to identify the key factors that promote community resilience,

such as the application of long-term recovery plans, the active engagement of nongovernmental or civil society organizations, and the adherence to principles of social justice. Initiatives led by federal agencies, philanthropic organizations, and state and local agencies to implement resilience frameworks and metrics are a testament to this growing set of interests.

Individual resilience work, rooted primarily but not exclusively in the field of psychology, has examined individual adaptation to stress and the personal and family attributes that nurture resilience at the individual level. Community resilience work, rooted in the fields of emergency preparedness, public health, infrastructure science, economics, community psychology (e.g., community-level trauma), and sociology, has explored the systems that can be activated before, during, and after a range of disasters to accelerate recovery and ensure that communities are not simply building back the same, but learning or "bouncing forward" in ways that leverage innovative solutions and promote equity.

Role of the Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation's (RWJF) interest in supporting the health and development of people and communities is reflected in their support and contributions to the fields of individual and community resilience. RWJF has supported resilience development through diverse approaches, including efforts to address adverse childhood experiences and to build coalitions that will actively promote health and well-being among the most underserved. The Foundation is interested in ensuring that it is motivating progress built on the best and most integrated evidence base on resilience, including support for the National Health Security Preparedness Index.
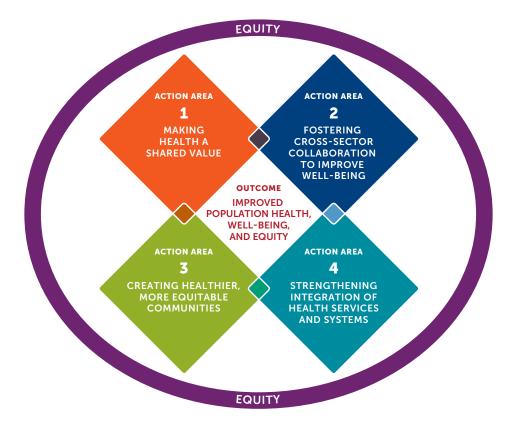
In addition, RWJF has set forth an ambitious vision to build a Culture of Health where all Americans—regardless of their ethnic, geographic, racial, socioeconomic, or physical circumstance—have the opportunity to live the healthiest life they can. This vision is rooted in the core principles of community resilience. The Culture of Health Action Framework (see Table 1 and Figure 1) promotes actions that are similar to those shown to promote resilience. Community resilience is intended to make it easier for people and places to adapt to the expected and unexpected, minimize the impact on people, and aid individuals in crafting creative solutions that make everyone healthier. Further, equity is a guiding principle of the Culture of Health, implicit in building community resilience that addresses *persistent* vulnerabilities, which not only make it more difficult for certain people and places to recover and thrive, but also undermine the collective resilience of the interdependent components of the whole community system.

TABLE 1.

CULTURE OF HEALTH ACTION FRAMEWORK ALIGNS WITH RESILIENCE PRINCIPLES AND FRAMEWORK

CULTURE OF HEALTH ACTION FRAMEWORK—ACTION AREAS	RESILIENCE FRAMEWORK
MAKING HEALTH A SHARED VALUE	Social cohesion; Mindset around collectivism
FOSTERING CROSS-SECTOR COLLABORATION TO IMPROVE WELL-BEING	Integration within and across government and nongovernmental organizations, integration across sectors and systems
CREATING HEALTHIER, MORE EQUITABLE COMMUNITIES	Placement of assets to promote health and resilience
STRENGTHENING INTEGRATION OF HEALTH SERVICES AND SYSTEMS	Alignment of activities for dual benefit in response to both everyday stresses and acute trauma

FIGURE 1.

CULTURE OF HEALTH ACTION FRAMEWORK

Purpose of the Resilience Roundtable

The Resilience Roundtable will bring together researchers and practitioners from diverse sectors to contribute their expertise toward developing a shared agenda. Resilience research that has primarily focused on individuals and families is now seeking a way to draw community science and system dynamics into analysis. Community resilience leadership is now primed to step forward in blending the discussion of human resilience with what might be called infrastructure resilience. The Resilience Roundtable will:

- Help the resilience field understand how we can better integrate lessons learned from individual resilience research, with community resilience analysis, including work from fields such as community psychology (including addressing community trauma), community science, social movement theory, and emergency preparedness.

- Identify the top research questions that should be answered to strengthen resilience policy and practice and fill gaps in understanding.

- Identify the gaps in governance, leadership and workforce development, and other areas of practice and policy that challenge the development of resilience.

These discussions will inform a post-meeting white paper, which will provide the framework for a new resilience research and practice agenda. This agenda will help guide RWJF's investments in resilience and hone future directions in resilience science to hopefully be embraced by a range of leaders and sectors. This paper will be made publicly available in late Summer 2016.

Purpose of the Discussion Paper

This discussion paper seeks to set the stage for the Resilience Roundtable by:

- Reviewing the current literature on resilience science and practice to ensure Roundtable participants, who are leaders across many fields and disciplines, come to the meeting with a foundation of common understanding;

- Identifying four potential themes around which to organize the agenda and deepen resilience research, policy and programming; and

- Provoking discussion among experts at the meeting, particularly across fields and disciplines.

These key themes are intended to inspire discussion among leaders at the Resilience Roundtable and will be further shaped and fully informed by the June 2016 meeting dialogue. Specifically, breakout groups of researchers and practitioners will come together to discuss each theme area and recommend how to:

- Enhance or revise government policy or policy development practices;

- Expand or enhance community programs and services (content, aims and outcomes) and improved delivery mechanisms;

- Better orient the workforce to resilience;

- Facilitate ongoing intersector and interdisciplinary dialogue on resilience;

- Fund future research; and

- Develop resilience measures and performance systems that can help to guide future investments.

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Brief Review of Resilience Science and Practice

In this section of the paper, we briefly summarize how resilience has been defined and approaches identified to build resilience.

Defining Resilience

Broadly, resilience can be defined as the capacity of a dynamic system to adapt successfully to challenges that threaten that 'system.' System can mean anything from an individual to an organization to a geographically or culturally bounded community.[5,6]

Community resilience can be thought of as the sustained ability of a community to withstand and recover from adversity. Community resilience conceptual frameworks often use network theory, systems analysis, environmental sciences, and ecological or social cohesion theory—theories grounded in the wide variety of disciplines from which community resilience is drawn (e.g., disaster sciences, sociology). While community can be defined a myriad of ways (e.g., by culture, ethnicity, geography), we will primarily refer to community in the context of place or geography simply for the purposes of this paper. The following definition is one that captures the developing and dynamic process of building community resilience:

> Community Resilience is the ongoing and developing capacity of the community to account for its vulnerabilities and develop capabilities that aid that community in (1) preventing, withstanding, and mitigating the stress of an incident; (2) recovering in a way that restores the community to a state of self-sufficiency and at least the same level of health and social functioning after an incident; and (3) using knowledge from a past response to strengthen the community's ability to withstand the next incident.[6]

Individual resilience has been defined *as the process of, capacity for, or outcomes of successful adaptation despite challenging or threatening circumstances,*[5,7] or the ability to withstand and positively adapt to environmental or psychological stress.[8] Individual resilience is often based in conceptual frameworks that use cognitive, physiological and adaptive processes, family stress theory, attachment theory—drawing from the fields of psychology and developmental science. However, there is rapidly expanding attention to neurobiological processes in resilience.[8–10] Resilience is dynamic and increasingly understood in terms of *process*, emerging from many interactions within and between systems. It is not an individual trait. Growing evidence implicates that the environment is also a strong driver of individual resilience. As such, the field of epigenetics has emerged to provide a useful framework for understanding how individual biology and the environment interact. In studies of Holocaust survivors and their offspring, changes to a region of a gene associated with regulation of stress hormones were found to be transmitted through *epigenetic inheritance*, demonstrating that the influence of stress can affect the genes of one's children and, possibly, grandchildren.[11] These same mechanisms may play a role in how we adapt to our environment and pass on environmental resilience.

Resilience researchers often consider factors that are correlated with, or predictive of, a group of people achieving a single positive goal, such as college graduation, having stable employment at midlife, or preventing early initiation of alcohol, tobacco or other drugs. We now know that an accumulation of different kinds of adversity drives many different physical and behavioral health problems as well as productivity and social problems. There is not a one-to-one relationship between adversity and any single outcome. Communities with high prevalence of accumulated adversity may experience many different community-level challenges. As we consider resilience research findings in the context of our relatively new understanding of the cumulative effects of experience in contexts that are also affected by cumulative experience, critical examination of assumptions about resilience will be important.

While seemingly developed in separate streams of inquiry, the definitions of individual and community resilience are quite complementary in the notions of adaptation and recovery. In short, given the interdependence between human response and the interaction with the social and physical environment, bridging individual and community science in this field is particularly important. For example, which social structures best support an individual's ability to respond and recover from a negative event, how should these structures be adapted to provide more tailored support to individuals based on both their acute and chronic stress experiences, and how does the ability of an individual to recover shape the future choices of how a community is designed or the policies that are put in place to support that resilience?

Building Resilience

While the definitions of resilience tend to organize around common words like adapt, recover or respond, how to actually build that capability within individuals and in whole community planning can take many forms. In this section, we list some of the factors related to resilience, approaches that address each of the factors, and some examples of interventions at the individual and community level that address one or more of the factors. Note, these examples are only meant to be illustrative, rather than comprehensive, of the multitude of approaches used to build resilience (see Table 1).

TABLE 2.

APPROACHES AND EXAMPLE INTERVENTIONS THAT ADDRESS THE KEY FACTORS RELATED TO INDIVIDUAL AND COMMUNITY RESILIENCE

FACTORS RELATED TO RESILIENCE	APPROACHES THAT ADDRESS EACH FACTOR	EXAMPLE INTERVENTIONS THAT ADDRESS ONE OR MORE FACTORS
INDIVIDUAL RESILIENCE[12,13]		
Attachment relationships	• Early relationships with parent figures • Can also include bonds with multiple caregivers, siblings, pets, and objects (e.g., security blankets) • Close relationship with friends and romantic partners	**Family bonding:** Project FOCUS (Families OverComing Under Stress) provides resiliency training to military children and families. It teaches children and families to understand their emotional reactions, communicate more clearly, solve problems more effectively, and set and achieve their goals. With this training, children and families learn not just to meet challenges but also to become stronger in the face of challenges.
Mastery motivation, or a force stimulating an individual to master a challenging task	• The motivation to adapt to the environment and experience reward for perceived success • Positive self-efficacy, which has been shown to promote individuals' pursuit of success and help them persist in the face of adversity	**Comprehensive soldier fitness[14]:** This program, developed by the U.S. Army, uses long-term assessment training to build the resilience of soldiers, family members, and defense agency civilians. The Global Assessment Tool assesses family, social, spiritual, and emotional fitness and drives the selection of a series of self-development resilience modules, which are provided in the form of unit training.
Intelligence, high cognitive skills and problem-solving aptitude Self-regulation including executive functions and emotional regulation	• The ability to continue thinking and planning effectively under conditions of high threat or adversity • High information processing, including the ability to process information from various sources	**Resilient first responders:** Beaton has developed a series of lessons learned on how to build resilience of first responders including fire fighters, police, and EMTs for the Department of Homeland Security. In this context, resilience is defined as the capacity of first responders to continue to function both physically and psychologically despite various exposures.
Cultural beliefs	• Religion and spirituality tied to culture • Rituals and ceremonies for social support	**Religion and recovery:** Research has shown that religion can predict psychological resilience in the face of chronic illness and trauma.[15,16]
COMMUNITY RESILIENCE		
Partnerships among government and nongovernmental organizations	• Integrated community disaster plans • Exercises that bring diverse organizations together	**Cross-sector coordination:** The 100 Resilient Cities (100 RC) network applies a City Resilience Framework to local planning and decision-making, which entails assessing a series of shocks and stresses, engaging diverse stakeholders, and then pursuing priority areas. 100 RC also uses a coordinating person (e.g., the Chief Resilience Officer) or entity (e.g., Office of Resilience) to braid efforts to build resilience capabilities in a cross-department or agency manner. **Convening:** The Annual Global Forum on Urban Resilience and Adaptation, hosted by the International Council for Local Environmental Initiatives, brings together experts and practitioners from around the world to discuss urban resilience and adaptation including resilience strategies, financing the resilient city, measuring and monitoring progress, governance and collaboration, resource management, and resilient infrastructure.

FACTORS RELATED TO RESILIENCE	APPROACHES THAT ADDRESS EACH FACTOR	EXAMPLE INTERVENTIONS THAT ADDRESS ONE OR MORE FACTORS
		Coalition mobilization: The Los Angeles County Community Disaster Resilience project (LACCDR) served as the first demonstration effort to test resilience capacity and capability at the local level. The LACCDR focused on developing resilience capabilities, such as the core components listed in the table above, to help community coalitions bring government and nongovernment leaders together across sectors, to identify where community resources are located, and to build stronger neighbor-to-neighbor ties. In an effort to strengthen organizational networks, one LACCDR coalition in La Crescenta, Calif., acquired a trailer to serve as the mobile communication center, and is now sharing this equipment with other community sectors at various events (e.g., blood drives, farmers' markets, parades, and school events) to build awareness about resilience among all community members.
Strong plans for recovery, including attending to the mental health needs of the population	• Whole community planning and evaluation efforts • Mental health first aid training	**Tracking plan progress:** The Community and Regional Resilience Institute (CARRI) developed the Community Resilience System as a means of implementing FEMA's Whole Community philosophy and improving community resilience. This model attempts to incentivize whole community planning and use of resilience measurement in order to systematically assess resilience progress. **Competing for planning funds:** The U.S. Department of Housing and Urban Development competitively awarded $1 billion to states and communities that were impacted by major disasters between 2011 and 2013 through the National Disaster Resilience Competition (NDRC). The NDRC was designed to promote risk assessment, stakeholder engagement, and resilience planning in communities where the risks of disaster are projected to increase substantially due to climate change. The grants awarded under this competition are intended to make communities stronger, more resilient, and better prepared for future natural disasters.
Development of community self-reliance or self-sufficiency	• Programs to support neighbor-to-neighbor networks • Community block planning	**Citizen engagement:** In New York City, the Department of Emergency Management coordinates the NYC Citizen Corps, an initiative that seeks to make communities safer, stronger, and better prepared to respond to and recover from emergencies. The NYC Citizen Corps brings together leaders from volunteer programs, community and nonprofit organizations, the private sector, and government to promote preparedness at the local level. The Citizen Corps conducts outreach, engages with community-based organizations, and hosts discussions and workshops to build capacity of the volunteer and emergency preparedness community. **Aligning strategies across sectors:** In Washington, D.C., Resilient DC worked to create a common strategy around a framework that identified community assets, prioritized community needs, and then set to embed resilience into all local policies and programs. This work focused on aligning efforts across city departments and determining ways to embed common resilience planning across sectors.

FACTORS RELATED TO RESILIENCE	APPROACHES THAT ADDRESS EACH FACTOR	EXAMPLE INTERVENTIONS THAT ADDRESS ONE OR MORE FACTORS
Understanding of community assets and vulnerabilities	• Asset mapping that accounts for training, competencies, and resources	**Asset mapping:** The Assistant Secretary for Preparedness and Response has used geographic information system (GIS) mapping to identify vulnerable populations with the goal of pre-positioning supports and responding more quickly in long-term recovery efforts. Efforts to decrease disparities and enhance equity (e.g., family leave policies, affordable housing)—economic, social and health—are also key to minimizing barriers to resilience because they work at root drivers that can help explain a community's ability to recover.
Identification of ways to find dual benefit by building resilience into daily practice	• Integrating emergency response planning into routine business practices, school programs • Discussing health issues in the context of both acute and chronic stress	**Economic revitalization:** The University Heights section of Newark, N.J., recently saw the arrival of one of its first full-service supermarkets. Taking over a site that had been vacant since the infamous 1967 riots, the ShopRite supermarket is not only a source of groceries for residents (half of which don't have access to a car), but has also created 350 full and part-time jobs. The new store is just one piece of a revitalization effort that is promoting not only economic growth, but also health and wellness. Businesses, government agencies, nonprofits, investors, schools, and community groups are joining together to make Newark strong again, in an initiative which also includes development of green space and mixed-income housing. **Insurance incentives:** SwissRe, a global reinsurance company, is implementing a program of resilience bonds, to offer both insurance and resilience benefits to disaster-prone cities. For example, as part of Oxfam's R4 Rural Resilience Initiative, SwissRe is allowing farmers along the horn of Africa to pay for crop insurance using their own labor.

As summarized in Table 2, there are many methods and approaches to building both individual and community resilience, which are ultimately congruent and if aligned may help to produce greater synergy for larger community benefits. For example, strong social networks in the broader community must complement building strong bonds and healthy attachment relationships at the individual level. This includes intervening to build networks among individuals and among organizations, as well as strengthening bonds in neighborhoods (e.g., building trust and community capacity to work together). When children are supported at both levels, they can better develop resilience capacity and capability. Likewise, when there is a more organized and connected network of community-serving organizations with clear understanding of what assets each organization can provide, individuals in the community have a better chance of having the resources they need to stay physically and mentally healthy and be able to respond to a range of stress. Many of the efforts in resilience building to date rest on strengthening the diversity and activity of community coalitions.

Taken together, these advancements to step beyond resilience definitions and frameworks in order to actually *test* interventions represent a key evolution of the resilience agenda nationally and globally. While this progress should be acknowledged, there are many questions that remain about how to bring disciplines together to strengthen the resilience science and identify the best practices that lead to sustained development of resilience in communities and individuals. In the next section, we provide a brief overview of four potential themes that could serve as an organizing structure for the resilience practice and research agenda (containing research, program, and policy recommendations).

Potential Themes to Guide the Resilience Research and Practice Agenda

The following four themes were surfaced from literature review and current practice, in which we note the current state of resilience science and action and remaining gaps. These themes were selected because they offer key points of potential intersection or synergy between the fields of individual and community resilience—where the key opportunities and challenges learned from research and practice in each field have begun to converge—and if taken together, may help galvanize a new and more integrated direction for the broader field of resilience. For each theme, we offer a brief summary and conclude with some key questions that we hope will provoke thought and discussion during the Resilience Roundtable. Please note that the references and examples included in this section are intended to be illustrative, rather than inclusive of the breadth of literature related to each theme.

Theme 1: Resilience should be applied across a wide variety of stresses that communities experience.

The stress response triggers a number of physiologic changes including rapid breathing, increased pulse rate and blood pressure, and a release of blood sugar and fats from storage sites in the body. While beneficial in responding to acute stress, repeated activation of this adaptive response over time can lead to negative consequences.[9,17] Recently, stress has been viewed within the context of allostasis, allostatic load and overload—allostasis is the ability to achieve stability through behavioral or physiological change, whereas allostatic load and overload refer to repeated exposure to stress and the wear and tear it can inflict on individuals and communities. In the short term, exposure to stress can be adaptive as long as allostasis is maintained. However, over time chronic stressors and the resulting maladaptive behaviors may increase susceptibility to poor physical and mental health.[10] For example, repeat activation of the sympathetic nervous system in response to acute stressors can interfere with growth during child development; an extreme example of this is psychosocial short stature, where the production of growth hormone is affected due to repeated release of stress hormones.[18] The conceptual framework of allostatic load can help to explain why stress, racial traumatization, adverse childhood experiences, or repeated exposure to environmental toxicants, can lead to health consequences across the lifespan, from vulnerability to acute exacerbations and triggering events to chronic disease. On the contrary, some allostatic responses can directly contribute to resilience by providing stability in the face of a changing environment. As such, it is critical to consider resilience over both the short-term, in the face of an acute challenge, and the long-term, as a measure of adaptive capacity over time.[8]

Furthermore, the community environments, both positive and negative, have been shown to impact allostatic load in individuals. In a large national sample of adolescents, exposure to greater cumulative neighborhood risk/stress, as defined by neighborhood sociodemographic characteristics, food and physical activity environments, family environments and crime risk, resulted in higher allostatic load. This relationship between neighborhood, family, and individual risk/stress exposure and individual allostatic load existed over and above that of household risk[19] (defined by household poverty and other parental characteristics, including allostatic load). Since stress response can vary based on past experiences of chronic stress, approaches to build resilience will need to take into account the different types of support required for communities, families and individuals based on their stress background. Accumulating evidence suggests that health disparities can be partially attributed to allostatic overload resulting from exposure to multiple physical, social, and psychosocial stressors, at the individual, household, and community levels.

Theme 1 Discussion Questions

Given the importance of considering stress or allostasis in the context of long-term and not just short-term impacts, it raises research and practice questions about how we plan for resilience building. For example:

- How does a mix of acute and long-term stress interact to weaken or bolster resilience?

- Given our understanding of how human beings adapt to experience biologically and epigenetically, how should programs and policies be designed to make sure resources are in place that both prevent and address long-term stress for a subset of the population, but are flexible enough to be scaled up for acute events that have broader population impacts?

- Does the workforce, who is building resilience, have the tools to handle acute and long-term stress?

- Are there evidence-based models for building resilience (and tracking associated progress) that can be simply applied to the full continuum of stress (acute and chronic) at the community level? Or that can be adapted to varying levels of chronic stress background?

Theme 2: A systems approach to building resilience is required.

As described earlier, many cities and organizations are not simply implementing one resilience intervention, but adopting a more holistic approach to building resilient systems (Table 2). In fact, complex systems theory is a useful framework for conceptualizing resilience. The basic tenets of non-linearity (such as the non-linear processes that characterize disaster response and recovery), adaptability (e.g., responding to environmental shocks or stressors), and connectivity (i.e., between individuals within communities and from one community to another) make them well suited to apply to resilience. Complex adaptive systems have been described as a dynamic network of agents acting in parallel, constantly reacting to what the other agents are doing, which in turn influence the behavior of the network as a whole.[20] Resilient systems must account for and adapt to the dynamic and complex interactions across different sectors (health, education, infrastructure) and between and within different levels (individuals, families, community groups, and jurisdictions[6,21]). Recognizing that these sectors and levels do not operate in silos, but rather, are agents in a larger system, is crucial to strengthening resilience. The Infrastructure-Systems of Systems Group is one example of an interdisciplinary research approach to mapping, modeling, and simulating both human and infrastructure systems to understand the impacts of climate change. By trying to map this complex system of systems, the Infrastructure-Systems of Systems Group hopes to develop new frameworks, metrics, and data architectures to help understand the interdependencies between infrastructure and humans (individuals and social networks[22]) with the ultimate goal of then deriving mechanisms through which to minimize the impacts of climate change. Similarly, research has shown that resilient individuals can draw emotional and instrumental support from their social networks.[23] As previously mentioned, this social support can help individuals to better cope with stress and may moderate genetic and environmental vulnerabilities.[24]

While the capacity to prevent, withstand, and mitigate the stress of an incident may already exist across some social networks, linking a set of networked adaptive capacities can help build community resilience.[25] In addition to resilience, the system approach that builds on capacities can ultimately ensure that well-being is achieved and a community can actually flourish post-disaster. In complex systems theory, the relationships between components give rise to the collective behaviors of a system and how the system interacts and forms relationships with its environment. This model challenges the normative thinking that every observed effect has an observable cause and that the whole can be understood by studying the pieces. One might conceptualize a complex system through the example of a jazz ensemble. Unlike other collective musical activities, such as a marching band, there is no hierarchical direction and no prescribed actions. Members of the ensemble agree to a general set of rules but are free to improvise. While the general characteristics of the music can be anticipated, each performance will be different, and is the result not of one individual, but as a response of the whole system.[26] In contrast to deterministic systems, it is impossible to predict a desired outcome from a single action in complex systems; however, an understanding of this model can help us formulate approaches to resilience.

With this model in mind, one framework to achieve resilience and well-being is through an "enterprise" approach, which harnesses a full range of government and nongovernmental organizations, communities, and individuals and calls for a high level of integration and coordination among a wide range of organizations[6] and agile leaders that can make progressive and sound decisions in a constantly changing environment, often-times with incomplete information. Because of nonlinearities and interacting relationships, it is difficult to identify possible failure points without observing how the system reacts, as a whole. But, communities can increase the volume and diversity of their resources by developing effective partnerships across the enterprise. Several elements can serve to increase the efficacy of these partnerships. Establishing and clearly delineating roles and responsibilities among partners can establish "ownership" of critical tasks and prevent confusion during and after a stressful event. Furthermore, sharing data across organizations, both governmental and nongovernmental, will also serve to streamline activities and prevent confusion. This alignment of data systems across organizations requires changes to governance that will only be possible if government leadership is invested in resilience and prioritizes sustained well-being as an outcome. However, we are seeing movement toward more integrated data systems. When possible, use of a dedicated workforce for these tasks and activities can help to maintain partnerships over time.[6]

Theme 2 Discussion Questions

If a systems approach to resilience is adopted, more sectors and stakeholders need to be engaged and a mapping of resources and assets is more critical. Further, a systems approach can be beneficial to ensuring well-being investment is happening on a consistent basis ultimately for resilience development. A systems approach also has implications for how we monitor or measure resilience progress. But key research and practice questions remain, including:

- What is the best way to design an organization or a community to maximize resilience? Where do you put the resources; how should groups work together; who should make decisions and how (i.e., what is the role of leadership); how do we account for variations in cumulative adversity of the population, etc.?
- How would the system function to promote well-being while still being resilient in the face of extreme stress?
- What are priority measures for whether a community system is resilient?

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- How do we build an efficient and resilient organization or community system? How do we extract the most benefit from activities that build resilience while not using too many or overlapping approaches?

- What policies and governance structures create barriers to cross-sector and interagency collaborations to build resilience and promote equity?

Theme 3: Cultural norms and values inform how individuals and communities build resilience.

The culture (i.e., shared values, social norms and customs[27]) and social capital (i.e., civic participation, social cohesion, trust) of a community are important influencers of community resilience. 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.[28,29] 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.[30] Feelings of cohesiveness and pride or identification with a strong community, can help bring people together to heal as a community after a stressful event.[31,32] For example, after the Boston marathon bombing, the Boston community pulled together around being 'Boston Strong,' releasing fundraising t-shirts, a blue and yellow ribbon, and tagging social media discussions with a hashtag(#). However, that same sense of community identity may present a challenge to community resilience, if individuals rebuild their houses in these areas despite the risks. After Hurricane Katrina there was great debate whether some portions of New Orleans ought to be rebuilt, given their high risk and vulnerability. The Lower Ninth Ward, a predominantly Black and low-income neighborhood, still lags behind other New Orleans neighborhoods in its redevelopment. Some have raised this as an example of how equity planning and decision-making may have important implications for the field of resilience.

At the individual level, variations in beliefs and rituals associated with the family, cultural and social environments have provided some natural experiments that highlight the importance of culture at the individual level. For example, longitudinal studies[33] of children and families suggest that factors associated with resilience (e.g., attachment patterns between children and parents, school success) vary by culture. However, one multi-country study suggested that economic development and globalization can diminish cultural impacts and there are also within-country differences that can be just as large as between country differences. For example, the American Psychological Association's Task Force on Resilience and Strength in Black Children and Adolescents (2008) found that factors associated

with Black children's identity, emotional, social, cognitive and physical development all showed unique impacts as a result of the systemic marginalization that they experienced.[34] The more that resilience is conceptualized as dynamic, reflecting the influence of culture on protective processes, the more likely it is that the resulting resilience research and practice will use culturally embedded processes. Research and policy efforts have also suggested that discrimination negatively influences child development and that a social justice agenda directed at changing the context could be an effective intervention, rather than expecting each individual child to adapt to injustice.[35,36]

Theme 3 Discussion Questions

It is clear that culture matters in how resilience is discussed and the approaches to strengthen resilience. Further, resilience cannot be discussed without recognition of entrenched issues of justice, fairness, and equity, which drive and inform resilience. Given these findings, there are new questions about how culture and community context should be integrated into resilience research and planning. For example:

- How do cultural norms and larger societal biases shape the expression and orientation toward resilience?

- How should cultural traditions and priorities be reflected in resilience programs, policies, and research?

- What ways should we harness cultural and community identity to build resilience, without leaving behind any groups?

- Are there other issues of culture impeding resilience development, and if so, in what ways or how?

- How should principles of equity (e.g., accounting for historical trauma and structural inequities that may result in varying levels of social capital) be blended in a resilience framework?

Theme 4: Resilience can be built by strengthening community leadership, workforce, educational training program capacities and capabilities.

Resilience requires active consideration of the connection between people development and placemaking, as well as among the activities that happen in social institutions and the physical conditions that surround them.[37,38] Historically, separate disciplines and sectors address infrastructure resilience (environmental, physical, etc.) and the human aspects of resilience (health and well-being, psychological resilience, etc.). But now, particularly in the context of local planning and response, there is clearer understanding that these disciplines and sectors must work together and be represented in more cohesive policies that braid the human and infrastructure aspects of resilience. In short, dynamic models that do not account for the myriad of disciplinary and sector influences are weakened because they do not account

for how community vulnerabilities and risks interact with human response, cultural tradition or other social themes.[39,40] For example, if a government leader aims to guide efforts to "*build back better*," he or she must blend together perspectives on recovery (i.e., how people cope and process compounding stress); the re-establishment or maintenance of social groups (e.g., how neighborhoods come back together) and the development of community cohesion through infrastructure investments (e.g., economic incentives, urban design, location of ecosystem services).

Given the myriad of disciplines, resilience workforce development and educational training in this field is also complex. Workforce development efforts will need to promote training and education through a transdisciplinary lens so that resilience research, programs, funding, and other resource planning reflect the myriad of disciplinary influences.[41–43] To design an effective approach to workforce development, we need to identify the key ingredients of training programs that build a resilience workforce or transition professionals from other backgrounds into the resilience field. If we assert key ingredients should align with the factors that predict resilience as noted in Table 2, how would we construct our educational and training programs? It may require a workforce with a more comprehensive understanding of ecological, environmental, and psychological frameworks and stresses as well as how these stresses operate and impact people and place. To build a resilience workforce, we may have to shift our notions of who are leaders, what their role is (e.g., top-down decision-making processes may disengage the population, so are distributive leadership models more conducive to resilience?) and how to train. However, the policies that result could simultaneously address the environmental impacts of social stress along with the resulting impacts on social cohesion and community organization. To date, leaders struggle to determine where to invest in efforts and how to develop policies that take this more integrated approach. It is not clear whether resilience leadership and workforce development can occur in the traditional workforce development systems or whether a new resilience-oriented system is required.

Theme 4 Discussion Questions

Blending disciplinary approaches can help to create a new cohort of resilience-minded leaders, but questions remain about how to develop this community leadership and construct a successful and adaptive workforce. Key questions for research and practice include:

- How should we create structures that blend resilience perspectives in community planning and workforce development?

- What is the composition of education and training programs to support resilience science and practice? How do these programs need to evolve to ensure we have the workforce needed to continue advancing the field of resilience?

- What are the metrics that tell us whether we are building a successful or productive workforce in the field of resilience?

- Does leadership look different in the context of resilience, and if so, how? What does this mean for the mental health provider, the urban planner, the teacher, and so forth?

Integrating Themes

These four themes are potential priority areas for further analysis and investment. Returning to the case example at the start of this discussion paper, we see that addressing these complex and overlapping stresses and effectively leveraging community assets will require a new understanding of the continuum of risks that communities confront, a more holistic way of approaching resilience development, and a better incorporation of cultural context in which resilience is viewed, interpreted and applied. For example, a community in which diverse leadership can work together to improve the experience of people and address physical or structural community conditions will be able to create more useful plans and policies. A workforce that understands how to communicate about acute and chronic stress together can be more impactful in identifying resilience-based solutions. Further, a community that understands how to effectively empower its residents to implement resilience-based solutions will be able to target a range of challenges without waiting for a single sector or entity to respond in isolation.

Summary and Next Steps

The Resilience Roundtable will be on June 2, 2016, with a screening on the preceding night, of Jamie Redford's new documentary, *Resilience*. We look forward to seeing you there and hearing your input on the four potential themes to guide the resilience research and practice agenda. In particular, please take a couple of minutes before Resilience Roundtable to consider:

- What themes are most important from this list? Which themes are missing?

- How should we address each theme? Are the discussion questions for each theme appropriate? What else might you add?

- What creative solutions and strategies for resilience have you seen in your work? What is scalable or transferable to other settings?

- What concerns you about current approaches to resilience? What ways should we shape the narrative?

We also welcome any feedback in advance of or after the meeting via email. (Please send to Clara Aranibar via email at aranibar@rand.org.) Please contact Joie Acosta via email at *jacosta@rand.org* or via phone at (703) 413-1100 x5324 or Anita Chandra via email at *chandra@rand.org* or phone at (703) 413-1100 x5323 with any questions or concerns.

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