

Toward an Initial Conceptual Framework to Assess Community Allostatic Load

**EARLY THEMES FROM
LITERATURE REVIEW AND
COMMUNITY ANALYSES ON
THE ROLE OF CUMULATIVE
COMMUNITY STRESS**

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Preface

Understanding the experiences of a community (defined in this report by geographic boundaries)—with a focus on how communities weather and adapt to stress—is key to grasping the true health of any population. As the Robert Wood Johnson Foundation (RWJF) pursues its efforts to advance the Culture of Health (a framework that outlines drivers of a healthier nation), it is important to examine community features that could have a stronger and more-robust orientation to health and well-being. That readiness assumes a certain level of capacity and capability to actively promote the health of community residents and to counter high levels of collective stress and difficulty. At the individual level, this construct of cumulative stress is captured by the term *allostatic load*—the physiological effects of constant or repeated exposure to stress. Allostatic load has enabled the public health sector to better explain why stress, racial trauma, and/or adverse childhood experiences have significant consequences on individual health across one’s life span, including biomarkers, chronic disease, and the associated vulnerability to specific triggering events. But the question remains on whether this concept of allostatic load could extend to the community level. Understanding community stress levels could help identify ways in which communities can address acute and traumatic events when they occur (e.g., police–community tension, natural disaster) and how such events and chronic stresses influence individual, family, and neighborhood health.

In this study, a team of researchers at the RAND Corporation examined factors that would be included in a framework to define community allostatic load. This framework could be used by public health practitioners and other community leaders to better support or mitigate stress levels community-wide and to work to create conditions that promote health and well-being. This report—containing a literature review, a sample of community analyses, and expert review—explores whether community allostatic load could be defined and how stakeholders respond to the concept, describes components of community allostatic load, and develops a proposed operational framework and a set of sample measures that could be tracked by communities.

This work is supported by RWJF and was conducted within RAND Health. For more information about RAND Health, visit www.rand.org/health. For more information about the study, contact the principal investigator for the study team, Anita Chandra, at Anita_Chandra@rand.org.

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Summary

Background

As the Robert Wood Johnson Foundation (RWJF) pursues its efforts to advance the Culture of Health (see RWJF, undated, for more details), it is critically important to examine communities (defined in this report by geographic boundaries) that are ready to create a stronger and more-robust orientation to health and well-being. Readiness to promote health and well-being is key to ensuring that people and community institutions can successfully implement interventions that will ultimately improve population health outcomes. Community readiness to build a Culture of Health assumes a certain level of capacity and capability to actively promote the health of residents and to counter high levels of collective stress and difficulty, which some communities confront disproportionately. This report presents insights from a study to examine this issue of collective community stress through the concept of community allostatic load. The goal is to develop an initial framework on the concept to ultimately help public health practitioners and other community leaders better explain, support, and mitigate stress levels community-wide; to work to create conditions that promote health and well-being; and to understand how cumulative stress may affect a community's overall resilience.

At the individual level, the construct of cumulative stress has been characterized by research on *allostatic load*, or the physiological effects of constant or repeated exposure to stress. The concept of allostatic load has enabled the public health sector to explain why stress, racial and historical trauma, and adverse childhood experiences can significantly affect individual health across one's life span. This stress can be evidenced in such ways as biomarker expression, chronic disease experience, or greater vulnerability to specific triggering or traumatic events (e.g., when a personal trauma, such as a family loss, is experienced). But the question remains on whether this concept of allostatic load extends to the community level. If individual allostatic load refers to the cumulative fitness cost experienced by an individual that is incurred through continuous adaptation to stress, then community allostatic load may be the community-level equivalent.

This initial framework development included four steps: (1) a literature review bridging research on individual allostatic load with other relevant and complementary topics (e.g., community resilience, community trauma); (2) community analyses (exploration of community experiences via interviews and secondary data review) of places in the United States that have experienced a triggering event or an enduring challenge; (3) integration of literature review and community analyses with expert input (crossing relevant disciplines of psychology, political science, and public health, as well as the community sectors of research, practice, and policy) to develop the draft conceptual framework; and (4) initial use of the framework to identify indi-

cators that may be integrated into a single measure of community allostatic load. While this work is formative and principally a proof of concept, the framework can help build a general appreciation of community stress for use by practitioners and policy leaders, offer new ways to measure community health and well-being, and support efforts by RWJF to better consider community stress in the context of health equity and the Culture of Health.

Methods

There were three elements of this project: literature review, community analyses, and expert panel engagement. For the literature review, we drew on several disciplinary threads that inform the idea of community allostatic load. We conducted a review to briefly summarize key relevant literature from a range of fields, including community science, psychology, conflict studies, and political science. The ultimate goal of the literature review was to uncover potential constructs for a conceptual framework of community allostatic load, rather than to be exhaustive.

While the literature review offered a fairly comprehensive review of key factors that influence the stress that communities experience and how they respond when shocks are introduced on top of those stresses, we wanted to explore whether and how these factors varied in communities that had experienced some type of negative event or downgrading series of events from which they were now recovering (referred to hereafter as the *triggering event*). We identified four community pairs that were matched based on their acute or triggering event experience but that might differ by the nature and quality of their response to the experience. For each event, we selected a pair of communities that were dealing with each of the following: tensions regarding police–community relations; difficulties related to environmental exposures; challenges in economic recovery; and difficulties in dealing with public health crises, such as opioid addiction. To arrive at the final list of four pairs, we conducted a review of news reports and other internet searches to identify a longer set of case sites for potential inclusion, arrayed by the type of incident—economic, public safety, health, and environmental. Then, we organized additional information about the sites, including geographic region and demographic composition (e.g., size, poverty level, inequality). We organized and matched communities by demographic background and incident type and selected case-study pairs from that pool to arrive at four pairs. We bounded communities by looking at the area affected by the event; thus, in some cases, we refer to small municipalities, and, in other cases, we refer to larger cities or county regions. For each of the eight communities, we included approximately ten to 12 interviews per community, with attention to stakeholders representing diverse sectors (e.g., public safety, public health).

The final element was an expert panel. As we developed the draft framework and then the final conceptual framework for operationalizing community allostatic load, we convened a panel of seven experts representing research and practice from diverse disciplines and sectors, including law, public health, psychology, sociology, public safety, and community science. Because this area of community allostatic load is both complex and relatively nascent, we needed diverse viewpoints to capture the multiple disciplinary threads reflected in this work, as well as to understand what is possible for use by a range of stakeholders, including those who are making local policy, designing and implementing programs, and studying aspects of community stress and well-being. We convened two meetings of the expert panel through

webinars, with some one-on-one discussions individually between meetings to hone in on particular concepts, issues, and potential measurement areas. The expert panel also shared several insights and expressed cautions, such as offering other fields of study or topics that we had missed in our review of relevant literature and that might provide additional insight to our conceptual approach, suggesting changes to the framework itself, exploring potential end uses of the framework, identifying measurement issues, and offering important cautions about development and use of the framework in the future.

Key Study Themes

Several key themes emerged about factors that may influence community allostatic load through these efforts to build the initial community allostatic load framework.

- **Community environments influence the allostatic load of individuals.** Accumulating evidence suggests that health disparities can be partially attributed to allostatic overload resulting from exposure to multiple physical, social, and psychosocial stresses at the individual, household, and community levels.
- **Community resilience frameworks that deal with chronic stress are also useful in understanding community-level allostasis.** Efforts to build community resilience have now moved beyond classic, acute emergency preparedness to include a deeper appreciation that shocks co-occur with long-term stresses, which in turn influence the community's ability to effectively respond and recover (e.g., restart civic processes, get people back to work).
- **At the community level, recognized drivers of well-being are intertwined with drivers of community allostatic load uncovered by this work.** Stress plays a critical role in a community's well-being. Recognized drivers of community well-being include social connections, economic resilience, and local context, all of which can mitigate or exacerbate community stress—or allostatic load—and, in turn, well-being.
- **Issues of segregation and marginalization affect community allostatic load.** Our analyses, particularly those of the community, illuminated key issues of prejudice (e.g., racial, ethnic, economic) and segregation that inform the collective stress level of a community.
- **Persistent policies that may exacerbate discrimination (or perceived discrimination across race or ethnicity, culture, social status, or economic status) and inequity, as well as changes in demography, can influence the level of community allostasis.** The existing social, cultural, and economic conditions of a community are critical factors in whether and how a community is able to organize in order to respond to and recover from a triggering event.
- **Community perception of stress is also important in the accumulation of community allostatic load.** The historical context of chronic stress matters. When communities feel successful in handling specific events and using solution-oriented strategies to deal with past stresses, the relative experience of stress is often experienced differently. The fairness of how the stress affects community subpopulations is critical to this wider community perception of stress.

- **Trust and the role of civil society are important in understanding community allostatic load.** Community analyses revealed that communities in which government is viewed as making an effort to respond appropriately—particularly to address the needs of the most vulnerable—are better able to bounce back after a triggering event. At the community level, trust both in leaders and in the institutions that serve the population is central to how a community handles stress generally and its ability to identify and implement stress-mitigating approaches.
- **The concepts of health equity and community allostatic load are closely related.** While the literature review and community analyses did not identify an explicitly stated link between the terms “health equity” and “community allostatic load,” there were clear relationships being drawn by respondents between expectations around fairness and opportunity to lead healthy and productive lives and whether a community experienced undue or disproportionate chronic stress.

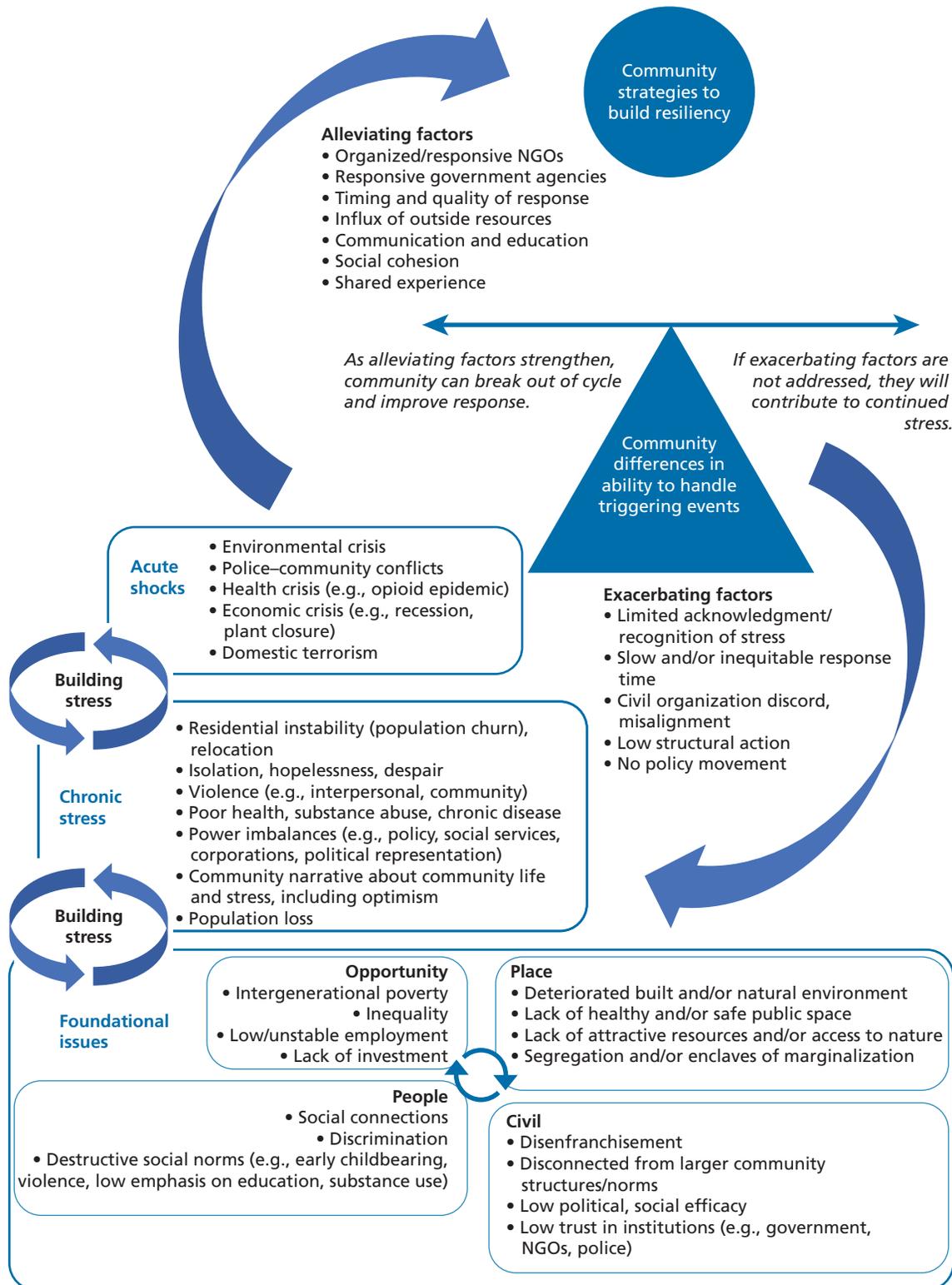
Initial Conceptual Framework

Based on these findings, we constructed a framework (see Figure S.1), which was reviewed and refined with expert panel input. The framework articulates a set of foundational issues—or community contextual issues—that influence chronic and acute stress experience over generations. Chronic stressors build from those foundational issues and tend to compound a community’s struggles in handling acute shocks and stressors. Acute shocks are those disasters (e.g., hurricane, massive economic downturn) that are stressful in and of themselves—as discrete events and in accumulation. Levels of chronic stress and the presence of the foundational issues can complicate the ability of residents to respond to acute shocks because these shocks often require connection to larger institutional structures. Ultimately, communities that can address stress can manage community allostatic load. There are alleviating factors (e.g., response capacity of civil-society organizations) and exacerbating factors (e.g., poor leadership response to stress) that are often activated through repeated acute shocks. As a result of how these factors interact, communities may find themselves strengthened, or they can find their issues compounded and community allostatic load increased.

Applications and Next Steps

While the goal of this study was not to devise and test a final measure of community allostatic load, we identified ways that measurement could be pursued for both an overall measure and to assess component parts of the framework. There are three potential benefits of measurement. The framework could be used by community leaders to describe the current stress level in a community and evaluate readiness before a triggering event. The framework could also be used to elevate the role of different drivers in influencing community allostatic load. For instance, one could imagine a community narrative that discusses how a community did or did not handle a stress and how that experience is now influencing its future ability to address or improve community health. Finally, the framework could be used to build an assessment tool, using each element of the framework to measure and assess different elements of community health and well-being.

Figure S.1
Initial Conceptual Framework for Community Allostatic Load



NOTE: NGO = nongovernmental organization.

While this initial work was principally a proof-of-concept exercise, there are important limitations that should be noted about the concept of community allostatic load. Most of the literature that was integrated to develop this initial framework is conceptual or observational. It is challenging to isolate the triggering event and the drivers that contribute to general stress compared with drivers that influence the experience of cumulative stress load or overload. This includes determining directionality in how foundational issues in the framework are compounded by acute and chronic stress events and where and how alleviating or exacerbating factors intervene. The conceptual framework for community allostatic load is focused on factors that appear to be critical in mitigating or reducing stress levels as these levels accumulate. The framework has not yet been tested to further discern the effects of cumulative stress on a community's well-being or the ultimate trajectory of a community.

Despite these limitations and the fact that this should only be viewed as formative work in a new area, there are important benefits to this research. By putting these ideas under the umbrella of allostatic load, communities might be better able to isolate factors that mitigate or exacerbate stress when negative events happen. Future research should deepen the examination of the mechanisms of community-level stress response, as well as the dynamics of community organization and community systems that support healthier stress management.

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Abbreviations

| | |
|--------|---|
| ACE | adverse childhood experience |
| ACS | American Community Survey |
| CDC | Centers for Disease Control and Prevention |
| NGO | nongovernmental organization |
| NHANES | National Health and Nutrition Examination Survey |
| NYAM | New York Academy of Medicine |
| OR | odds ratio |
| RWJF | Robert Wood Johnson Foundation |
| SAMHSA | Substance Abuse and Mental Health Services Administration |
| TICB | Trauma Informed Community Building |

Introduction

Imagine two communities: community A and community B. The two communities look alike on paper: They are located in the same general region and have similar demographics and economies. Now imagine that both communities experience a significant leak from a nearby gas-storage facility. Here's how they respond:

Residents in **community A** are quickly moved to temporary housing away from the gas leak, and regional leaders divert funding to the community to help repair the leak. Local service organizations and the hospital build on existing communication plans to coordinate a public health response to mitigate lasting health effects.

In **community B**, the local government is slow to mobilize, and rumors about the severity of the leak and health impacts rapidly spread through the community. Distrust of those leading the response grows, and the local hospital is overwhelmed with patients reporting minor and serious symptoms—which may or may not be related to the leak.

Community A appears to have handled the shock better than community B. What might explain this difference? Why was community A better able to respond? Could a more-stressful and frayed day-to-day community environment have complicated community B's response to the event, preventing as effective a response as in community A?

This difference in community response to shocks—be they environmental crises, incidents of community violence, or public health crises, such as the current opioid epidemic—led to this study. This report documents an examination of whether accumulated stress in a community significantly affects how well a community responds when tested.

Motivation

As fields of community resilience and community well-being take root, and the orientation toward building a Culture of Health (Robert Wood Johnson Foundation [RWJF], undated) in communities becomes prevalent, it is increasingly useful to understand the relative health and stress a community experiences. As noted in the examples of communities A and B, that collective stress level can influence the community's ability both to address enduring challenges and to respond to more-immediate or flashpoint events. Yet, there is relatively little understanding of what factors drive or influence community-level stress and how one might measure that stress at an aggregate level.

At the individual level, this construct of cumulative stress has been captured by the concept of *allostatic load*—the physiological effects of constant or repeated exposure to stress. The concept of allostatic load has enabled the public health sector to better explain why stress, racial trauma, or adverse childhood experiences (ACEs) can have significant consequences for individual health across the life span, affecting such measures as biomarker expression, chronic disease experience, and vulnerability to specific triggering events (e.g., trauma for personal loss) (McEwen and Seeman, 1999; McEwen and Gianaros, 2011). While the term *allostatic load* has been a construct primarily applied in the health and biomedical sciences, equivalent considerations of cumulative stress have emerged in the environmental sciences (Lenton et al., 2008), as well as in the political sciences, particularly around conflict that has led to cultural changes or tipping points (e.g., Arab Spring) (Lamberson and Page, 2012; Halverson, Ruston, and Trethewey, 2013).

While there is robustness in the health sciences literature about individual allostatic load, it is unclear whether this concept of allostatic load can extend to the community level (defined principally geographically herein) and how it would be measured. For example, elevated levels of the cortisol hormone are commonly used to identify individuals under stress. What is the equivalent of elevated cortisol at the community level? There are frameworks that articulate the role of *community resilience* (or the response and adaptation to stressful events) as an adaptive set of networks (Norris et al., 2008) or a set of capacities (Chandra et al., 2011), but those do not speak to how a community collectively handles historical and current experiences of stress. Frameworks emerged from the built and social environment fields, articulating the effects of community stress levels on individual stress and individual allostatic load. These frameworks stop short, however, of demonstrating how stress affects communities as a whole (Morello-Frosch and Shenassa, 2006). How might stress affect the collective community experience (e.g., the way a community characterizes its outlook) or a community's ability to mitigate long-term negative impacts after stressful events? This question tends to produce analyses about community stress: Is it only an individual's experience or is it an aggregate of the collective stress of individuals, which is then read as community collective stress? There is far less examination of how communities handle negative events as a complete unit. Further, community health research can contribute to an understanding of community stress, but much of the early research emphasized relatively static characteristics of places that function as health determinants (e.g., poverty level, education level) (Diez-Roux, 1998; Huynh et al., 2005). The place-based perspective on health is beginning to consider a more-dynamic characterization of the events and experiences occurring in a community over the last decade, although more consideration of network dynamics and the long-term role of stress is needed (Vlahov et al., 2005).

In the wake of events that challenge communities (e.g., police–community tension, natural disasters), attention is being paid to the notion of community tipping points—events that can shock a community and push it into a certain amount of upheaval (Pelling and Dill, 2009). These events do not happen in isolation but usually rest on a history of community stress and essentially serve as triggers for broader reaction. Moreover, these traumatic events may also occur over longer periods of time than is typically realized by local leaders. Awareness and understanding of these events and experiences are vital to measuring and monitoring community stress levels. Understanding community stress levels can help identify those communities that are more likely to have difficulties in responding to triggering events and when those difficulties are particularly acute (e.g., those that may have more social discord following an event). Community stress levels could also identify when those dynamic processes in event

response and recovery are actively influencing individual, family, or neighborhood health. It should be noted that some amount of stress experience can be adaptive if it leads to improvements in community processes or knowledge that informs improvement of community well-being indicators. But the question is what the effects are when there are degrading or negative consequences of such stress, which is the central focus of this exploratory study.

A community measure of allostatic load can leverage community science, as well as other constructs, such as community resilience, so that intervention efforts can better support or mitigate stress levels community-wide and create conditions that can promote health and well-being. Further, a community allostatic load measure can help stakeholders plan for and address cumulative factors that affect a community's ability to respond to acute shocks while also improving the health and well-being of its residents. Unlike such frameworks and concepts as geography of opportunity (Rosenbaum, 1995), which posits the role of place in influencing opportunities and life outcomes, or community assets (Kretzman and McKnight, 1996), which are the partnerships, resources, and policies that contribute to community experience, community allostatic load is intended to more squarely consider the role of historical and current stress on the lived experience of community members and the role that stress has on their perceptions of community outlook and robustness. While measurement is starting to solidify in such related fields as resilience, trauma, and well-being, a viable framework that helps communities understand collective stress levels, suggests monitoring conditions, and signals when key interventions are needed has not yet been developed.

Research Objectives

In this context, this research was intended to be developmental. We pursued these exploratory objectives:

1. Summarize themes from the literature that may inform the construct of community allostatic load.
2. Deepen understanding and framing of community allostatic load through a sample of community interviews and review with experts.
3. Draft a conceptual framework and potential measure areas for community allostatic load.

Ultimately, the goal of this research is to explore whether the concept of community allostatic load resonates with community leaders and experts (i.e., is it of interest, does it have any value), identify elements that might inform a community allostatic load framework, and lay the foundation for future work regarding ways that communities might measure allostatic load at the community level over time. We recognize that, conceptually, this is a difficult and complex area—research to date spans diverse events and stresses and marries many fields of study (described later in this report), and measurement in this area is challenging. The themes and recommendations from this work should be viewed in that light and should be considered a starting point for future study and application. This research is intended to build on prior work on community stress and resilience while moving the scholarly and practice discussion to include a community-level measure that links historical and current stress to better understand response capacity, stress management, and health.

It is also important to define what we mean by *community* in this study. While we recognize that people belong to many communities (e.g., ethnic, virtual), we primarily use a geographic characterization of a city or county area. This is relevant because most of the related literature (community resilience, community trauma) that informed our analysis of cumulative stress uses that characterization. Note that the selection of geography for community analyses was determined by the impact area of the event; thus, in some cases, we refer to small municipalities, and, in other cases, we refer to larger cities or county regions.

Literature Review: Part One

Approach

We drew from the fields of community science, psychology, conflict studies, and political science for this literature review, which included both peer-reviewed and grey literature, with the following primary aims:

- Summarize related content areas that may be relevant for understanding community allostatic load, including individual allostatic load, community trauma, and resilience.
- Uncover drivers and mitigators of stress in communities, particularly those that have experienced some type of acute or chronic stress.
- Set the stage for community analyses, including areas of inquiry, in key informant interviews.

The ultimate goal of this literature review was to uncover potential constructs for a conceptual framework of community allostatic load.

We included peer-reviewed articles, book chapters, and grey literature (material not formally published) written in English. We primarily focused on articles available since January 1, 2004, starting with several databases, including PubMed, the Cumulative Index to Nursing and Allied Health Literature, PsycINFO, Scopus, and Social Sciences Abstracts. Upon initial review and with confirmation by a librarian, we determined that Scopus and Social Sciences Abstracts would be sufficiently comprehensive to use to source the peer-reviewed literature and other documents, so we focused on these two databases for this analysis. For the grey literature, we used the New York Academy of Medicine's (NYAM's) Grey Literature Report database (which was discontinued in January 2017) and Scopus to identify reports that may have been written about particular events or community experiences with stress. We also conducted targeted Google searches for grey literature, but this approach did not yield much beyond NYAM and Scopus, so we used these two as primary databases. Google and LexisNexis were used for community analyses (discussed later in this chapter).

We used a series of keywords to inform this literature review. We pursued a summary scan of relevant literature to summarize texts on resilience, stress, and individual allostatic load—which may be relevant to a conceptual framework for understanding community allostatic load. For resilience, we used keywords including [*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 *measurements*] and [*preparedness* or *emergency* or *disaster* or *mitigation*]. For allostatic load, we used keywords including [*stress* or *trauma* or *allostasis* or *allostatic load*] and [*person* or *individual*] and [*family* or *household*]. This part of the literature review

was not as intensive, given that this literature has been well-treaded in other review articles and syntheses. Our goal was to summarize those findings to ensure that we were not missing any relevant construct or driver in our community allostatic load conceptual framework. Further, we have conducted previous analyses in these fields, so we reviewed current articles to ensure that we could appropriately extract the salient themes for this analysis. Ultimately, we identified 353 articles (peer reviewed and grey) that reviewed these critical areas. Of these articles, 176 had salient information about drivers of stress and, potentially, community allostatic load.

The more-intensive and systematic focus of our literature review was on critical drivers of stress at the community level, with a primary emphasis on understanding how difficult or traumatic community events have affected the community, what was in place before the event, how the community responded, and what factors either impeded or facilitated recovery. We were primarily interested in articles that met the following inclusion criteria:

- studies of disasters or other stressful and triggering events (e.g., foreclosure/economic challenges, environmental issues, health, and issues of public safety)
- studies of events based in the United States, Canada, or Western Europe; the reasons for this were primarily twofold: these were written in English, and there are socioeconomic and other structural similarities across regions
- human-based studies; we had to limit the focus, given the number of stress studies on animal models.

In addition to these core criteria, we searched for articles that covered one or both of the following criteria, given our focus on building a conceptual framework:

- study discussed drivers of the event
- study discussed factors that addressed community discord as a result of the event or efforts to build community will or solidarity.

For these studies, we specifically searched for public safety or instances of “riot” (civil unrest), issues of economic distress, and health and environmental issues. Tables 2.1–2.2 show the keywords used in each analysis and the number of initial results from Scopus and Social Sciences Abstracts for peer-reviewed articles and from Scopus and NYAM for grey literature.

Literature Review and Abstraction

We used a two-tiered citation-review process to facilitate a systematic evaluation of each article reviewed. Each citation was first reviewed using criterion A (see Table 2.3). If the citation met criterion A, the research team further reviewed the citation to code for criterion B. A data-abstraction grid was developed to record key information from each article. The abstraction form included the following fields for extraction:

- focus on drivers
- article title, authors
- search engine used
- focus or keywords

Table 2.1
Initial Search Results from Analysis of Event Literature (Peer Reviewed)

| Topic Area | Keywords Used ^a | Scopus Search (Number of Articles) | Social Sciences Abstracts (Number of Articles) |
|---|--|--|---|
| Public safety and "riot" related | (TITLE-ABS-KEY [histor* or polic* or infrastructure or governance or segregation or racism or structur*] and TITLE-ABS-KEY [condition* or determinant* or caus* or contrib* or driver* or factor*] and TITLE-ABS-KEY [riot]) and SUBJAREA (mult or medi or nurs or vete or dent or heal or mult or arts or busi or deci or econ or psyc or soci) and PUBYEAR > 2004 | 224 | 81 |
| Economic crises, foreclosure | (TITLE-ABS-KEY [histor* or polic* or infrastructure or governance or segregation or racism or structur*] and TITLE-ABS-KEY [condition* or determinant* or caus* or contrib* or driver* or factor*] and TITLE-ABS-KEY [foreclosure or housing] and TITLE-ABS-KEY [crisis]) and SUBJAREA (mult or medi or nurs or vete or dent or heal or mult or arts or busi or deci or econ or psyc or soci) and PUBYEAR > 2004 | 365 | 103 |
| Environmental, public health, and related | (TITLE-ABS-KEY [histor* or polic* or infrastructure or governance or segregation or racism or structur*] and TITLE-ABS-KEY [condition* or determinant* or caus* or contrib* or driver* or factor*] and TITLE-ABS-KEY [leak or spill or fire or explosion or accident or epidemic or outbreak] and TITLE-ABS-KEY [crisis]) and PUBYEAR > 2004 and (LIMIT-TO [DOCTYPE, "ar"] or LIMIT-TO [DOCTYPE, "re"] or LIMIT-TO [DOCTYPE, "ip"]) and (LIMIT-TO [LANGUAGE, "English"]) | 490 | 53 |

^a We did not include physical sciences and life sciences articles in this review. We also limited literature reviews to empirical articles, review articles, and articles in press. English was also a criterion for inclusion.

Table 2.2
Initial Search Results from Analysis of Event Literature (Grey Literature)

| Topic Area | Keywords Used ^a | NYAM (Number of Articles) | Scopus (Number of Articles) |
|---|--|---------------------------------|-----------------------------------|
| Public safety and "riot" related | (TITLE-ABS-KEY [histor* or polic* or infrastructure or governance or segregation or racism or structur*] and TITLE-ABS-KEY [condition* or determinant* or caus* or contrib* or driver* or factor*] and TITLE-ABS-KEY [riot]) and SUBJAREA (mult or medi or nurs or vete or dent or heal or mult or arts or busi or deci or econ or psyc or soci) and PUBYEAR > 2004 | 1 | 4 |
| Economic crises, foreclosure | (TITLE-ABS-KEY [histor* or polic* or infrastructure or governance or segregation or racism or structur*] and TITLE-ABS-KEY [condition* or determinant* or caus* or contrib* or driver* or factor*] and TITLE-ABS-KEY [foreclosure or housing] and TITLE-ABS-KEY [crisis]) and SUBJAREA (mult or medi or nurs or vete or dent or heal or mult or arts or busi or deci or econ or psyc or soci) and PUBYEAR > 2004 | 28 | 19 |
| Environmental, public health, and related | (TITLE-ABS-KEY [histor* or polic* or infrastructure or governance or segregation or racism or structur*] and TITLE-ABS-KEY [condition* or determinant* or caus* or contrib* or driver* or factor*] and TITLE-ABS-KEY [leak or spill or fire or explosion or accident or epidemic or outbreak] and TITLE-ABS-KEY [crisis]) and PUBYEAR > 2004 and (LIMIT-TO [DOCTYPE, "ar"] or LIMIT-TO [DOCTYPE, "re"] or LIMIT-TO [DOCTYPE, "ip"]) and (LIMIT-TO [LANGUAGE, "English"]) | 597 | 112 |

^a We did not include physical sciences and life sciences articles in this review. We also limited literature reviews to empirical articles, review articles, and articles in press. English was also a criterion for inclusion.

Table 2.3
Systematic Literature of Event Articles (Peer Reviewed and Grey)

| | Search and/or Abstraction Criteria | Peer Review (Number of Articles) | Grey Literature (Number of Articles) |
|-----------------|--|-------------------------------------|---|
| Search strategy | See keywords from Tables 2.1 and 2.2 (first review). | 1,316 | 761 |
| Criterion A | Does the article focus on the stressful or triggering event? Is it based in the United States, Canada, or Western Europe? Does it focus on individual and/or community response? | 142 | 211 |
| Criterion B | Does the article provide detail about drivers of the event and/or ways in which the event was addressed? | 114 | 62 |

- event, including event location
- relevance to literature review (e.g., drivers, mechanism, effects, resilience)
- objective of study
- driver(s)
- triggers for event
- any relevant policies leading to event
- any details on study population, key results.

Table 2.3 summarizes the final number of peer-reviewed and grey literature articles reviewed.

Key Disciplinary Threads

There are a few disciplinary threads or fields of study (principally psychology, political science, and public health, as well as economics and disaster research) that provide openings for further literature review, case studies, and drafting of the conceptual framework in Chapters Three and Four. Here, we briefly summarize key themes from those fields to set the stage for the community allostatic load framework. These disciplinary threads—individual allostatic load, community trauma, community resilience, and community well-being—are immense, with long histories of research and scholarship; thus, we only highlight relevant elements from each area in the following sections.

Individual Allostatic Load

Allostasis (McEwen, 1998; McEwen and Seeman, 1999; McEwan and Gianaros, 2011) refers to the process by which an individual adapts and maintains stability in response to stress. Allostasis can be measured using biomarkers (Ranabir and Reetu, 2011). *Stress* refers to an individual's response to events or changes and generally results from an interplay among behavioral, endocrine, genetic, and developmental factors. Allostasis takes into account external stress and an individual's perception of the resources available to respond to the stress. In short, individuals differ in how their immune systems respond to stress. Allostasis is the ability to achieve stability through behavioral or physiological change, whereas allostatic load and overload refer to the cumulative fitness cost incurred by such continuous adaptation. As noted earlier, stress can be useful in helping individuals or communities adapt and learn from change. High allostatic

load, however, describes stress that can be harmful. It takes into account stress loads, available resources, efficacy of the allostatic process, and frequency of allostatic activation—the wear and tear it can inflict on individuals. When individuals experience stress, the body responds with changes in breathing, pulse rate, blood pressure, and endocrine function (e.g., blood sugar, fats). Even as the body adapts to these changes, it can still be overwhelmed when a physiological breaking point is met or surpassed, and excessive allostatic load—*enduring* stress—increases susceptibility to physical and mental disease (McEwen, 1998; Selye, 1950). For some, the overload of stress can result in cumulative negative effects.

The MacArthur Research Network conducted seminal work on individual allostasis and its effects on human physiology and life-course health and well-being. McEwen and Seeman (1999) noted the pathways and consequences of cumulative stress, particularly as that stress helped to explain health differences that are closely tied to socioeconomic status. As an example, researchers have published a considerable body of work on the effects of stress caused by socioeconomic status and racism and its corresponding impact on health (Dowd, Simanek, and Aiello, 2009; Green and Darity, 2010; Howard and Sparks, 2016). For instance, in extensive analyses examining the weathering hypothesis—or the degradation of health over time—among black Americans, Geronimus et al. (2006) noted that health deterioration is accelerated by a range of stresses, including the cumulative effects of social or economic adversity and marginalization. These researchers noted that the stress effects do not affect populations evenly across the life span but, rather, can contribute to increasingly wider health disparities between black and white Americans with age. In short, health degradation accumulates over time, thus contributing to greater health inequality between populations in middle and later ages.

In addition to the general effects on life expectancy and the prevalence and effects of chronic disease with strong racial/ethnic differences, there is also growing evidence of the relationship between allostatic load and the individual experience of pain. Using cross-sectional data from the National Health and Nutrition Examination Survey (NHANES), Slade, Sanders, and By (2012) found an association between allostatic load and pain-related conditions, including severe headaches or migraines, widespread body pain, and more-localized pain.

More work has linked classic self-report measures of health and allostatic load. For instance, in the Nashville Stress and Health Study, Brown, Turner, and Moore (2016) found modest concordance between allostatic load and self-perceived health (odds ratio [OR] = 1.74), allostatic load and doctor-diagnosed diseases (OR = 2.31), allostatic load and bed days (OR = 1.10), and allostatic load and activity limitations (OR = 1.78).

While the individual analysis of allostatic load has dominated the literature, community environments—both positive and negative—also have been shown to influence the allostatic load of individuals. In a large national sample of adolescents, exposure to greater cumulative neighborhood risk and 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 and stress exposure and individual allostatic load existed over and above that of household risk (i.e., household poverty and other parental characteristics, including allostatic load) (Theall et al., 2013). Because stress response can vary based on past experiences of chronic stress, approaches to build resilience often 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 stresses at the individual, household, and community levels. Thus, the analysis of allostasis and allostatic load, especially as they vary across communities of different socioeconomic levels, is relevant to public policy because it can help explain health disparities in the population (Boardman, 2004).

The measurement of allostatic load using a range of biomarkers has been strengthened by a robust body of research (Howard and Sparks, 2016). Chief among them is the index of allostatic load derived from data in the NHANES. Key indicators include data from blood (glycated hemoglobin), serum (C-reactive protein, homocysteine, cholesterol, and triglycerides), urine (creatinine and albumin), and physical measurements (body mass index and systolic and diastolic blood pressure). The allostatic load index for each individual is then defined as the total number of biomarkers at the highest risk quartile. Mauss, Jarczok, and Fisher (2016) developed a streamlined allostatic load measure that included only five indicators to assess allostatic load as part of workplace health: diastolic blood pressure, waist circumference, glycosylated hemoglobin, low-density lipoprotein, and heart-rate variability. Employees who perceived more stress in the workplace also had higher allostatic load findings.

Measurement of allostatic load, like many other social and epidemiological constructs, can vary. In a systematic review of 58 studies conducted through 2012, Beckie (2012) found great diversity in how allostatic load is operationalized. Despite this variation, there was a strong association between allostatic load and a range of sociodemographic and physical factors, and allostatic load was connected with poorer physical and mental health and hastened mortality. While these studies used slightly different measurement rubrics, they all indicated the need to target precursors of the development of allostatic load (e.g., what causes stress, what raises cortisol levels) to enable early interventions and improve health outcomes over the life span.

The notion of community allostatic load, then, would build on these insights from individual allostatic load. We hypothesized that allostatic load and related concepts may explain differences in community health, even when more-classic social determinants of health (e.g., income, neighborhood quality) are considered. But while there is robustness in the health sciences literature about individual allostatic load, it is unclear whether this concept of allostatic load can extend to the community level and how it would be measured. For instance, some communities may be better equipped to respond to and rebound from an acute stress—even though they may share the preexisting economic and health vulnerabilities another community—because they do not have the added strain of an accumulation of stress.

Potential Relationship Between Individual Allostatic Load and Community Allostatic Load

Communities may be thought of as networks that are formed by relationships and the interconnectedness of individuals, organizations, and institutions (sometimes bounded geographically, but also culturally and virtually). Individuals can have relationships with other individuals or with small groups of individuals they create and maintain (e.g., families) (Doerfel, Chewning, and Lai, 2013). Groups can then be formalized as organizations and institutions, which then can connect with individuals they serve or with those who belong to them. Institutions also connect to one another at an organizational level. Together, these networks create an ecosystem consisting of links between individuals, links between organizations, and links between the individual and organizational levels (Freitag et al., 2014).

The importance of such connections across individual and organizational levels suggests that community allostatic load could also be thought of in terms of interconnectedness.

Stresses or mitigating factors that more broadly affect an entire community could, for instance, affect institutions or could have affected people at earlier time periods (e.g., preexisting policies or historical inequities). Accordingly, stresses that contribute to individual allostatic load likely only explain a portion of an entire community's allostatic load.

Accumulating levels of community stress—for example, organizations that are more competitive than cooperative because of limited available resources—may lead to weakened institutions that are unable to adequately support people (Granovetter, 1983). In this manner, community allostatic load may be manifested through a lack of institutional support or ability to organize and mobilize for positive change. Thus, there is a need to define and characterize community allostatic load to better understand the complex relationship between individual and community allostatic load, including breaking points of individual stresses, the ability of institutions to absorb the effects of individual stresses, and the net impact on the community.

In short, if individual allostatic load refers to the cumulative fitness cost incurred by such continuous adaptation to stress, then community allostatic load may be the community-level equivalent.

Community Trauma

While the allostatic load literature has begun to link the relationships noted in Theall et al. (2013) and summarized earlier between risky environments and individual stress experience, these studies have generally focused on more-classic, proximal metrics of social inequality (e.g., income inequality, crime exposure). These studies have not always incorporated deeper analyses of community-level factors (e.g., history, conditions, narrative), including historical trauma, as part of the analysis of allostatic load. However, relatively recent advancements in the field of community trauma offer an important opportunity to weave this perspective into a larger discussion of community allostatic load.

Historical trauma is a “complex and collective trauma experienced over time and across generations by a group of people who share an identity by affiliation, geography, or other shared experience” (Gone, 2013). Usually, this experience of historical trauma or trauma experienced by a community is distinct from other forms of trauma: The experience carries over in time to the current members of the group, who experience trauma-related symptoms even if they did not experience the initial precipitating trauma or event. There is a growing literature that has linked historical trauma to community health. Scholars have linked historical trauma to biological mechanisms of disease and associated stress and illness, and they have related this trauma to a range of structural determinants of health and disease (Sotero, 2006; Bar-On, Eland, and Kleber, 1998; Fullilove, 1996).

In recent work, the Prevention Institute and Kaiser Permanente developed a framework for addressing community trauma, building on the notion of ACEs to articulate a vision around adverse community experiences. Pinderhughes, Davis, and Williams (2015) wrote that trauma is pervasive, that it can occur at the community level, and that the experience of community trauma is felt at every level of the social experience from the sociocultural environment, the built environment, and the economic environment. In this framework, the authors define the symptoms of community trauma through such stresses as intergenerational poverty and disinvestment combined with deteriorated environment, deconstructed social norms, and weak social networks.

There are several models that have begun to incorporate these ideas of community and historical trauma as part of community-building and community mental health strategies. The

Substance Abuse and Mental Health Services Administration (SAMHSA) has advanced the concept that trauma is not held nor solely addressed at the individual level. Through its Community Trauma Initiative, SAMHSA is focused on six principles that were identified as ways to address widespread community trauma:

1. safety, or preventing violence across the life span
2. trustworthiness, or fostering positive relationships among residents and city leaders
3. empowerment, or ensuring opportunities for growth for all
4. collaboration, or partnership among agencies
5. peer support, or engaging residents to work together on issues of common concern
6. a culture that values and supports history, culture, and diversity.

SAMHSA is working to cultivate trauma-informed communities that realize the effects of trauma using these six principles. With that knowledge in mind, SAMHSA aims to help communities prevent further harm.

In a related model that builds on the growing field of community trauma science, the Trauma Informed Community Building (TICB) model developed by BRIDGE Housing Corporation also incorporated many of these principles to actively address trauma through community-building strategies. TICB noted the inextricable link between community trauma, housing, and community development. TICB addresses key areas not dissimilar to the SAMHSA model. This includes actively addressing sources that exacerbate the trauma experience:

1. lack of trust and social cohesion
2. lack of stability
3. lack of community ownership
4. inability to envision the future
5. breadth and depth of community needs.

TICB focuses on recognizing trauma, strengthening social connections, fostering resilience, and minimizing stress (Weinstein, Wolin, and Rose, 2014). For instance, by helping residents to see the future, TICB tries to address trauma's effect on cognitive skills and hope (Mani et al., 2013). The model uses key approaches that allow for ongoing community voice and reflective processes to ensure that community members actively recognize and respond to both individual and community stress. At the community level, TICB cultivates community leadership through skill building and provides activities that will demonstrate community change.

The Sanctuary Model focuses more on trauma-informed approaches at the organizational level. This model incorporates whole-scale cultural change using the organizational system as the unit of change. Like SAMHSA and TICB, the Sanctuary Model implements key themes to address collective trauma by using an approach to foster a culture of nonviolence, open communication, and social responsibility, all to help people work through the narratives of loss noted by Mohatt et al. (2014, Chapter 3) and restore hope (Bloom, 1997).

Community Resilience

The interest in community resilience, which has, in no small part, increased in recent years because of changes in the scope and scale of disaster, is also a key thread informing community

allostatic load (U.S. Department of Homeland Security, undated). Community resilience is the sustained ability of a community to prepare for, withstand, and recover from adversity. Definitions of community resilience often describe resilience globally or discuss resilience specifically in the context of disasters, with attention to a set of capacities and capabilities (Abramson et al., 2015). These definitions cite such capacities as community knowledge about threats, community empowerment to address risks, existence of social networks, existence of trust in government, the capacity to engage in positive change, and the capacity to move on after a disaster. For example, Keim (2008) argued that disaster resilience consists of (1) the absorbing capacity, (2) the buffering capacity, and (3) the response to the event and recovery from the damage sustained. Gilbert (2008) suggested that resilience is the capacity to find solutions, resist hardship, restore function, learn new skills, change, and survive. Related to the broader role of networks, Graham and Pinto (2018) identified the critical functions of place and social networks in explaining the differential resilience levels between low-income black Americans and low-income white Americans. Much of the resilience work has centered on the factors that make individuals and communities more resilient and on interventions that can build resilience. Identifying factors associated with community resilience can be a powerful tool for determining what policies, programs, and research are needed to create healthier and more-robust communities that use resources more efficiently. 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 adherence to principles of social justice (Chandra et al., 2011; Ritchie, 2012).

While much of the national and global attention on community resilience initially was bolstered by emergency preparedness discussions and community planning for acute shocks, such as natural disasters (e.g., hurricanes) and human-caused disasters (e.g., terrorism), community resilience has now widened to include a deeper appreciation that shocks co-occur with long-term stresses, which, in turn, influence the community's ability to effectively respond and recover.

Resilience frameworks now more effectively recognize the role of slow-moving disasters, such as climate change or community violence. For instance, as noted earlier, work by Pinderhughes, Davis, and Williams (2015) and others has introduced frameworks to address and prevent community trauma and to recognize that communities—and not just individuals—experience the effects of community and structural violence. Expanding the construct of ACEs to adverse community experiences has elevated an important discussion of symptoms of community trauma: the role of sociocultural, physical, and economic environments in influencing the trauma experienced by residents in a community and the need to step past individually oriented, trauma-based intervention models.

As another example, the New Haven Community Violence Prevention Group used a traditional disaster resilience framework and applied it to the issue of gun violence. The team considered community variables and how to harness those to address this pervasive issue by using the resilience levers of collective efficacy and community self-sufficiency to engage residents in violence prevention and reduction strategies (Riley et al., 2017).

Community Well-Being

While individual allostatic load, community resilience, and community trauma are key disciplinary constructs that inform the community allostatic load definition and framing, the literature on how communities set conditions for well-being—including broader conceptual-

izations of civic or community well-being—is also relevant. In short, the focus should be not only on drivers of stress but also on how community conditions and capabilities are set to help the community balance that stress, thrive, and flourish.

Historically, well-being comprises both individual and community dimensions and both subjective and objective measurement. Individual well-being can be defined as the extent to which people experience happiness and satisfaction and are able to realize their full potential. Key aspects of community well-being include community health, economic resilience, educational capacity, and environmental adaptation.

Putting well-being at the center of policymaking is a new and promising approach at the local and national levels. Measuring well-being and understanding its determinants and how they interact can help create a more-holistic and informed policymaking approach. Proposals for how to measure well-being and quality of life or progress have been around since the 1960s, although less so in the United States. The direct measurement of experienced well-being has made an important contribution to this approach, with academics and think tanks calling for “national accounts of well-being” (e.g., Kahneman, Krueger, and Schkade, 2004; Michaelson et al., 2009). Despite this interest, most community initiatives have historically stopped short of strengthening well-being through policy and program development. These initiatives focus on only on some aspects of health, economic productivity, or wellness, with a less integrated focus on the core roots of well-being, including the connections among residents and the organizations that support them. But that tide is now changing as more governments seek to consider and, in some cases, embed well-being in government and consider it as a factor in immediate and local decisions.

There are several elements to community well-being, which are not dissimilar from the core foundation elements in the community trauma literature noted earlier—sociocultural, physical, economic—but are simply further disaggregated. For instance, *economic vitality* is essential to community well-being and can include such indicators as involuntary unemployment or productivity. To build and maintain well-being, communities must engage in economic development and reduce social and economic inequities. According to Pfefferbaum, Pfefferbaum, and Norris (2009), resilience and, ultimately, community well-being depend on ongoing investments in physical resources, including schools, health facilities, job training, and neighborhood development.

Social connections are an important dimension of well-being that are often overlooked in city-planning efforts yet are vital to feelings of optimism and resilience. Social connectedness refers to the personal (e.g., family, friend, neighbor) and professional (e.g., service provider, community leader) relationships among community residents. 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). In addition, people with a greater sense of community are more concerned with maintaining their connections to the community (Yong-Chan and Kang, 2009). The issue of understanding community networks must be viewed from all perspectives as well. For example, Granovetter (1973) demonstrated that close ties in certain community networks can impede social mobility because community norms are prioritized and then promulgated through those networks. As such, unpacking social connection characteristics, including the quality of those ties, is important as well.

The topic of social connection is not simply interpersonal but also organizational. Government and nongovernmental organizations (NGOs) must work together to improve a com-

munity's well-being. Communities that have strong integration and engagement of these organizations are able to support community response to any type of stress (Baezconde-Garbanati et al., 2006; Pant et al., 2008). In particular, NGOs can help engage local people who have vital assets (Stewart, Kolluru, and Smith, 2009).

The underlying health of the population (e.g., the number of residents with chronic conditions) can greatly affect the community's well-being. Understanding the preexisting health conditions of a community is critical for well-being assessment. 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 that impedes overall well-being and an ability to respond to stress (Kailes and Enders, 2007). In addition to physical health, psychological health is both essential for and a desired result of community well-being. Psychological wellness provides individuals with coping resources and is defined as the absence of psychopathology; healthy patterns of behavior; adequate role functioning at home, school, and/or work; and high quality of life (Norris et al., 2008). Norris et al. (2008) and Pfefferbaum, Pfefferbaum, and Norris (2009) propose that population wellness, in measuring overall mental health and quality of life, serves as an appropriate indicator of community resilience and, ultimately, well-being.

Education well-being or support for lifelong learning is important but is often overlooked in overall community well-being assessment. It can include school achievement (reading, math, science literacy) and educational attainment, but it also includes such items as out-of-school time, employment transitions, social and emotional learning, and development of 21st-century learning skills (e.g., learning and innovation skills, media and technology acquisition, life and career skills) (Bodilly et al., 2010; Karoly, 2009).

Finally, *local context* can influence residents' perceptions of their well-being and drive engagement in healthy behaviors. Local context can include everything from the availability of green space to transportation options and efforts to address or adapt to climate change. Neighborhood safety and deterioration, for instance, are linked to poor well-being (O'Campo et al., 2015). As noted in the resilience literature, communities that have plans to address a range of changes in climate, from rising sea levels to changes in precipitation (whether through such adaptations as floodplain management or use of green or eco-approaches to construction), are often better equipped to adapt to change in demographic and economic conditions. Because of their preparation, they are better able to withstand a range of stresses. Furthermore, these communities tend to have individuals who view their local context more favorably.

Summary

These threads of research—individual allostatic load, community trauma, community resilience, and community well-being—offer important early insights into the factors that may matter in an operational definition and framework for community allostatic load. The individual allostatic load literature provides a way to define and operationalize what a stress threshold could be, its effects on health, and how equilibrium functions at the physiological level. Our review of the individual allostatic load measurement literature raises questions about what might serve as the equivalent set of community biomarkers for community allostatic load. For example, is there a measure of community tension that is equivalent to individual hypertension? The community trauma literature is also instructive in helping answer such a ques-

tion. By bringing together the joint effects of the built and social environment in the context of past experience, the literature demonstrates the role that historical trauma can play in the experience and accumulation of stress, all of which are key elements of community allostatic load. The community resilience research literature, which has been strengthened by the experience of recent natural disasters, has further highlighted that the capacities and capabilities of a community to respond effectively can shape this stress narrative going forward. In short, communities that are able to organize and facilitate healthy recovery share a different view on the experience of cumulative stress. Taken together, the community trauma and resilience literature underscore issues around the salience and packaging of the stress narrative. Finally, community and civic well-being research suggests a counterweight or response to the cumulative experience of stress. By investing in features and amenities that promote well-being, communities can mitigate the experience of stress and begin to address foundational issues that exacerbate the overall community stress level.

While this brief summary of these disciplinary threads is foundational for framing community allostatic load, it is not enough to articulate the core components of what allostatic load at this level would look like and how it would be measured. In the next chapter, we summarize findings from our additional literature review on lessons learned from key crises—economic, environmental, and health. We then detail key themes from our community analyses in communities experiencing some of these events. We conclude with our initial conceptual framework informed by both literature review and community study and then shaped by expert input and review.

Literature Review: Part Two

As noted in Chapter Two, we reviewed the literature on individual allostatic load, community trauma, community resilience, and community well-being as part of an initial review to understand how to derive a concept of community allostatic load. We then looked more closely at some of the core drivers or themes that surround a community's ability to handle stress—whether acute, as in the case of disaster, or chronic. We initially separated the literature review by type of negative event—public-safety incidents, economic challenges, environmental crises, and health problems. As we abstracted key findings from the literature using our data abstraction framework, it was clear that there were common aspects across context regarding the key themes and drivers, the triggering and exacerbating factors, the response and recovery patterns, and the policies and other actions that appeared to mitigate the stress experienced. Further, most of the research focused on acute disasters, although some work did point to the interaction of acute and chronic stress (e.g., ongoing economic or civil unrest). We attempted to extrapolate natural disaster research to other experiences of stress whenever it was possible.

Throughout the literature review, it was evident that vulnerability as a broader construct is a key contributor to poor community response to stress or negative events and exacerbates the conditions in which negative events are situated. We briefly discuss this in this chapter, although, given the wealth of research on merely defining vulnerability, we selected key aspects of definitions potentially relevant to community allostatic load.

Beyond vulnerability, we were particularly interested in key drivers that contributed to a population's or community's ability to handle a negative event and what might worsen or exacerbate stress levels. Our findings can be organized around three major themes (see Table 3.1): marginalization, community narratives (about stress), and institutional functioning. Note that most research to date is conceptual or observational at best. Despite this limitation, the literature does provide good grounding on what factors appear to weaken a community's ability to healthfully respond or adapt to stress, rather than be overwhelmed by it—or the notion of allostatic load and overload noted earlier.

We first start with some general findings on vulnerability and then delve further into each of these major theme areas.

General Definitions of Vulnerability

In an analysis of triggering agents and disaster reduction, McEntire (2001) proposed that vulnerability lies at the intersection of physical and social environments and the liabilities (risk and susceptibility) and capabilities (resistance and resilience) inherent in those environments.

Table 3.1
Additional Themes and Example Drivers from Crisis or Triggering Event Analyses (Literature Review)

| Major Themes | Example Drivers |
|--|---|
| Issues of marginalization and inequality | Economic or financial exploitation Segregation Racial/ethnic or gender discrimination Alienation of young Social inequality Social exclusion |
| Stress narratives | Social construction Narrative salience and historical trauma Public engagement Media representations |
| Institutional fabric | Institutional dysfunction Use of civil-society institutions Decisionmaking, governance |

He argued that there are several trends in the 21st century that further exacerbate both foundational vulnerabilities (e.g., social and economic conditions, such as poverty) and vulnerabilities in the specific context of a disaster or triggering event response (e.g., ability to marshal resources quickly). The nature of these vulnerabilities can be physical (e.g., environmental degradation), social (e.g., marginalization of specific groups), cultural (e.g., public apathy), political (e.g., overcentralization of decisionmaking, isolated or weak institutions), economic (e.g., poor distribution of wealth), or technological (e.g., overreliance on warning systems). McEntire concluded with recommendations to address the growing trends in vulnerabilities that fall within these domains but principally center on distributing capability development across government and civil society, strengthening culture and institutional trust, and integrating response capabilities to address both acute stress and chronic factors related to social and economic development.

Adger (1999) further defined vulnerability by unit of analysis—individual and collective. Individual vulnerability is based on personal access to resources and social status within a family, household, and/or community. Collective vulnerability in a community is determined by institutional structures, infrastructure, market factors, and other conditions of the social structure. In this configuration, issues of inequality, distribution of resources, and institutional strength are key when negative events happen because they sit at the intersection of individual and collective vulnerability.

McLaughlin and Dietz (2008) moved the discussion further by overlaying perspectives on vulnerability that are more focused on the interaction of people and place and the ability to respond, mitigate, and adapt to conditions and negative events. While their analysis focused on vulnerability in the context of environmental change, these filters are transferrable to other economic and social stresses. One such view is the biophysical approach, which, as the name suggests, focuses on the biological and ecological state of a community as contributing to the risk that the community faces and its ability to weather and respond to degradation. The political economic perspective looks more closely at the labor structure and related economic structures of a community and why those factors might contribute to vulnerability and ability to cope with stress. Further, the constructivist perspective focuses much more on the cultural narratives that people use to interpret stress, most akin to the narratives surrounding historical trauma from the community trauma literature described in Chapter Two. Braiding

these perspectives together, the authors suggested that it is important to view vulnerability in the context of dynamic interactions between social structure at individual and community levels (much like Adger's work), human agency (i.e., "the capacity of individual and corporate actors, with the diverse cultural meanings that they espouse, to play an independent causal role in history" [McLaughlin and Dietz, 2008, p. 105]), culture, and the environment. Later in this report, these constructs—particularly the interaction of social structure and human interpretation—will be key in our discussion, given the interaction between stress perception and processing and the structural conditions that are critical in understanding community stress—and, ultimately, a concept of community allostatic load.

Issues of Marginalization and Inequality

Vulnerability as a construct demonstrates that risk and liabilities can increase community stress levels and worsen the community's ability to respond effectively during and after negative events, but it is too broad to inform a framework that specifically measures and tracks community allostatic load. Instead, we sought to answer the following question: What are key elements or drivers that appear to weaken response and recovery and/or contribute to cumulative stress? One area that emerged in further literature review was the issue of marginalization, both historic and chronic, often represented in issues related to discrimination and social inequality (e.g., poverty, social exclusion). We explain each in turn in this section.

Marginalization has historically been defined as social inequality and living in peripheral status relative to the core or normative social structure (Bynner, 1997), but the concept is essentially based on determining who has and does not have power. Gaillard and Cadag (2009) noted that marginality "reflects poor entitlement to livelihoods." In current discourse about refugees, marginalization is associated with the difficulty of adapting positively because of being set aside on the margins of a community in settlements or camps. Further, Grabska (2006) defined marginalization as a dynamic process of discrimination and exclusion.

While all of these definitions may be academic, in practice, marginalization has played a key role in whether certain groups are disproportionately affected by disaster and whether they subsequently are able to recover from negative or stressful life events. Wisner and Luce (1993) demonstrated that marginalization heightens people's vulnerability to hazards. Further, the usual cycle of disaster response tends to reinforce a return to conditions as they were, thus further cementing marginalization in the affected group. In an analysis of response to the 2000 Payatas trash slide in the Philippines, Gaillard and Cadag (2009) demonstrated that vulnerabilities across natural, human, social, physical, financial, and political capital were exacerbated by the trash slide, which led to further geographical (e.g., relocation), social (e.g., further dependence on other groups), economic (e.g., poverty), and political (e.g., civic neglect) marginalization. Analyses of urban wildfires in Arizona demonstrated the same phenomenon; in short, the least powerful groups inhabit the most hazardous conditions (Collins, 2008). In an analysis of the impact of catastrophic events on the gender gap in life expectancy, Neumayer and Plümper (2007) found that the "socially constructed gender-specific vulnerability of females built into everyday socioeconomic status and access" was related to higher female disaster mortality when compared with males, and the gender gap also led to greater post-disaster vulnerability for females.

While these examples have tended to come from natural disaster experiences, the processes that underlie them could be extrapolated to any cycle of stress, both acute and chronic. Dynamics of marginalization have extended to issues of community violence (Cerdá et al., 2012), homelessness (Coumans and Spreen, 2003), youth gang membership, and the stresses associated with acculturation among immigrant communities (Andersson, 2003). While the context may differ, the process of compounding stress, isolation, and exclusion is comparable.

Although marginalization is the overriding concept that contributes to community experience of stress and the ability to respond to negative events, we also draw lessons from the individual allostatic load literature that has linked discrimination, both perceived and structural, to stress levels. Brody et al. (2014) conducted a longitudinal analysis of perceived discrimination among African American adolescents. Using data from the Strong African American Families Healthy Adolescent Project, the authors followed about 500 adolescents from fifth grade to age 20. The researchers found that those who experienced higher levels of perceived discrimination—and particularly exposures that increased over time—had higher allostatic load, as measured by the classic physiological markers defined in Chapter Two (e.g., cortisol levels), but they also found that strong emotional support provided an important buffer. As we move into broader studies of discrimination, there are continued demonstrations of the relationship between racial/ethnic discrimination and health. Williams and Mohammed (2009) noted that the distress that comes with discrimination can result in a physical and mental health impact, which can compound over time, if repeated or chronic. Williams, Neighbors, and Jackson (2003) reviewed the findings of various community studies and found an association between discrimination and poorer physical and mental health status. While the strength of association varied from no association to conditional association to positive association, key impact domains included self-esteem, major depression, self-rated health, blood pressure, and such behaviors as smoking and alcohol use.

In addition to aspects of marginalization and discrimination, literature analyses also surfaced the important roles of other social inequality drivers of community stress. As noted in our explanation of vulnerability, we know that “social vulnerability is partially the product of social inequalities” (Cutter, Boruff, and Shirley, 2003). Through Cutter’s (1996) work in developing the Social Vulnerability Index, we have evidence that there are strong dimensions of social vulnerability that are based in access to such economic resources as per capita income, personal wealth, housing stock and tenancy and community dependence on a single economic sector. Adger (1999) noted that social vulnerability is determined by “relative distribution of income, access to and diversity of economic assets, and the operation of formal and informal coping mechanisms (e.g., ability to leverage wealth).” Here, it is also important to note the role of equity in the distribution of public resources and how community norms around that distribution ultimately influence economic choices and financing behaviors. As such, there is an important interplay of social expectation, community norms, and resource choices (Young, 1994).

The role of poverty can have cognitive impacts that contribute to stress and future orientation. For example, Mullainathan and Shafir (2013) described how chronic stress in the lives of the very poor in low-income countries has cognitive effects, such as the inability to plan for the long term. In short, stress is connected to a lack of future orientation and a lack of interest in community investment. In a comprehensive review of the role of poverty and disasters, specifically in the United States, Fothergill and Peek (2004) noted that disaster effects vary by social class and, in many cases, are worsened by those factors. This includes vulnerability

in the areas of place and type of residence, as well as social exclusion. Social class and poverty operate through all stages of readiness to recovery. For example, among those who are low income or otherwise without economic power, the perception of risk and culture around risk can further marginalize groups from appropriate hazard protection. Rovai (1994) examined the differential role of the media in communicating information and disaster characterizations by economic status. For example, this work demonstrated that the media played a role in shaping the incorrect perception that a more-affluent town was more badly damaged after the 1992 Humboldt, California, earthquake than the neighboring lower-income community was. Socioeconomic status is also associated with greater stress after disaster because of anxiety over losing employment and other potential economic impacts. Further, lower-income groups tend to have a more difficult time navigating government processes to access supports during the recovery period. This can deepen the social marginalization process (Dash, Peacock, and Morrow, 1997).

While poverty is clearly the core component of social inequality described in many disaster and stress studies, it should be noted that some scholars have stepped beyond poverty to describe the role that social exclusion plays in exacerbating community stress levels (Bhalla and Lapeyre, 1997). Social exclusion is the mechanism through which some parts of the population are excluded from economic and social life. Social exclusion encompasses several dimensions at once; it places individual and community perception—and not simply income or the existence of poverty—as determinants of inequality-related stress. These dimensions include individual and community economic status (e.g., income) but also broader social (e.g., access to social services, opportunity for social participation) and political (e.g., civil participation, political power) factors. While how to comprehensively measure social exclusion is still debated, it is useful to consider this concept in the context of community allostatic load because it more holistically represents community stress. Social exclusion can account not just for stress within a household but also for stress that is experienced in communities and between individuals and the civic or governance structure of a community (most often the government).

Stress Narratives

Marginalization, aspects of exclusion, and inequality can worsen community stress and the ability of a community to respond to and recover effectively from a negative event or a series of negative events. But marginalized populations and inequity alone are not enough to explain the challenges that communities confront with stress and, particularly, how stress accumulates over time. As first summarized in the community trauma literature (see Chapter Two), the characterization of the negative or stressful event can influence how the stress is processed, communicated, and ultimately experienced. The interpretation of stress around the event can be experienced through social construction, historical trauma and narrative salience, public engagement in understanding the stress, and media portrayals.

Cannon (2008) explored the social construction of disasters, with particular attention to “innocent” disasters, defined as a disaster that “affects people who have not been placed at risk of hazard impacts by exploitative processes.” In this, stress and the experience of stress are related to choices that people make in choosing where they live. He uses two examples of disasters: one in which people choose to live in a hazardous area because of livelihood or other cultural attachment despite not being beholden to a class or institution that has

required the group to be there, and another case in which people must live in areas of risk because of their social status or class (e.g., gender, ethnicity). In the former, Cannon asserts that there are groups or entities that are not “innocent” or could receive the brunt of blame or responsibility—in short, rendering the disaster not innocent. While Cannon’s thesis centers on classic natural disasters, it is a useful frame with which to consider the role of how negative events are perceived, explained, and operationalized. For instance, one might posit that, in the context of community allostatic load, if the stress or negative event is seen as external to the population or community and the result of something systemic or unfair, it may be experienced differently. We know that stress perception is a key part of how stress is internalized and implicated in individual allostatic load. As such, the assignment of innocence to a negative event or disaster may influence how the community describes and chronicles its origin and its impact on the welfare of the affected community.

Returning to the community trauma literature, we know that historical trauma and the narratives that are used to explain historical trauma affect present-day health. Mohatt et al. (2014) offered a conceptual framework of historical trauma’s impact on health, using the role of public narrative. In this model, Mohatt et al. posited that there are two elements that remind a community of historical trauma: public reminders (e.g., public symbols, dominant cultural narratives, structural inequalities) and personal reminders (e.g., personal trauma, perceived discrimination, microaggressions). Together, these elements create narrative salience about the resonance of those narratives, which in turn influences individual and community health. Communities can develop resilience in the face of public narratives of trauma, and that ability to internalize, process, and then structure that narrative influences community well-being. Some studies have demonstrated a link between that narrative and the risk of mental health consequences of depression and anxiety (López, 2011).

Another aspect of stress narratives concerns how the public is engaged in understanding and addressing stress. Public engagement relates to how the community is involved in capturing and explaining risk to others in the community but also the level of involvement in community decisionmaking to address the problems. Some of the public engagement discussion has centered on public health disasters specifically; thus, an illustrative example is useful here. In an analysis of public deliberation and social distancing in the context of pandemic response, Baum, Jacobson, and Goold (2009) noted that public engagement is key for “transparency, creating public trust, improving compliance with public health orders, and ultimately, contributing to just outcomes.” Using an exploratory, deliberative process of community elicitation, the researchers found that there were several dimensions that characterized how people wanted to engage in responses to and decisionmaking related to pandemic flu. Choice related to that engagement could influence the relative burden associated with a negative event, should it occur. While the research was initially intended to inform how decisions should be made were pandemic flu a problem in the community, it reinforced other aspects of how people wanted to exercise autonomy and wanted their community peers to respond and engage during stressful events. Participants in this study wanted the community to maintain essential services, asked for ongoing public input and education (particularly in the face of high government distrust), and wanted to ensure that people acted in the community’s best interest (e.g., complied with social distancing) to avoid stricter enforcement measures. If the community was not supported to plan and respond in this way, it could exacerbate tensions and contribute to the stress perception surrounding the event. While there is not much work yet on the role of public engagement or use of deliberation in helping communities manage chronic or compounding stress,

as in the case of community allostatic load (Abelson, Eyles, et al., 2003; Abelson, Forest, et al., 2003), one might posit the important role such measures could have in managing poor stress perception if basic elements of public engagement are not addressed early and often.

Finally, we know that media characterizations of negative or stressful events can shape the narrative of response and recovery (Doerfel and Haseki, 2015). There has been criticism that the media can worsen community stress by sensationalizing the impacts, not presenting an accurate picture, or not representing the experiences of particular groups being affected, particularly those with less political or social power (Snow, 2008; Nelkin, 1996). In an analysis of how Australian journalists covered the threat from avian influenza, Hooker, King, and Leask (2011) noted that while the journalists interviewed felt committed to accuracy and providing comprehensive information in the public interest, if a stressful event persisted, it became increasingly difficult not to prioritize stories of dissent and criticism of government above other public benefit.

In response to Hurricane Katrina, there were many analyses of media characterization of the incidence of civil unrest and community stress. Tierney, Bevc, and Juligowski (2006) assessed the role of metaphor and myth in the context of Katrina response and recovery. The analysis explored how some of the mainstream media outlet characterizations of urban warfare and civil unrest (e.g., stories of looting, other violence) shaped the response differently than if the media frame had been more oriented to classic disaster response; in short, the latter can evoke feelings of unity and community, while the former inspires fear (Goltz, 1984). In the context of community allostatic load, this issue of what frame is used to characterize a widespread community stress or trauma can influence the experience of that stress or trauma and its impact of community health.

In the context of new media modes (e.g., social media), the issue of how negative community events are framed takes on new resonance. There is an immediacy of the reporting that can provide emotional context to the experience, but the characterization can also be skewed or serve to inflame the level of community stress (McCosker, 2013). If these findings are extrapolated to the concept of community allostatic load, these new modes positively or negatively contribute to the perceived stress level and thus could influence the ability of community members to process and manage the associated stress.

Institutional Fabric

In addition to the broader factors of vulnerability, marginalization, and how stress is interpreted and contextualized, the institutional context of communities has been shown to influence the experience and the handling of negative or stressful community events. In work on community resilience, Norris et al. (2008) described how the social and civic institutions in a community shape its adaptive capacity to respond to stress, particularly through the ability and speed with which those institutions can mobilize resources. Resilience is the function of networked and adaptive capacities that include key elements of institutional fabric, specifically the competence of community institutions and the capital contained in social networks (Maton and Salem, 1995; Handmer and Dovers, 1996). In a literature review of a community's ability to respond to and manage stress, there were several elements of institutional fabric that related to that stress capacity: institutional dysfunction (including civic system challenges, culture of fraudulence, and failure to disclose or act), the role of civil society, and the role of

decisionmaking, including in aspects of governance. We describe each of these in the following paragraphs.

Freudenberg (1993, 2000) and other scholars began to use the term “corrosive community” initially in response to technological or man-made disasters to describe the long-term effects of disasters on individual and communities, particularly when marked by delays in response, corruption, or other types of institutional dysfunction. While legal or policy response might be positive when used to appropriately address the impacts of a widespread stress, when those civic system processes do not work, this dysfunction can add to community stress levels. For example, Picou, Marshall, and Gill (2004) examined the role of litigation on the social and psychological well-being of individuals using the Exxon *Valdez* disaster as an example. Using such institutional variables as level of institutional trust and recreancy (“a form of institutional malfeasance where an expert, or specialized organization, fails to carry out a responsibility that is expected of them”), the authors found that protracted litigation can actually impede community recovery and contribute to psychological stress. In short, when civic institutions, such as the legal system, fail to act in good faith or expeditiously, that failure can exacerbate community stress. While the level of community attachment was shown to mitigate some of the stress, Picou, Marshall, and Gill (2004) found that it was simply not enough to counter stress impacts from failed civic processes.

Related to institutional dysfunction concerning breakdowns in civic and legal systems, communities in which there is a culture of fraudulence can also contribute to community response and ability to handle the stress. For example, in an analysis of bacterial contamination of water in Walkerton, Ontario, reviewers noted that there were several institutional issues that contributed to the tragedy: systemic fraudulence among public utilities, changes in how risk notifications were made, and other institutional deficiencies (Salvadori et al., 2009). Each of these factors not only made response to the specific negative community event difficult but also shaped the ability of that community to handle the subsequent stress on community well-being for some time.

Another dimension of institutional dysfunction is the failure of those institutions to disclose and/or act, which can influence community ability to handle a negative event and, ultimately, the community’s stress. For example, in the context of the occupational cancer epidemic in the United Kingdom, O’Neill, Pickvance, and Waterston (2007) found that poor data transparency, a failure to act on known workplace risks, and a failure to publicly disclose the problems associated with work-related cancers significantly affected the country’s ability to actively address the problem and maintain public trust.

In addition to these aspects of institutional dysfunction, civil-society organizations can play a key institutional fabric role in the ability of a community to handle negative events and manage stress. Disaster research has shown that voluntary, social, and philanthropic organizations are instrumental contributors to disaster response and recovery efforts. However, leveraging these actors has been highly variable across communities, and, in many cases, organizations that comprise this sector face inadequate policy and financial support to participate effectively (Cutter et al., 2008; Moore, Chandra, and Feeney, 2013; Özerdem and Jacoby, 2006; Waugh, 1993). While social and community-based organizations provide critical social, economic, and health services, there is evidence to suggest that their effectiveness could be enhanced if the relevant organizations were more formally engaged in recovery efforts and better integrated into planning at the local and state levels (Cutter et al., 2008; Waugh, 1993). In the broader community stress literature, the effectiveness of civil-society organizations in a fully mobilized

community response is central. When these organizations have well-defined roles to address social, economic, and health stresses, they can help to mitigate or lessen the negative impacts of a community trauma (Patterson, Weil, and Patel, 2010).

Finally, the role of governance and decisionmaking is an element of institutional fabric that influences the way a community manages and balances a stress. In the context of the social capital literature, we know that bridging social capital (links between people and civil institutions) and bonding social capital (vertical links between people and those in higher authority positions) contribute to community trust and the ability of the community to recover from traumatic events (Iwasaki, Sawada, and Aldrich, 2017). These types of capital influence the way that community residents engage with their institutions and their ability to advocate for change to address an acute or chronic stress. In fact, in the broader disaster governance literature, there are movements to understand how to build on the social capital literature to demonstrate the value of more-distributed community decisionmaking models. These models are ones in which there are multiple stakeholders addressing aspects of community risk and stress at all times (Djalante, 2012). Further, more-integrated models of decisionmaking that are both top-down and bottom-up tend to be more effective in facilitating community stress response (Mamula-Seadon and McLean, 2015). While much of this governance literature was initially rooted in the context of climate and natural hazards, the models could be extrapolated to other social and economic stresses.

Summary

The literature that examines how communities address acute negative events and chronic stress underscores three elements that contribute to the experience of cumulative stress: experiences and policies related to marginalization and inequity, how negative experiences are processed and contextualized by leaders and community members, and the role of formal institutions and informal networks in shaping and influencing the experience of the stress. Each of these elements appears to cut across different types of stress, from natural disaster to slower-moving stresses (e.g., economic downturns), although most of the literature to date tends to focus on the stress experienced from acute disasters.

Taken together with the disciplinary perspectives summarized in Chapter Two from individual allostatic load, community resilience, community trauma, and community well-being research, the literature review offers insights about the factors that appear to exacerbate or alleviate the negative consequences of stress that whole communities experience. We continue to emphasize the word *appear* because most of the literature is conceptual or observational at best, with some analyses that try to compare communities side by side. Despite these limitations, the research to date reveals key insights about the community stress experience and identifies possible avenues for intervention. For example, communities that are able to use accountability mechanisms or be more transparent about processes appear to mitigate the negative impacts of stressful events. Communities that can mobilize organizations to effectively respond to and care for the most vulnerable are also able to alleviate some of those stresses. On the other hand, communities that are challenged by difficulties in how they handle historical trauma and make collective, forward progress on social issues may struggle with the negative consequences of accumulating stress.

Key Themes from Community Analyses

Overview

While the literature review in Chapters Two and Three offered a fairly comprehensive review of key factors that influence the stress that communities experience and how they respond when shocks are introduced on top of those stresses, we wanted to explore whether and how these factors varied in communities that experienced some type of negative event or downgrading series of events from which they were now recovering (referred to hereafter as the *triggering event*). We decided to focus on communities experiencing one of four types of negative events: tensions regarding police–community relations; difficulties related to environmental exposures; challenges in economic recovery; and difficulties in dealing with public health crises, such as opioid addiction. We also decided to investigate pairs of communities experiencing each type of negative event to develop a more-nuanced picture of community response to each type of event. The community analyses are nested in the larger exploratory study, including the literature review and expert input, and the analyses contribute to the ultimate objective of constructing the initial conceptual framework for community allostatic load.

Community Pair Selection

To support community analyses, we ultimately selected four community pairs. To select the communities for further exploration, we first conducted a review of news reports and other web searches, identifying a large set of communities for potential inclusion ($N = 99$ communities were initially reviewed) and organized by the type of event experienced—economic, public safety, health, and environmental. Within those categories, we further described the triggering events (e.g., affordable housing crisis, foreclosure, major gas leak) to better match potential community pairs. Then, we organized additional information about the sites, including geographic region (e.g., urban, rural) and demographic composition (e.g., size, poverty level, inequality). As noted earlier, the geography for community analyses was determined by the impact area of the event (small municipalities and/or larger cities or county regions). We also used web searches to try to characterize the nature of the response, to the extent possible (including relative time frame of when the problem or triggering event appeared to start), which would lend itself to aligning pairs by demography but varying pairs by the quality of response and recovery (i.e., communities appearing to handle the triggering event differently). We searched for event experiences that were no older than the past two decades but ultimately landed on events that started no later than 2000. We tried to match communities by timing of event. In the case of economic recovery and public health crises, the event roll-outs are slower and, in some ways, more enduring, so they spanned at least five to ten years each. For the

police–community event or environmental crisis, the acute or triggering event happened over a month or two at most.

We note that we did not match on geography. As such, communities may be in different parts of the country but had to experience similar events and be as closely matched on demography as possible. We knew that only when we talked with stakeholders could we accurately characterize this response and recovery, and, even then, we knew we would not completely characterize all elements of recovery, community stress, or community history. But we were looking for pairs of communities where the response and recovery may have differed, at least crudely, to help us investigate factors that surfaced in the literature review, as well as new issues that may influence the experience of cumulative community stress.

We then organized and matched community pairs by demographic background and incident type and selected communities from that pool, with the ultimate sample of four pairs, or $n = 8$ communities. We should note that exact matching was difficult, as we tried to match on a range of economic and social factors and balance event-type experience, but, as noted later, most communities were relatively aligned. While we gathered as much objective information about potential community pairs as possible to inform our decision, ultimately the decision was subjective.

For the purposes of this report, we do not disclose the name of communities but rather describe key characteristics to help the reader understand general context. Based on sensitivities related to event experiences, as well as potential community characterization that one recovered better than another (based in some part on community views but mostly reliant on study team aggregation and perspectives), the team determined that naming communities was less important than surfacing the key drivers and factors that inform the concept of community allostatic load.

Once the community pairs were selected, we gathered data in two ways: (1) through in-depth searches for additional information on communities relevant to the negative event and response and (2) in-depth interviews with key stakeholders in each community. Our goal for the community analyses was specifically to explore whether the factors identified in the literature review were salient across conditions and contexts and to identify opportunities for measurement of community allostatic load specifically.

Data Collection on Community Pairs

Initially, we attempted to capture information on areas that were identified in our literature review (e.g., vulnerability marginalization) from secondary sources, so we could focus interviews on stress perceptions and historical conditions. But as we delved into this area further, we could characterize some elements of sociodemographic characteristics of the communities (e.g., disadvantage, some indicators in inequity or marginalization) but could find less information about the stress narrative and institutional fabric we outlined in Chapter Three. This is not surprising because these are not areas that are systematically tracked by communities, hence the reason for this exploratory study. We relied more on gathering these data in key informant interviews. But since these areas are likely key for future measurement of community allostatic load (see Chapter Five), we describe our initial approach to capturing this information to the extent that it is useful for future study.

From secondary sources (e.g., web searches, community reports), we searched for information on the following:

- **Levels of disadvantage.** As we noted in our literature review, we know that significant disadvantage can make developing networks of support more difficult, increase burdens on social service providers in the area, and, in turn, make community members less equipped to cooperatively and effectively advocate for themselves when crises occur. We included information on concentrated disadvantage (concentrated disadvantage index, often presented in quartiles, where lower values equals less disadvantage), income inequality (Gini coefficient, 0–1 range, with 1 being total inequality), racial/ethnic heterogeneity (index of heterogeneity, 0–1, where higher values equal more diversity), population stability or change, unemployment, income, and such health measures as chronic disease rates and community violence. Most of these data were derived from the American community Survey (ACS) and the Centers for Disease Control and Prevention (CDC). Some data were also captured from the RWJF County Health Rankings, which tend to integrate information from ACS and such surveys as the CDC’s Behavioral Risk Factor Survey.
- **Government functioning.** We initially tried to obtain information through secondary sources on government functioning, including trust levels and resources, but as we explored further, these data were very difficult to obtain systematically across all eight communities. Further, we looked for data on government representation and alignment with community demography, given that this theme had emerged in prior studies of community stress response. We know that government functioning and resident trust in government can affect the ability of leaders to provide support (financial, services, infrastructure) in times of crises; can contribute to resident sentiment that they cannot rely on government to provide basic services; and/or may keep residents from advocating for help during crises from leaders (e.g., because of public corruption). Ultimately, these government structural factors became difficult to tease apart in the interviews, although some respondents commented about the role and effectiveness of government as contributing to cumulative stress.
- **Community engagement.** Similarly, we searched for information about community level of engagement. As noted in Chapters Two and Three, communities that are less networked and more isolated may not have the resources or ability to get needed help or services during noncrisis and crisis periods alike. We searched for network information on social cohesion or social/social media data community sentiment before and after crisis. We also explored community service capacity. We know that low presence of civil-society organizations or NGOs or the presence of low-capacity organizations might leave significant portions of a community lacking needed services, which can exacerbate crisis situations. We included a measure of social associations in the background on each community, and, through our interviews, we describe issues of civil-society organizations, community coalitions, and general community activism as relevant.

Community Interviews

We conducted approximately ten to 12 interviews per community, with attention to stakeholders representing varied sectors, including the mayor’s offices or city councils, public health departments, public safety departments, environmental protection departments, economic development departments, media, social services organizations, school or educational institu-

tions, advocacy organizations, faith-based organizations, and/or business groups. Stakeholders were located through existing contacts the research team may have already had in the community, by identifying stakeholders in specific positions of interest (e.g., in local government), and via suggestions from other interviewees.

The interviews primarily deconstructed a local event or series of events and included a range of community stakeholders (government leaders and NGOs, including resident groups, advocacy groups, businesses, and other community-serving organizations) who were present through the event. The interviews explored the conditions that predated the event; the change in community conditions as the event unfolded, including triggering events; and how the community responded and recovered. We specifically queried informants about their perceptions of community function before and after the events. Finally, we asked respondents to reflect on data, measurement, and the extent to which they were tracking or would want to track other indicators of cumulative stress at the community level. Given that this work was exploratory and that we wanted to determine whether a framework for community allostatic load might have use in the future if further developed, we also asked respondents whether they saw value and use in pursuing a community stress assessment (see Appendix A for the protocol, which was tailored by event type and stakeholder as relevant).

Analyses

Given that we were trying to identify components that inform a framework for community allostatic load and the drivers for whether a community handles its cumulative stress effectively, most of our analysis was cross-community and cross-event type, where possible. For each key informant interview, we took detailed notes on the interview content and recorded interviews to ensure that we did not miss any key themes. Given time and resources, we did not fully transcribe all interviews. But our interview notes were comprehensive, including stakeholder quotations. Our analysis involved extracting themes and factors that influenced a community's ability to handle cumulative stress both from the secondary data and information gathered on each community and from the stakeholder interviews. As such, the team was searching for any insights that would expand on our literature review, affirm or contradict findings, and help us shape an initial conceptual framework.

We used the triggering event-based community analyses to search for information not simply about the one stressful or negative event, but to test this larger concept of community allostatic load. We pulled interview notes into Dedoose, a platform-based application for managing and coding text data, among other modes (such as visual data). We first organized and coded the interview protocol (see Appendix A) by characterizing the triggering event, drivers of the experience of the stress or triggering event (including historical context), mitigating factors, characteristics of response to the event, characteristics of recovery from the event (including how organizations coordinated to respond), and then indicators or data related to tracking cumulative stress. Two coders reviewed notes for coding, and after an initial pilot to assess interrater reliability, we mostly focused on whether each coder was categorizing themes in the same ways across these categories. Using the protocol categories was a robust approach and made coding relatively straightforward.

Once we had completed individual note coding in Dedoose, we were able to organize information across interviews and our set of community notes, which was key to ensuring we

extracted particular trends or factors related to community allostatic load. We were mostly interested in salient themes across diverse community contexts and triggering events because this was an initial study of the issues and mostly a proof of concept to assess themes from the literature review and deepen our understanding of these topics. We were less interested in discerning the relative difference in response to police shooting stress compared with the response to a natural disaster, for instance. Instead, we wanted to identify the mechanisms by which communities considered acute and chronic stresses and the factors that appeared to persist and that contributed to healthy or ineffective stress response and management.

Community Background

First, we briefly summarize the types of communities studied and the nature of the events in this section. We present systematic data on community characteristics (i.e., selected social and demographic indicators) to the extent possible to provide consistent structure across communities and descriptions of how the basic event response differ slightly given the nature of the incident or triggering event (whether acute or slow-moving over the long term). Following this section, we offer insights organized across communities. We note where a theme or response is relevant only to a particular event type or community. As a reminder, following on the literature review findings, we selected communities that had experienced or were experiencing issues related to economic downturn, public health crisis (in this case, opioid-related), public safety (in this case, police–community tension), and environmental disaster or exposure. The public safety and environmental disaster communities experienced more-traditional flashpoint or acute incidents, whereas the other two case pairs were characterized by a more rolling, chronic stress.

Triggering Event: Economic Downturn Communities

Background

We selected two communities that have been addressing economic downturn and recovery over the last ten years (since the late 2000s) but whose economic impacts could be termed “slower burn” rather than single, acute, or catastrophic all at once. The two communities are of moderate size (about 600,000 residents each), are considered bounded cities, and reported high growth based on population change between 2009 and 2014, each adding (on average) 50,000 new residents in that time frame. They were relatively matched on some economic indicators, with moderate amounts of concentrated disadvantage (index of around 0.30). But they varied on income inequality (Gini coefficient around 0.24 in community A compared with 0.34 in community B). Unemployment was more comparable (8 percent in community A, 10 percent in community B), and the rates of those living below the federal poverty level were similar (21 percent in community A, 18 percent in community B). They are less matched on demographic factors, with a range of very low (community A) or low racial diversity (community B) (based on quartile rankings of index of heterogeneity: 0.30; 0.44).

In terms of other indicators related to overall community health and well-being, the communities were comparable. We noted, however, some differences in health-service access. As of 2017, about 27 percent of residents in community A reported being in poor or fair health, while about 18 percent of residents in community B reported being in poor or fair health. Adult obesity was in the same relative range: 28 percent in community A and 32 per-

cent in community B. Excessive alcohol use was slightly lower in community A (17 percent) compared with community B (19 percent). Access to health services did vary more significantly, with much higher noninsured rates in community A (25 percent) than in community B (9 percent). Preventable hospital stays were comparable, with community A reporting 47 stays compared with community B at 54 stays.

In terms of social factors, such as institutional fabric or community violence, the communities differed with respect to the civil-society infrastructure. As measured by concentration of social or membership association, community A reported fewer associations per 100,000 people (4.9) than community B did (10.0). Community A reported less violent crime (364 per 100,000 people) than did community B (562 per 100,000 people).

Basic Event Response

While the Great Recession of 2008 negatively impacted communities across the country, some places fared differently. Neither community A nor B experienced an immediate decline, but both had to leverage parts of their economies to stabilize while still attending to the most economically vulnerable residents. The two communities had similar types of economies at the start of the decline, and they were mostly reliant on manufacturing and construction.

Community A appeared to weather the recession relatively well through 2015, but it is now one of the poorest communities in the nation. Initially, resilience to the downturn was because of the strong military presence in community A, which had benefits for the local economy. With this came expansions in infrastructure development, including investment in transportation infrastructure, new investment in construction, and large additions to the population that benefited the commercial and residential development community. Community A also had a certain amount of economic dependence and a relationship with a neighboring city, which served to strengthen the community's economy and contributed to its ability to effectively weather the recession (e.g., retail sales influx). Further, the neighboring community began to see increases in community violence, which affected perceptions of safety in community A. There was a net benefit to community A, however, as families relocated there and began to buy homes and invest in the community.

Community B's economic trajectory was comparable in that the stress or triggering event was not an acute shock but affected the community over a period of time. In the past ten years, the community has faced widespread but evolving economic challenges. When the Great Recession hit, the community lost around 40,000 jobs. In particular, this affected the working middle class, which had already seen declines in manufacturing. During this time, housing prices fell, and vacant or abandoned properties increased; according to respondents, the downward trend was to a lesser degree than in other areas, where housing had been built more rapidly.

After community B's initial hit in job loss, the economic downturn was represented in sector impacts over the next few years. There was a lack of construction and less residential or commercial development. Some of the stability in the economy was attributed to a relatively conservative environment that had predated 2008 (in short, no extreme highs or lows in any one sector). The larger response challenge was how to weather declines in manufacturing, which had historically influenced greater representation in lower-wage jobs than in middle- and higher-wage jobs. Community B began to tackle issues related to economic diversity as a key challenge to ensure that there was a better mix of manufacturing and logistics jobs, as well as jobs from such sectors as information technology, business services, and engineering.

Attracting the latter three sectors was a focus of the post-2008 recovery, and the effort is now being felt, with some notable successes in since 2015. facturing, community B's economy is now primarily driven by the health care, food service, and logistics and distribution industries. Like community A, which benefited from investment in the community development sectors, community B's overall economy has since recovered on the strength of its manufacturing and other sectors. Yet, the community continues to face uneven economic recovery issues, principally related to overall high poverty rates. Unlike community A, which experienced some net benefits of population growth given changes in a neighboring community, community B's population remained relatively stable even through the initial negative impacts of the economic decline.

Overall, the communities reported very different orientations to the economic decline. While community A weathered it reasonably well early on, the community has been challenged to diversify and did not fully integrate economic development as part of an overall community plan. This limited the engagement of particular organizations in economic response efforts. Community B, on the other hand, built from a collective action framework, engaging a range of businesses, nonprofit organizations, and academic institutions in designing a community growth plan. While both communities reported on ways leadership tried to infuse optimism in community narratives, it appeared that these messages were more robust in community B. Leaders from government and NGOs talked about the strength of the population and future growth potential, while in community A, the perspectives across government and NGOs were more mixed.

Triggering Event: Public Health Crisis (Communities Affected by the Opioid Epidemic)

Background

We selected two communities that have been addressing the opioid and related drug addiction problem for at least the past five to ten years (roughly from 2007 to 2017, with greatest focus between 2011 and 2017). The two communities are both rural and in states with a high percentage of rural regions. They are relatively matched on economic indicators, with moderate amounts of concentrated disadvantage (index: -0.06 to -0.08), moderate income inequality (Gini coefficient around 0.34 to 0.36), comparable unemployment (8–9 percent on average), and similar numbers of those living below the federal poverty level (18–21 percent of the population). They are a bit less matched on demographic factors, with a range of very low (community A) or low (community B) racial diversity (based on quartile rankings of index of heterogeneity: 0.06 , 0.46). Community A experienced a higher loss of population between 2009 to 2014 compared with community B, which had a somewhat more stable population. The size of the communities was relatively small—each had no more than about 16,000 residents.

In terms of other health indicators that may relate to overall community health and well-being, the communities had some comparability but also important differences in health services. As of 2017, about 23 percent of residents in community A reported being in poor or fair health, while about 12 percent of residents in community B reported being in poor or fair health. Adult obesity was in the same relative range, 36 percent in community A compared with 30 percent in community B. Excessive alcohol use was a bit lower in community A (12 percent) compared with community B (18 percent). However, access to health services did vary more significantly, with higher noninsured rates in community A (23 percent) compared with community B (6 percent). Preventable hospital stays were also not aligned, with

community A reporting 216 stays compared with community B at 46 stays, suggesting differential health-service quality that also may have implications for substance use treatment availability.

In terms of social factors, such as institutional fabric or community violence, the communities were comparable with respect to the civil-society infrastructure. As measured by concentration of social or membership association, both communities hovered around 12 to 13 associations per 100,000 people. In 2017, community A reported less violent crime (84 per 100,000 people) than community B did (176 per 100,000 people).

Basic Event Response

Both communities reported high amounts of opioid and related prescription drug use. Community A is situated in a state in which nearly 80 percent of unintentional poisoning deaths between 2007 and 2013 were related to prescription drugs. The community had one of the highest rates of drug overdose deaths in the state. The opioid death rate in 2015 for the state was more than 400 people per 100,000, and, in the selected community, it was close to 100 drug-poisoning deaths per 100,000 people in 2017. Community B was also situated in a state confronting the national opioid epidemic. However, the total deaths in 2015 related to opioid use were closer to 80 people. In 2017, the community experienced 35 drug-poisoning deaths per 100,000 people (CDC WONDER mortality data). In short, while both communities still have significant opioid and related drug issues, community B experienced a greater decline in opioid-related deaths than community A did.

The efforts to address the opioid issue in each community were similar, including increasing public awareness, expanding treatment services, and instituting prescription drug monitoring programs. In community A, the state legislature set forth efforts to increase awareness about prescription drug use, and the governor instituted a prescription monitoring program database to cross-check prescriptions across physicians. Community leaders also convened a coalition of individuals representing substance use, public health, law enforcement, and related social services to address the issue through reduction of access to opioids, principally to prescription drugs. The community worked to expand the availability of addiction treatment centers, particularly in rural and tribal communities, and obtained federal grants to support treatment. Respondents in community A were particularly focused on the issue of treatment and were concerned that the treatment capacity was never going to match the need.

Community B also tackled the issue by expanding treatment programs, reducing waitlists for treatment, making naloxone available for all state troopers, and expanding diversion programs. Most notably, community B created an overarching community structure that linked more than 100 stakeholder organizations, including churches, social workers, police, and businesses, to confront the problem. Many respondents explained that community B combined opioid issues with other aspects of social and economic well-being, which linked opioid use to systemic problems related to rural community life and the need to attract population back to the community. In community B, the police chief noted that having police central to the community's response to the issue was not going to be as effective as having a broader and more diverse community plan. As such, community B used its community coalition model that had clear goals that included a law enforcement and addiction focus with an added a focus on strengthening neighborhoods.

While many of the actions to combat the opioid challenge were similar across the two communities based on comparable initial approaches (e.g., creating task forces), the distinction

between these two communities was that community A spent more time exercising actions related to law enforcement, while community B focused more effort on creating an integrated community response plan in which opioid use was not the only focal point of action. Community B assumed a more interconnected response, which was spearheaded by nonprofit and law enforcement leaders working together (a government and nongovernmental partnership), sharing a common vision, and assuming responsibility for common outcomes.

Triggering Event: Police–Community Tensions

Background

We selected two communities that were challenged by incidents related to police–community relationships. This type of triggering event was important for the exploratory study because part of the motivation for this initial work was rooted in what could be learned from events in Ferguson, Baltimore, and other American cities grappling with this issue. The two communities in this pair are more suburban or urban than the economic and public health pairs, and they are based in two different parts of the country (Midwest and South). They are relatively matched on economic indicators, with low amounts of concentrated disadvantage (index of -0.31 in community A to -0.22 in community B), low income inequality (Gini coefficient of 0.23 for community A, 0.25 for community B), comparable unemployment (9 percent in community A, 8 percent in community B), and similar numbers of those living below the federal poverty level, although the percentage is not insignificant (23 percent in community A, 20 percent in community B). They are somewhat less matched on demographic factors, with moderate (community A) to high (community B) racial diversity (based on quartile rankings of index of heterogeneity: 0.52 and 0.61 , respectively). The population of community A is somewhat larger (about 390,000) than community B's (240,000), but both communities experienced strong population growth between 2009 and 2014, adding about 15,000 residents in community A and 22,000 residents in community B.

In terms of other health indicators that may relate to overall community health and well-being, the communities had some comparability but also important differences in health services. As of 2017, about 10 percent of residents in community A reported being in poor or fair health, while in community B, 18 percent of residents reported being in poor or fair health. Adult obesity was in the same relative range, 23 percent and 29 percent, respectively. Excessive alcohol use was a bit higher in community A (22 percent) compared with community B (18 percent). Access to health services was noticeably different, with lower noninsured rates in community A (7 percent) versus community B (15 percent). Preventable hospital stays were also not completely aligned, with community A reporting 43 stays compared with community B reporting 33 stays, suggesting slightly different health service quality across the two communities.

In terms of social factors, such as institutional fabric or community violence, the communities were comparable with respect to the civil-society infrastructure. As measured by concentration of social or membership association, both communities hovered around ten to 11 associations per 100,000 people.

Since violence and crime is a key component in police–community relations, we offer more contextual data for this case or event here. In 2017, the surrounding county of community A reported less violent crime (424 per 100,000 people) than community B did (613 per 100,000 people). But, when reviewing more-detailed 2015 Uniformed Crime Reporting data for the specific cities, community A had a rate of 1,063 violent crimes per 100,000 persons,

and community B had a rate of 847 violent crimes per 100,000; for comparison, New York City's violent crime rate was 586 per 100,000, and Los Angeles's was 634. The communities have higher-than-average violent crime rates and saw similar trajectories of violent crime over the past few years: Both cities experienced a small decline in violent crime between 2012 and 2013 before these types of crimes increased in 2015 and continued to increase into 2016, especially in homicides and shootings. In both communities, the highest levels of violent crime are concentrated in relatively small areas, which overlap with the pockets of minority populations and concentrated disadvantage described above.

Brief Event Response

Community A experienced two police-involved shootings of civilians within a year of the start of this project, and community B experienced more long-term, simmering tensions between the police and minority communities. For community A, the incidents happened in two neighborhoods in the city, but reactions were reported across the larger city. In community B, the tensions were localized in a few neighborhoods, but they received significant community-wide media attention. Interviewees from both cities felt that the current national conversation about police-related incidents and the increased coverage of incidents across the country contributed to the current attention being paid to these issues within their cities. They described a feeling of solidarity with other cities where residents were facing similar struggles and also found other cities' experiences to be a source of ideas for approaches to addressing the issue in their communities.

The two recent shootings in community A received significant national attention. Other police-involved shootings subsequently occurred, receiving mostly regional coverage but nonetheless contributing to the police–community tension in the city. To better focus our efforts in community A, we decided to concentrate our discussions with informants in one community in the city where one of the police shootings occurred. In that incident, a young black man was shot and killed by police, who said that they believed he had harassed his girlfriend and was interfering with paramedics' efforts to aid the woman. The police officers' accounts of the specific actions that led to the shooting are disputed by community members who witnessed the incident. One respondent also described the community as being “on edge,” not just because of the shootings but also because of a buildup of distrust from the community: Underlying the acute crisis (the shooting) was a general worsening of tensions between the police and the community over the prior few years. Along with the worsening tension was a spike in crime rates—homicides, in particular. In many ways, the specific shooting was a tipping point for community activism and conversation around long-standing issues in the community.

Community B did not experience a nationally covered police-involved shooting, but the police department there dealt with several police-involved shootings, one occurring in late 2016 in a public housing development; some in-custody deaths; and persistent accusations of bias in police practices over the five years prior to the start of this project. Respondents generally noted that there was no one precipitating event, but instead a slow accumulation of small incidents involving police that were perceived as being racially motivated. In 2013, an analysis of traffic stops and consensual searches in community B was conducted, and the results showed significant evidence of bias against minorities in decisions to stop, search, and arrest individuals.

Respondents universally expressed disappointment with how the prior police chief handled incidents, describing him as poorly communicating in the aftermath of a shooting or

incident by making statements that would make everything worse, denying that racial disparities were an issue in the police department, and generally refusing to work toward improving police–community relations.

Respondents noted that these serious incidents increased the concern over police use of force in the community, and, because all of the victims in these incidents were black or Latino, concerns were especially heightened in minority communities. Low-income communities and public housing developments were noted areas with high levels of tension between police and the community. Others described how some residents in these communities did not view the police as there to help and suggested that police actions in their communities made residents feel “overpoliced and underprotected.” This sentiment stemmed from minority residents feeling that they were disproportionately targeted for low-level drug enforcement or traffic violations and subsequent searches but were not protected from serious violence occurring in their neighborhoods or from the police themselves.

Triggering Event: Environmental Exposure/Crisis

Background

We selected two communities that had experienced an environment-related disaster. We opted for environmental disasters that were more acute in nature, rather than something slow-moving, such as climate change. The purpose was not only to discern how response and contributions to community allostatic load may differ in this type of event, but also to compare the relative impact of a relatively bounded triggering event with the other three event examples, which had both flashpoint and chronic stress elements.

Community A and community B each experienced an acute event characterized, respectively, by a gas leak and a gas leak and fire contained to a business at first (in this case, a refinery), which then affected the surrounding communities. Both community A and community B are suburban areas situated in the western United States. Since we wanted a distinct and relatively rare event type, the economic profiles of the communities were not as well-matched as we hoped. Generally, community A has higher levels of wealth and diversity than community B, although community A has higher levels of economic inequality (Gini coefficient of 0.51) compared with community B (0.24). Community A has very low levels of concentrated disadvantage (index: -1.27), while community B has moderate levels of concentrated disadvantage (index: -0.05). Unemployment was much lower in community A (4 percent) compared with community B (12 percent), as was poverty (community A, 11 percent; community B, 17 percent). The communities are somewhat less matched on demographic factors, with moderate diversity in community A and high racial diversity in community B (based on quartile rankings of the index of heterogeneity: 0.62 and 0.73, respectively). The population of community A is smaller (about 30,000 residents) than that of community B (about 100,000 residents). Community B experienced modest change in population between 2009 and 2014 of about 5,000 residents, while community A experienced about a 20-percent growth in the early 2000s; it has been relatively stable in size since 2010.

In terms of other health indicators that may relate to overall community health and well-being, we were unable to get specific community indicators but were able to pull the relevant county information (we refer to community A or B in the rest of the references to the demographic information, but these actually refer to the associated *county* data). As of 2017, about 19 percent of residents in community A reported being in poor or fair health, while in community B, about 10 percent of residents reported being in poor or fair health. However,

given the diversity of the county in which community A sits and other characteristics of community A, the likely percentage of poor or fair health is much lower. Adult obesity was in the same relative range in both places: 21 percent in community A and 25 percent in community B. Excessive alcohol use was comparable, with community A at 18 percent and community B at 19 percent. Access to health services did vary, with somewhat lower noninsured rates in community A (17 percent) compared with community B (19 percent). Given the economic conditions of community A, the county data are likely higher than the community-specific noninsured rates. Preventable hospital stays were somewhat comparable, with community A reporting 42 stays compared with community B at 34 stays.

In terms of social factors, such as institutional fabric or community violence, the communities were comparable with respect to the civil-society infrastructure. As measured by concentration of social or membership association, both communities hovered around five to six associations per 100,000 people. In 2017, the county in which community A sits reported more violent crime (424 per 100,000 people) than the county in which community B resides (366 per 100,000 people).

Basic Event Response

In community A, the local gas company had a gas leak in its storage facility, exposing residents to noxious odors, harmful gases, and other contaminants that seeped into the air and water. The leak took approximately four months to cap. Health response varied, as some residents of community A and neighboring areas claimed that the gas leak had not caused them to experience any health problems, while other residents reported that they and their loved ones had suffered from nosebleeds, nausea, dizziness, and other symptoms stemming from the leak. The gas leak also resulted in significant evacuations, and those who were displaced were provided assistance with relocation expenses. The business sector was also impacted by the evacuation due to loss in the customer base, but the U.S. Small Business Administration provided loans for business owners in the area. As a result of the experience in community A, there was a federal and state legislative response to prevent similar gas leaks from occurring and to assist victims of environmental crises. This included federal regulation of underground gas storage facilities to improve safety. There was also a state bill to prevent companies from basing settlements on whether the victim agreed to indemnity for the polluter in the future. The residents of community A also continued to respond to make sure that gas leaks would not affect property values or the safety of their community in the future. They organized efforts to ensure that other communities in the area, close to oil and gas operations, were protected and would not experience health or other safety concerns in the future.

Community B experienced a similar event (gas leak), but with the added challenge of a major refinery fire. As a result of the fire, 19 workers were put in danger, several workers were injured, and 15,000 residents were treated at local hospitals for such symptoms as breathing problems, eye irritation, and sore throats. State and federal officials who investigated the incident attributed the fire to the company's failure to comply with internal safety standards, poor regulatory systems, and the company's corroded pipes, which could have been replaced earlier. A review by the U.S. Chemical Safety Board affirmed these concerns, and the board discussed weaknesses in the company's emergency response, which may have worsened the leak situation. The board's report also raised issues about the refinery's safety culture, which encourages employees to continue working even in hazardous conditions.

In response to the fire, the state filed misdemeanor criminal charges. The company agreed to three-and-a-half years of probation, \$1.28 million in fines, and restitution payments made to key groups in the community and at the state level. That month, residents also protested at the refinery, intending to push the company to change its environmental and safety practices. Furthermore, community B sued the company, claiming its “willful negligence” led to the fire the prior year.

While both of the responses in community A and B included legal action, review of safety regulations, and community resident action, the responses differed in a few important ways. In community A, the residents trusted that response would be effective, while in community B, the refinery fire was not an isolated incident, but part of a larger tension between the community and the company over a range of economic (e.g., property tax payment) and environmental justice issues. Second, the response in community A was swift and included federal review and consideration of broader safety regulations. In community B, most of the legal action was protracted and included more contentious use of lawsuits to mobilize change. Both communities report that they have mostly fully recovered, but the unevenness of recovery across the two communities might be attributed to some of these distinctions in response.

Summary Themes

As the study team reviewed key informant interviews and other notes from community analyses, several themes emerged about community response and recovery and how the triggering event was contextualized in the broader experience of cumulative community stress. We used insights across communities because using diverse triggering events allowed us to understand whether there are common factors that might inform a framework of community allostatic load. In particular, we tried to extract lessons within community pairs that may explain differential response success and the ability to handle community stress. In some cases, there were themes that were comparable within and across community pairs; in other cases, there are distinctions that we describe. We summarize those themes in three major areas noted here, with examples from communities as relevant.

Community stakeholders expressed several key issues as they discussed their community’s ability to respond and recover, including socioeconomic issues, persistent policies around discrimination (or perceived discrimination) and inequity, and changes in demography.

Our community analyses affirmed that some of the literature review findings about key demographic and social factors were critical in determining community response and recovery—namely, the role of marginalization, equity, and social exclusion. Comparing the responses of the more and less successful communities in each community pair, it appeared that the existing social, cultural, and economic conditions were critical factors in whether and how the community was able to organize to respond and recover. As noted in these interviews, there were particular challenges around the existing community conditions of poverty, inequality, and a history of social disenfranchisement of particular groups. For instance, in the police–community examples, respondents frequently discussed the ties between violence and other types of disadvantage and stress in their communities—in particular, mentioning racism, manifested through residential segregation by both race (“you have pockets of neighborhoods that are all black”) and income, clustering the city’s poorest residents into one area (e.g., redlining, distribution of resources). Across the opioid, economic, and police–

community examples, community isolation was an issue, regardless of urban or rural setting. For example, respondents cited the impacts of having limited businesses or social services, lack of educational opportunities, poor community physical conditions, and lack of quality housing as key foundational issues that influenced chronic stress.

The community analyses identified concerns that existing policies either unfairly targeted a particular population or did not allow the community to improve itself effectively. For example, in the environmental crisis examples, respondents voiced concerns about regulatory policies that might affect environmental safety standards. In cases of economic recovery, policies that continued to reinforce inequity (e.g., loan policies, housing policies) were seen as contributing to uneven or impeded recovery when a major financial shock to a community occurred. For example, in the economic recovery example, community B's ability to attend to the most vulnerable with the lower-wage jobs while still diversifying economic sectors was a foundational policy challenge that contributed to persistent community stress, despite economic recovery. One respondent noted, "[There's] a segment of [the] population not getting ahead. If we're not able to bring everyone along into economic prosperity, then that's going to be an ongoing problem."

Finally, shifts in demographic composition in a community were observed as a difficulty if they were not handled well by community leadership to prepare the community effectively. If these demographic shifts were poorly acknowledged or handled, they often undergirded a community's challenges in coming together or assembling resources to respond to stress. For example, in communities addressing the opioid and economic recovery issues, there were clear concerns about the shifts in community composition that may affect the future viability of the community. In the opioid example, community B's change in demography was used as part of the intervention itself because it focused on building strong neighborhoods and having new residents wanting to live and work in the community. Key elements of the economic recovery examples were how communities A and B dealt with the issue of new residents contributing to community development and, in the case of community B, diversifying sectors beyond manufacturing. Community B was working to shape the narrative of diverse industries so that those with lower-wage jobs did not feel displaced or left behind—although, as noted earlier, issues of persistent poverty in a segment of the community remained a concern.

How communities perceived the stress, along with the actual amount and quality of stress, was critical.

While much of the literature focuses on acute events that surface on the preexisting challenges in a community, community respondents tended to emphasize the historical context of chronic stress. Interviewees noted that the length and complexity of stresses that had affected their communities weighed down their ability to respond to difficult events and shaped how the community characterized its own resilience. On the other hand, that history could also be a source for mobilization. For instance, in community B in the environmental example, one respondent noted that the incident

brought lot of attention to the city, raised things that had been happening for some time, people wanted to highlight good things happening in spite of challenges . . . created conversation about what's really happening [here]. Lots of community members feel like "we've got this spotlight now, let's not use it to focus on bad, let's focus on what's positive."

Not surprisingly, if a community felt it had weathered events and pursued solution-oriented strategies in response to past stresses, it described its response to the event discussed in interviews as being more positive and hopeful. Community B in the opioid example had already begun a successful process of bringing younger residents back to the community and effectively focused on economic development. That progress allowed the community to look at the opioid issue through a lens of community improvement and then reframe the problem. One respondent noted,

We reframed the narrative—stopped blaming everyone else—and took ownership of the issue. . . . I think we had love and hope—four years ago, we had hopelessness, we now came together for collaboration for greater good. Nontraditional partners working together for the common good.

Communities also noted the importance of characterizing the way stress affected particular subgroups within the population differently and how the narrative about existing stressors varied across subgroups. While comprehensive media analyses were not a major component of this work, our initial review of newspapers and other outlets suggested the importance of the media role in either quelling or exacerbating stress levels.

The example from the police–community events provides a useful illustration of the issue of the media; versions of this were articulated in other triggering event examples as well. In the police–community cases, the role of the media and the narrative that was created for residents were important factors in the experience of stress from the police–community tensions. Some respondents in those communities felt that by focusing on negative events that occur in an area, the media can create a narrative for outsiders—that the area is fundamentally unsafe, which may be internalized by the wider metropolitan area. The media emphasizes the legitimacy of police reports of crisis events and expresses skepticism of witness reports; this conflicting information and chaos further reinforce the perception that the area is lawless, a place where violence is rampant. The media also reinforce dangerous stereotypes of residents in the area, which, according to one respondent, can lead to “dehumanizing” treatment by police. These narratives suggest to outsiders that the neighborhood should be avoided, which can reduce business investment in an area, further reducing residents’ ability to improve their community’s conditions. The respondents noted that the media narratives can also be internalized by residents; repeatedly hearing about how bad their community is can lead residents to feel disengaged, disinterested in working to improve conditions, and, for some, less interested in following wider social norms.

Some respondents raised the issues of *othering* in their narratives—that is, marginalizing a person, a group, or incidents as not being part of the dominant or main group. This process of othering the violence (believing that violence happens only to a specific group) was a convenient excuse for the community—both the affected subgroup and the citywide community—to avoid taking responsibility for the problems. Another respondent said that many activists show up in droves to protest police violence, but when it comes to violence among residents in the community, residents are not willing to speak up—again, avoiding responsibility for the community’s role in violence. Other respondents suggested that, for residents in large parts of the city, there is a belief that there are poor police–community relations in a part of the city that did not fit the city’s image of itself. For many residents, this is true—they do not experience the same interactions with police as do those in minority communities. But this type of

othering provides an excuse for community outsiders not to join in the efforts to effect change in minority communities.

Finally, interviewees noted that the way in which community leaders responded to the stress and framed the community experience was critical to how that community responded and recovered. Communities that had better communication between leadership and residents were better able to deal with triggering events. Here, issues of trust were profound. While both community A and B in the environmental examples struggled with issues of poor communication at the start of event response, there were differences in communication that respondents believed influenced recovery and the experience of the stress. One respondent in community A noted that “open lines of communication probably has helped the most, serving as an opportunity for discussion, informing the public, and bringing concerns to us or to their providers.” Respondents in community B had mixed experiences at best, which made recovery uneven. One shared the following:

The initial response was very poor, very dilatory, and very haphazard. The refinery did not provide adequate information to the public initially. In the days following, the refinery and the spokespersons did a very poor job of being transparent in educating the public about health concerns. And this poor response exacerbated the tension and unease in the community.

Ultimately, several factors improved or impeded the ability of communities to handle cumulative stress, particularly in the wake of a triggering event.

Several factors surfaced across case-study examples that appeared to reduce the stress of the triggering event, even in the context of important foundational issues, such as poor socioeconomic conditions. These included the quality and length of time of government action in response to the triggering event. Communities in which government was viewed as at least trying to respond, particularly to address the needs of the most vulnerable, were better able to move forward after a triggering event.

Connection and coordination among civil-society organizations mattered as well; communities in which civil-society organizations or NGOs were actively engaged and seen as effective could reduce the stress and strain of a triggering event. For example, although communities A and B in the police–community event example differed in some of their response to the stress caused by the tensions, there was a theme that strong civil-society coordination appeared protective in both communities. In communities A and B, interviewees stated the role and importance of activism in their discussions about police–community relations. Both cities reported that several active nonprofit organizations coordinated protests, lobbied for new legislation, and created coalitions to fight for needed changes. The civil-society organizations provided significant leadership for community organizing around change.

Trust has been a consistent theme in the resilience, well-being, and trauma literature. Trust emerged as key in the community case studies as well—especially in the environmental and police–community cases, in which there was a clear group or body with the power to effect change that residents could choose to trust or not (e.g., the police department, specific government agencies, offending oil/gas company). Trust was a differentiator for those communities that appeared to handle the stress of police–community conflict or environmental trauma better. For example, stakeholders in communities that responded more effectively to police–community conflict consistently noted that trust in both individual leaders and in institutions

that serve the population was central to how their respective communities handled stress. In these communities, trust also affected their ability to identify and implement stress-mitigating efforts. At the heart of trust, respondents said, was transparency, which could be achieved by having a foundation of honest communication.

The role of transparency and communication in building trust was raised by respondents in the environmental case communities, who suggested that poor communication from the oil and gas companies complicated immediate recovery and created distrust that continued to linger. As noted in the communication theme, the initial response from the oil company in community A was poor. This lack of transparency created fear among residents, who believed that the oil company was “lying to [them]” and that the company was “not going to take care of things right . . . people aren’t trusting of [them].” In community B, the response from the gas company was similarly described as poor; this created a lingering mistrust of the company and fear among the residents about the air quality. However, the difference in community B was that the local health department stepped into the void, using its expertise in risk communication to approach the situation properly:

[I]t’s so easy to say the wrong things [and] suddenly, your credibility and relationship with the community goes to zero. This is a very high-stakes issue, high levels of concern by the community, and that communication has to be done right. . . . It’s really tricky to do this well.

The ability of community leaders to communicate and educate effectively—including a willingness to discuss the shared experience of stress and trauma in the community—appeared to lessen the impact of triggering events so that communities were not disrupted to the point of ongoing turmoil.

While these factors we just described appear to lessen the negative consequences of triggering events, there were a few drivers that were primary contributors to exacerbating the stress experienced in a community. First, if leaders and institutions were limited in their recognition or acknowledgment of historical stress issues, this not only reduced trust in leaders and institutions but also influenced how the stress was experienced and defined in the community. Interviewees noted that it was difficult to process community stress if it was not identified or named and if it was not connected to other community issues or experiences. Further, while many of the foundational issues, such as discriminatory policies, are often viewed as intractable or difficult to change by community leaders, communities that did not appear to be trying to address underlying structural issues through policy action or other response struggled more with triggering events.

For instance, in the example of police–community relations, the issue of trauma and how that was acknowledged was key. The trauma created significant levels of stress; according to one community interviewee, “It’s stretching and stressing our community in so many different ways.” High levels of violence and witnessing poor treatment by police created vicarious trauma. One respondent brought up her community’s high homicide rate and suggested that the trauma over those killings accumulates over time, but that, “as a society, we have no way of intervening to try to mitigate that trauma.” Police activity in the neighborhood can make children especially fearful: “[I]f you have a four- or five-year old seeing this stuff, [the trauma] shows up down the line in a totally different way . . . it really creates some embedded fear that people don’t realize [is there].” These experiences manifest themselves in different ways as chil-

dren mature, many times in the form of negative or delinquent behaviors. Other respondents described the violence and trauma as being transferred “intergenerationally.”

Respondents across all cases acknowledged that addressing the crisis event over the long term required connecting it to larger historical stressors and foundational issues. For the police–community sites, respondents linked overall well-being to violence but also reported fears that the wider public was not good at connecting the same dots. For example, while people understand that the city’s community redevelopment efforts are a way of improving lives and addressing poverty of place, they do not necessarily link positive aspects of redevelopment to mitigating the stress from police shootings or violence in general, particularly where policy is concerned.

Respondents in the economic sites were more positive about their ability to link economic development to other elements of well-being; there has been recognition that challenges to business and economy are interconnected with “education, workforce, and health. We’re looking [at it] much more holistically.” In one site, stakeholders thought through what education initiatives might be needed for the future needs of the region’s strong manufacturing base. The other economic site has emphasized quality-of-life initiatives to recruit and retain businesses and residents. According to one interviewee,

[I]t was a great place to be and live but didn’t have a lot of amenities to make people stay here or come here. So we’ve put a significant emphasis on . . . making walkable areas, adding more quality of life and retail options. . . . [We] have been focused on this as a principal strategy for growing the community over the past three years.

In one of the environmental cities, a community group worked with the gas company’s union to address issues together, despite initial misperceptions about the other side’s motivations. The union leadership noted that the union was “operating under false premises about [the] motivations of community-based groups . . . that those groups wanted to close [the company], period.” The community-based group “thought [the union] was unconcerned about environmental justice issues and . . . that it was their jobs that took precedent over the health of community.” Ultimately, both sides could see that they shared the goals of protecting community health and worker safety, health, and labor rights—and that “if you protect worker safety/health, you protect community health.”

Second, when the civil-society sector appeared out of alignment with each other (nonprofits and businesses) and/or with government actors, this was a key factor in how that community could identify indicators of stress and intervene accordingly. Several communities noted the role of coordination and benefits of collective action across event examples. Community B in the economic recovery example offered some good insight on the issue of coordinated community engagement and shared accountability. One respondent shared,

The key thing that we have been doing that has been very powerful is working through like a collective impact lens. The key piece is: Can you set a goal that has a wide buy-in by the community? Can you bring the right people to the table relentlessly and then the spirit of what can we accomplish as a community through transparency and communication and then how do you hold yourselves accountable to the commitments you make to that community?

Another business leader added, “We’re a business organization, so our job is not social justice, but we try to coordinate and understand that unrest is not good for business.”

Finally, power differentials between the community and the government, agencies, and organizations involved in the crisis event exacerbated the issues and hampered response and recovery efforts. When the community did not feel empowered to make changes, response efforts tended to be more limited; they focused only on the immediate crisis or took longer to get off the ground. For example, in one of the police–community sites, respondents spoke pointedly on the police union president’s role in driving policing issues in the city, describing the individual as obstructionist. Respondents lamented that the federation president was elected by officers, limiting the power that citizens have to change things—and even feeling that the police department leadership was unable to challenge the union president’s opinions or approaches. This significantly curtailed the ability to hold officers accountable for incidents in the community and complicated the efforts to build the police–community relationship. In the other police–community site, activists understood that making changes in the police department would be an uphill battle and strategically aligned themselves with two powerful political organizations. Activists asked the political organizations to help “boost their signal” by publicizing the effort more broadly; the partnership sent a message to the city council about there being broad political support for the desired changes, which gave activists more power to be heard.

In the economic cases, respondents noted their inability to increase wages in some industries, especially for entry-level jobs. One respondent mentioned a recently renegotiated union contract that paid entry-level workers \$12 an hour:

[I] don’t know how you can rationalize [that]. [I’m] bewildered because manufacturing fields, so much turnover, workforce development is so challenging because jobs don’t pay well enough so if money can go elsewhere, they get frustrated and they quit because it’s not worth it.

Another respondent echoed this, comparing wages with those in other cities: “[We] have too many people who do not enjoy a family-supporting wage. . . . A lot of people are not making enough to pay their rent, to put food on the table, save for their children’s future.” Issues with living wages could hinder the community’s ability to attract and retain workers, but workers typically feel like they have little power to change the situation.

These summary themes, along with findings from the literature review, serve as the building blocks for a community allostatic load framework. In the next chapter, we outline the core elements of that framework.

Initial Conceptual Framework for Community Allostatic Load

Overview

As summarized through literature review and community analyses, communities experience events and challenges that can shock them. Over time, communities accumulate stress, which affects individual well-being and the overall health of the community. Integrating perspectives from such fields as community resilience and community trauma can inform development of a framework and, ultimately, a measure of community allostatic load. The framework and measurement of community allostatic load can offer insight into how to better mitigate stress levels community-wide and how to create conditions that can promote health and well-being. We also might consider the role of community allostatic load to advance thinking about social determinants of health, to expand our understanding of how these determinants are physically embodied, and then to see how these two factors vary at both individual and community levels. As noted in Chapter Two, individual allostatic load refers to the cumulative fitness cost to an individual because of continuous adaptation to stress; following from that definition, community allostatic load is the fitness cost to the community that arises from adaptations to stress made by the community, such as those described in the community case analyses in Chapter Four.

In the next sections, we outline the initial conceptual framework that the research team developed based on insights from literature review and community analyses, further refined by expert input.

Key Findings Informing the Development of the Framework

The prior chapters provide more detail about specific elements that inform community allostatic load, and in this chapter, we briefly summarize cross-cutting findings from the exploratory study as the foundation that informed the ultimate depiction of the conceptual framework for community allostatic load.

Community environments influence the allostatic load of individuals. Exposure to greater cumulative neighborhood risk or stress—as defined by neighborhood sociodemographic characteristics, food and physical activity environments, family environments, and crime risk—is related to higher allostatic load among individuals. These risks or stresses are associated with outcomes among residents, which may include depression, anxiety, obesity, and chronic heart disease. Accumulating evidence suggests that health disparities can be partially

attributed to allostatic overload resulting from exposure to multiple physical, social, and psychosocial stresses at the individual, household, and community levels.

Community resilience frameworks that deal with chronic stress are also useful in understanding community-level allostasis. Our understanding of community resilience has moved beyond the classic focus on acute emergency-preparedness efforts to account for the fact that shocks do not occur in a silo but, rather, alongside or on top of long-term stresses—which, in turn, influence the community's ability to effectively respond to and recover from those shocks (e.g., restart civic processes, get people back to work). Current resilience frameworks also more effectively recognize the role of slow-moving disasters, such as climate change or community violence. For instance, recent work by Pinderhughes, Davis, and Williams (2015), among others, has introduced frameworks (adverse community experiences) to address and prevent community trauma and to recognize that communities, and not simply individuals, experience the effects of community and structural violence. There is a relationship between individuals who have collectively experienced stressful conditions and the experience of the community as a whole.

Expanding the construct of ACEs to adverse community experiences per Pinderhughes, Davis, and Williams (2015) has elevated an important discussion of symptoms of community trauma; the role of sociocultural, physical, and economic environments in influencing the trauma experienced by residents in a community; and the need to step past individually oriented trauma-based intervention models. Poor performance on drivers of well-being appear to contribute to community allostatic load. Key drivers of community well-being include factors that also contribute to community health, such as social connections, economic resilience, and local context. These drivers are also salient in the accumulation of stress. For example, economic resilience or vitality is essential to community well-being and can counteract stress levels. To build and maintain well-being, communities must engage in economic development and reduce social and economic inequities. Social connections are an important dimension of well-being and vital to feelings of optimism and resilience, which, in turn, influence stress perceptions. Local context (e.g., how communities are organized, community demography, community history) can influence resident perceptions of their well-being and drive engagement in healthy behaviors. If investment looks robust in a community's physical or social infrastructure, these factors can also mitigate the compounding of allostatic load.

Issues of segregation and marginalization affect community allostatic load. Our analyses, particularly those from the community, illuminated key issues of prejudice (e.g., racial or ethnic, economic) and residential segregation that inform the relative stress level of communities. For example, a history of racial discrimination, broader economic or financial exploitation, and exclusion contribute to community allostatic load. Structural drivers of mistreatment or marginalization are particularly challenging to address and relate to entrenched issues of alienation, perceived and real challenges in social mobility, and other issues that can drive up stress and contribute to the ability of a community to respond and recover from a range of stresses and triggering events.

Persistent policies that may exacerbate discrimination (or perceived discrimination across race or ethnicity, culture, social status, and economic status) and inequity, as well as changes in demography, can influence the level of community allostasis. Concerns that existing policies (e.g., loan policies, housing policies, environmental regulations) either unfairly target a particular population or restrict the community from improving itself contribute to stress. Further, shifts in demographic composition in a community, when poorly acknowl-

edged or handled (e.g., how leaders talk about new immigrants), can influence whether a community is cohesive enough to assemble resources to respond to acute stresses.

Community perception of stress is also important in the accumulation of community allostatic load. Just as individual allostatic load is influenced by how a stress is perceived (e.g., is that bear's roar coming from the television or from the backyard?), community perceptions of local stresses influence how stress is embodied (i.e., that stress is something from which one's community can or cannot recover). For this reason, historical context of chronic stress matters, and yet it is less well-understood or measured. Here, the field of cultural sociology is useful in identifying the processes by which community residents understand and interpret what is happening in the community. In our case studies, it was clear that perception and processing of stress were key. When communities feel successful in handling specific events and using solution-oriented strategies to deal with past stresses, the relative experience of stress can be mitigated or lessened. The distribution of stress across community subpopulations—and perceptions of how fairly stress is distributed—are critical to this wider community experience of stress. Power differentials and the perception of power can contribute to inequities in community allostatic loads and, ultimately, community health and well-being. Community leadership is central to how community stress narratives are framed and whether power is discussed or acknowledged.

Trust and the role of civil society are important in understanding community allostatic load. Community analyses revealed that communities in which government is viewed as at least trying to respond appropriately, particularly to address the needs of the most vulnerable, are better able to bounce back after a triggering event. Trust has been a consistent theme in the resilience, well-being, and trauma literature. At the community level, trust in both leaders and in the institutions that serve citizens is central to how a community handles stress generally and its ability to identify and implement stress-mitigating approaches.

Connection and organization of civil-society organizations matters as well. This includes the connections between individuals and organizations, as well as those among civil-society organizations. Those communities in which civil-society organizations or NGOs were actively engaged and seen as effective could reduce the stress and strain of a triggering event. Here, the role of civil society in building social capital and helping to create the bonds and bridges that underlie social capital development is important.

Expert Panel Review

As we developed the draft and then final conceptual framework for operationalizing community allostatic load, we convened a panel of seven experts representing research and practice from diverse disciplines and sectors, including law, public health, psychology, sociology, public safety, and community science. Because this area of community allostatic load is both complex and relatively nascent, we needed diverse viewpoints, given the multiple disciplinary threads this work reflects. We also wanted to understand whether the framework could be used by a range of stakeholders, including those who are making policy locally, those who are designing and implementing programs, and those who study aspects of community stress and well-being.

We convened two meetings of the expert panel through webinars, with some one-on-one discussions between meetings to hone particular concepts, issues, and potential measurement areas. Before the first panel meeting, the experts received a discussion paper summarizing the

motivation for the work and key themes from the literature review and community analyses. The discussion paper guided the first of two meetings of the expert panel regarding a potential framework to describe community allostatic load and ways to measure the concept. The primary focus of the first meeting was to discuss the potential for the concept of community allostatic load, how it fits with other emerging research and frameworks, and how the concept could be moved forward, including identifying potential measurement opportunities. We presented a draft framework during that meeting, with the goal of checking our concept and road testing the benefit of moving forward with such an idea.

We reconvened a month later for the second meeting after incorporating feedback from the first meeting into the final conceptual framework. We also used the second meeting to further explore potential measurement areas, which corresponded with the refined framework.

The expert panel shared several insights and also expressed concerns. They offered other fields of study or topics that we missed in our review of relevant literature and that might provide additional insight to our conceptual approach, suggested changes to the framework itself, explored potential end uses of the framework, identified measurement issues, and offered important cautions about development and use of the framework in the future.

We briefly summarize each of those here. For additional fields of study, the experts wanted to make sure that we were fully integrating social capital (e.g., bonding, bridging, and linking capital) as part of the institutional fabric that may help communities address cumulative stress. They pointed the research team to other cultural theories in sociology, which affirmed and informed our use of stress narratives (initially described in Chapter Three). They offered insights about other research to explore related to marginalization, such as power and gentrification.

When reviewing the initial framework, panelists sought more explanation of some of the initial boxes we had in the first draft framework, including what constituted foundational issues versus factors that alleviate or exacerbate stress. They were intrigued by our findings regarding the role of civil society, and discussions ensued about where this issue should be placed in the framework. They asked us how we might demonstrate the dynamic nature of networked behaviors among elements of the framework (e.g., among acute and chronic stress response, among individual and organizational actors). The experts were very interested in how we captured community-level factors rather than the aggregation of individually experienced stresses. And, finally, they felt that the stress narrative and how communities make meaning of stress were key and thus should be explicitly noted in the framework.

The expert panel also helped us understand end use—where the value of the community allostatic load and further operationalizing in a framework might exist. First, they felt that a framework would raise the relevance of important influences on community stress, health, and well-being. Second, the panelists reflected that the framework could serve as a tool for community groups to identify which factors to address that may influence community social, economic, and/or health issues but also may shape the effectiveness of certain policies, programs, or other interventions. Third, panelists described ways that a community could target areas at greater risk for high levels of community allostasis and, thus, cumulative stress overload. Finally, there was discussion of how an appreciation of community allostatic load might contribute to an understanding of when and where collective impact efforts to mobilize communities to make progress on an issue may or may not work because of factors contributing to allostasis, such as historical trauma or institutional dysfunction.

The panelists also provided some input on measurement, particularly the extent to which a community allostatic load framework could guide communities that do not routinely collect data but that may benefit from systematic data gathering and tracking. Namely, they argued that it is unusual for communities to gather systematic data on chronic stress and how it intersects with communities experiencing acute stresses. Further, communities generally do not track information on how stressful events were handled and how those events were messaged or characterized. There is usually little data on organizational structure and response, such as how civil-society organizations or NGOs engage and contribute to or alleviate cumulative stress. Finally, panelists offered important measurement cautions. Namely, they expressed concern about being careful about not measuring attitudes and trust in institutions in ways that are simply aggregations of individual views, rather than some community-level indicator of institutional trust.

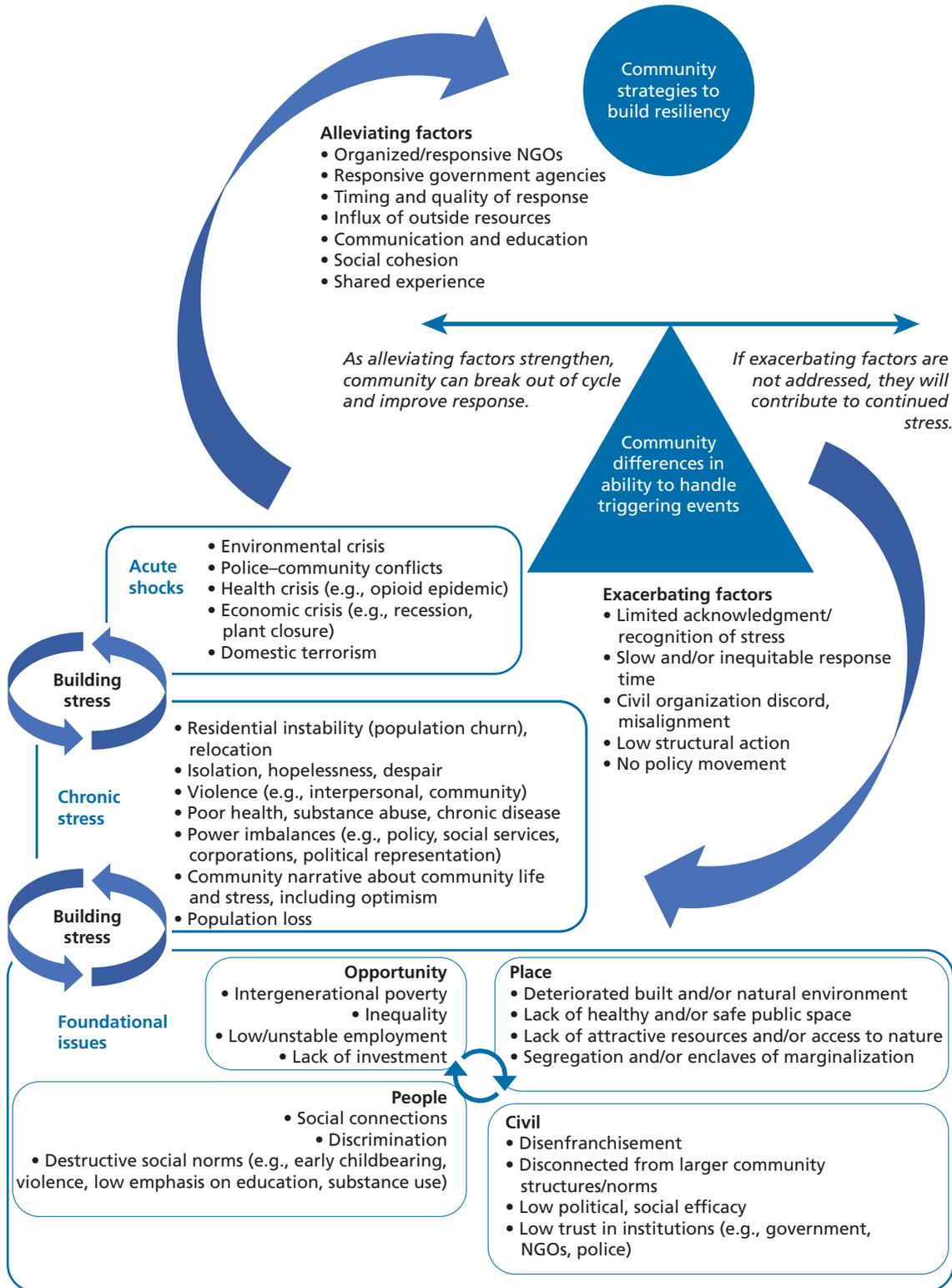
The last component of the expert panel discussions, which was particularly important because this concept is relatively new and complex, was to understand the overarching limitations in pursuing such an idea. While the panelists were generally supportive of continued development of this idea and felt that the benefits outweighed the drawbacks, they offered three main critiques of the concept for our further consideration. They argued that examining community allostatic load at the city or town level can be problematic. They noted that every neighborhood is unique and has other histories beyond the flashpoint or triggering event that might surface or contribute to the cumulative stress but that may never be easy to document or measure. As such, care in the consideration of community allostatic load at the community level versus allostatic load at the neighborhood level within a community is important. Panelists encouraged us to explore the bidirectional influences on stress, noting that causal identification or discernment of what pushed a community to high allostatic load or overload is likely difficult. This point resonated with the team, given that the literature review and community analyses were mostly observational. Community stories and conditions are so interconnected that isolating one factor that distinguishes a community that does not experience a high allostatic load or overload from one that does is challenging. Finally, the panelists cautioned that we should be wary of any stigma that might result from measuring community allostatic load. For instance, does describing and measuring cumulative stress change the community's narrative about itself and how others see that community?

Guidance for the Initial Conceptual Framework

Based on the literature review, community analyses, and expert review and refinement, we arrived at a final conceptual framework (Figure 5.1). We provide guidance on how to review and use the framework in the following sections. Note that we used some of the terms first identified in the literature review and community analyses (e.g., institutional fabric) but continued to refine terms based on expert input to be as digestible and usable as possible. Thus, institutional fabric was disaggregated in a few parts of the framework. It is part of the “civil” category within the foundational issues group and also part of the alleviating and exacerbating factors. Further, the bullets under each domain represent key areas that emerged in the literature review and community analyses but are not meant to be comprehensive or definitive.

Foundational issues. These issues are at the bottom of the framework. These can also be read as community contextual issues. These are enduring, often intergenerational features of

Figure 5.1
Initial Conceptual Framework for Community Allostatic Load



communities that contribute to stubbornly high levels of allostatic load. Of the three levels of stress shown in the framework (foundational issues, chronic stress, acute shocks), foundational issues are typically the hardest to address because they can often only be improved through slow, incremental change to enduring social and economic structures and norms. Knowing and appreciating these contextual factors is a key part of understanding community experience, history, and the drivers of health and stress. Foundational issues most closely relate to issues of marginalization and inequity described in Chapter Three but were further affirmed as key structural factors in community analyses.

We identified foundational issues in four domains: opportunity, place, people, and civil. This builds on work that predates the framework on conceptualizing adverse community experiences, as we referenced earlier. The issues we identified in these domains are closely linked, and the circular arrows connecting the four domains demonstrate how each domain feeds into and is exacerbated by conditions in other domains. The opportunity domain mainly refers to economic opportunity and includes issues related to the ability of communities to identify and take advantage of opportunities to improve their economy. Lack of economic investment in communities is closely tied to persistently low levels of employment and a lack of opportunities for quality, stable employment. Inequality can be exacerbated in communities with very low business investment and few services that support employed residents—such as the availability of banks or public transportation—because there are few opportunities that allow residents to climb out of poverty. The cycle is repeated over generations, resulting in communities that maintain persistent poverty and offer ever-fewer opportunities for residents.

Place, or the physical environment, is also an important consideration in understanding allostatic load; residents faced with a deteriorated built environment—such as vacant houses and lots, empty storefronts, run-down infrastructure, and limited access to the natural environment through parks, playgrounds, and quality recreational facilities—have restricted access to healthy lifestyles. These areas can become places that outsiders do not want to visit and make them less attractive for business development, further segregating and marginalizing the community.

Echoing the marginalization of communities are some of the issues we identified in the civil domain. With limited opportunity and degrading physical spaces come further disenfranchisement from the larger social structure in which communities are embedded. Communities with higher levels of allostatic load may become cut off from wider social norms and structures. Having seen businesses and services slowly leave their community, they may feel left behind and develop lack of trust in institutions and may lose belief that they have the political or social power to change their community. This also includes the disenfranchisement of people in community processes and decisionmaking.

This loss of connection to wider society and disempowerment can manifest itself in the people themselves, limiting their social connections with one another and tamping a shared sense of responsibility for the community. Structural discrimination has severe psychological effects on individuals and can also contribute to the loss of trust in institutions. Ultimately, destructive social norms may take root, including the acceptance of violence, substance use, and low value placed on education.

Chronic stress. Stemming from and building on the foundational issues that contribute to allostatic load are chronic stresses. These may not be intergenerational, as is the case with many of the foundational issues, but are instead low-level but significant processes. Chronic stresses compound a community's struggles in handling acute shocks and stresses. As foun-

dational issues lead to disinvestment, deterioration of physical space, and disconnection from larger society, residents who can move will do so, leaving behind residents with fewer means to escape and attracting residents with few alternative opportunities. Population loss and residential instability can lead to a concentration of residents with poor health and chronic disease. From a limited sense of political and social efficacy stem power imbalances with formal institutions; these imbalances may manifest themselves as disproportionate attention and harsh treatment from police and lack of access to health and social service providers.

Violence can also become an accepted feature of such communities, with limited trust in such institutions as the police or the government to address the situation. In these situations, residents may feel despair or lose hope about the possibility that conditions can change. Residents—and, sometimes, outsiders—may create a self-fulfilling narrative about the community that focuses on the negative and feeds into psychological distress. As chronic stress continues and, in some cases, worsens, it can deepen into foundational issues. In turn, foundational issues make it more difficult for communities to address chronic stresses.

Acute shocks. The framework notes the important and overlapping interaction among all three levels of stress, with acute shocks or stresses occurring atop, and feeding back into, chronic and foundational issues. Acute shocks are often the ones that get local or national attention—an incident between police and community members, a natural disaster, a sharp economic decline. These events are stressful in and of themselves as discrete events and also in accumulation. Levels of chronic stress and the presence of foundational issues can complicate the ability of residents to respond to acute shocks because these shocks often require connection to larger institutional structures.

As we noted in the community analyses, communities may also find their strength in response to acute shocks; residents may come together, develop social networks, and begin to exercise the political and social efficacy required to meet the needs of the community. Acute shocks may also serve to reconnect isolated communities to larger city or community structures and bring attention to their needs. As communities experience multiple acute shocks over time, they may become very flexible and adaptive, or, more often, communities may become hampered by the effects of persistent acute shocks, thus immobilizing any efforts to get a promising initiative (e.g., a health initiative) off the ground that can effect change at the foundational levels.

Community strategies that can address stress and, ultimately, allostatic load. Communities can build from their prior experiences, but they are also subject to factors, some of which may be beyond their control, that either alleviate or exacerbate allostatic load. Based on the alleviating and exacerbating factors that are activated through (repeated) acute shocks, communities may find themselves strengthened, or they can find their issues compounded and allostatic load increased. The triangle (or delta figure) in Figure 5.1 represents this difference and denotes differences in communities that maintain allostasis and those that might experience load or overload.

As we learned in community analyses, particularly in the example of opioid-related stress or police–community tensions, one of the challenges in addressing community stress is that the interventions are often sector specific or, for health issues, health-topic specific. The analyses that informed this community allostatic load framework were particularly critical in identifying and understanding alleviating and exacerbating factors, as noted in the framework. The framework suggests a more-holistic way of thinking about strategies that can either exacerbate or mitigate overall community stress. For instance, exacerbating factors include not having a

coordinated response, failing to acknowledge community stress, or having disarray and discord among the social or civil organizations in a community. Powerful mitigating or mediating factors that determine how well a community handles acute shocks include social cohesion, trust in institutions, community roles in engagement and influencing decisionmaking, and the ability to respond not only to acute stresses but also to chronic and foundational stresses. For example, as noted in the environmental response narrative, trust in institutions to convey information in a timely and accurate manner was key in aiding more-effective response and recovery. As communities build strength over time in their ability to respond to acute shocks, improvements will trickle down through chronic and, eventually, foundational stresses.

Potential Measurement

While the goal of this exploratory study was not to devise and test a measure of community allostatic load, we did want to identify ways that measurement could be pursued both for an overall measure and to assess component parts of the framework. As noted by the expert panelists, the systematic assessment of factors that may influence cumulative stress at the community level (e.g., historical trauma, institutional response) is rare.

There are three potential benefits of measurement. The framework could be used by community leaders to describe the current stress level in a community and sense challenges before a triggering event. We are not suggesting an alert level of yellow, orange, or red, but one could use the elements of the framework to explain community health and well-being through the lens of the four foundational issues and the experience of acute and chronic stress. Rather than discussing cardiovascular disease rates or diabetes prevalence alone, leaders could situate those health findings within the context of community stress. Using a holistic lens, leaders may be better able to anticipate emerging crises and prevent or prepare for them. For instance, a simple approach is to pair objective data on the percentage of the population that has been a victim of crime or is in poor health with subjective indicators, such as the percentage of respondents who felt safe walking in their neighborhood or respondents' perceived health status. If there are gaps between the results of the objective and subjective indicators, they highlight different norms and expectations across particular communities.

The framework could also be used to elevate the role of different drivers that influence community allostatic load. For instance, one could imagine a community narrative that discusses how a community did or did not handle a stress and how that experience is now influencing its future ability to address or improve community health. Relatedly, the framework could be used to explain differences between groups and neighborhoods within a community, particularly when more-classic social determinants of health (e.g., median income) do not fully explain a disparity.

Finally, elements of the framework could be used in an assessment tool to measure and assess different elements of community health and well-being. Further, programs seeking grant funding or community support could use this framework as part of assessing the likelihood of an intervention being successful or sustainable or whether additional community supports are needed because of this history of community stress. The work on community allostatic load

suggests several areas of measurement that are not consistently part of community health and well-being measurement, such as

- community history of stress response, graded on a scale or qualitatively assessed and summarized
- catalog of acute and chronic stress experience, in a way that could be indexed or summarized
- community social fabric, including relative trust by residents in institutions and the role of civil organizations
- perceptions and characterizations of stress, either through survey and/or social data/social media analyses
- the extent to which community policies account for stress or allostatic load in decisions about length of a policy, intervention, and/or resource allocation. For example, a community might consider historical stresses and how they may factor in where and how resources are distributed.

In the next section, we offer sample tables by the sections of the conceptual framework (foundational, chronic stress, acute stress, alleviating factors, exacerbating factors) that might be considered. We identified potential measurement areas and indicators based on the literature review, community respondent ideas, and expert panel input. In the second category, there were many indicators identified in the community analyses that were very specific to the triggering event (e.g., economic indicators in the economic recovery examples, violent crime in the police–community relations examples, treatment quality in the opioid examples). However, there were some broad categories that most respondents felt were important to track for both community recovery but also cumulative stress. These included the following:

- quality of place or the built environment
- attitudes of residents toward government and other institutions
- community sentiment about local problem-solving
- trauma, psychological recovery from negative events.

As noted at the outset, we did not test these measures in this first phase (pilot study). Data exist for some of the sample indicators, while others suggest areas that communities could measure in the future. The intention of these tables is to offer ideas that correspond with the framework components only. We offer a few examples (foundational, chronic stress, alleviating factors) in Tables 5.1–5.3. See Appendix B for the complete tables.

Table 5.1
Foundational Issues: Sample Measurement Ideas

| Construct | Key Component | Potential Measure Area | Sample Measure | Likely Data Source |
|-------------|--|------------------------------------|---|-----------------------------|
| Opportunity | Disinvestment | Withdrawal of homeowner investment | Census tract distribution on number and value of mortgages | Administrative or secondary |
| Place | Segregation or enclaves of marginalization | Residential segregation | Diversity exposure | Administrative or secondary |
| People | Social connections | Social support | Percentage who can rely on someone for social, emotional, and/or instrumental support | Survey |
| Civil | Low political, social efficacy | Political efficacy | Sense of political efficacy scale | Survey |

Table 5.2
Chronic Stress: Sample Measurement Ideas

| Construct | Key Component | Potential Measure Area | Sample Measure | Likely Data Source |
|-------------------------|--------------------------|--------------------------|--|-----------------------------------|
| Residential instability | Population permanency | Tenure in community | Percentage of population that has been in community greater than ten years | Administrative or secondary |
| Isolation | Despair | Hopelessness | Beck Hopelessness scale | Survey |
| Violence | Community violence | Violence exposure | Percentage of children exposed to violence | Administrative or secondary |
| Poor health | Chronic disease | Disability | Disability-adjusted life years | Administrative or secondary |
| Power imbalance | Political representation | City council composition | Percentage of council that maps to community demography | Administrative or secondary |
| Community narratives | Community history | Experience of stress | Qualitative assessments of cultural and community narratives | In-depth interviews, social media |

Table 5.3
Alleviating Factors to Address Community Stress: Sample Measurement Ideas

| Key Component | Potential Measure Area | Sample Measure | Likely Data Source |
|---|--|---|--|
| Success of response or effective response | Role of external organizations in response | Level of external engagement in response, proportion to internal actors | Key informant interviews, observations |
| Depth and diversity of civil-society organizations | Range of civil-society organizations, addressing diversity in population | Representation of civil-society organizations for minority groups in community | Key informant interviews, observations |
| Trust in institutions; response dependent | Relative trust of residents in leadership action and messaging | Sentiment analysis of community confidence in local leadership | Social media analyses |
| Connection of groups during the immediate response and long-term recovery | Relative engagement and alignment of subpopulations in response and recovery | Collective comment on community response and experience | Media analyses |
| Quality of information or materials | Material cultural responsiveness and clarity | Percentage of materials that use effective communication science, employ clarity of messaging, are action oriented, and are linguistically and culturally diverse | Document review |
| Community narrative | Media expressions around event or stress | Coding of stress and resilience proportion | Media analyses |

Summary and Next Steps

This report describes the key themes from this community allostatic load project and its potential application to work that RWJF is pursuing as it advances its Culture of Health in America initiative. This work has only begun the inquiry into whether the notion of community allostatic load could be grounded in literature and community experiences and whether the concept could be operationalized. We found demonstrated interest in this concept by community leaders and developed an initial conceptual framework and a sample set of complementary measure areas.

Next Steps

There are several potential next steps for this work. First, it will be important to disseminate key study findings and the initial conceptual framework for use by researchers, community leaders, and other stakeholders. Disseminating this information will allow us to assess additional value and use of the framework, as well as expand understanding of how the dimensions in the conceptual framework could be further operationalized and tested.

Second, as noted earlier, this is only the first phase of the framework and measures development effort for community allostatic load, and, thus, it requires testing of leading indicators summarized in Chapter Five and Appendix B. This might include gathering data from existing and new data sources in each of the dimensions of the framework, then going back into communities that have experienced stress to assess the predictive validity of those measures against community response, recovery, and overall stress level. The community testing might also include a broader assessment of data-collection feasibility, given that some of these measurement areas are relatively new in community health and well-being monitoring.

Third, it will be important to understand how to use community allostatic load in the context of community narratives and messaging. One of the motivations of this work was to aid public health leaders in communicating the issue of community cumulative stress and the impacts on health and well-being. Given this, the next logical step is to explore what easy-to-understand, accessible messaging strategies could be used to explain the importance of viewing health through an appreciation of this concept of community allostatic load. This may require consideration of how to better message information about the cumulative interaction of acute and chronic stress and how public health and other community leaders are trained about ways to communicate how the community is affected by complex interactions of trauma and stress over time.

Finally, the ultimate goal of any work in community allostatic load is assessing how adding some measurement of this concept could better inform future grantmaking, health planning, and policy development. For instance, RWJF, a granting institution that focuses on developing a Culture of Health, well-being, and health equity, could consider how community allostatic load can be a counterpart measure to measures of individual well-being (e.g., ACEs) currently prioritized in the Culture of Health action framework. Since the Culture of Health initiative includes a focus on creating shared values around health, research on community allostatic load could consider how shared values are shaped or influenced by community stress experience. The Culture of Health initiative also includes a focus on engaging nontraditional health sectors in promoting health. The community stress experience, as operationalized by community allostatic load, may be better understood by these other sectors (e.g., economic development) than if the initiative simply described community health.

For individuals interested in developing more-robust health policies and programs, community allostatic load (as articulated in our initial conceptual framework) could help policy-makers understand how to capture the links between power, community stress, and individual health outcomes in policy development or program design. Efforts to improve community design for health could consider the extent to which design policies and programs should consider the stress experience. As part of healthy placemaking, many communities are trying to create spaces in which community members can connect to enhance social cohesion. It would be worth exploring how these spaces and places could mitigate community stress experience. For those focused on improving health services and systems, the community allostatic load framework could inform conversations about facilitators and barriers to population health improvement and guide prioritization of health care interventions that consider the role of health care institutions in communities—and the role they play in their community’s historical and political context (e.g., issues of trust in health/health care institutions).

Key Limitations of Community Allostatic Load

While this initial work was principally a proof-of-concept exercise, there are important limitations that should be noted about the concept of community allostatic load.

First, most of the literature that has been integrated to develop this initial framework is conceptual or observational. That is, with the exception of some of the case studies in disaster response and community resilience, the literature on isolating and testing factors that contribute to community ability to handle stress or recover from trauma over time is still relatively limited. There are very few prospective longitudinal studies, which makes discerning stress trajectories and mechanisms by which communities handle the interdependency of acute and chronic stress very difficult.

Relatedly, several challenges exist because of the limitations in the current empirical foundation, a point that was further affirmed in our community analyses. For this research, it is very challenging to isolate the triggering event and the drivers that contribute to general stress versus drivers that influence the experience of cumulative stress load or overload. This includes determining directionality in how foundational issues in the framework are compounded by acute and chronic stress events and where and how alleviating or exacerbating factors intervene. In short, we attempted to piece together literature, community analyses, and expert-

panel input to identify the most salient interactions among factors, but we do not yet have a sense of causality.

We were also limited by the fact that measurement of some of the dimensions in the conceptualization of community allostatic load (e.g., community stress narratives) is not part of routine community data collection. This is particularly true for measures that capture community processes, rather than those that are focused on the aggregation of individual experiences. Thus, we do not yet have a repository of systematically collected information across communities in key measurement areas beyond our initial attempt via community analyses and key informant interviews. To better round out the framework and test this proof of concept, we would need information that captures the roles of organizations in a community, the characterization of community trauma, the response and recovery to stressful experiences, and a host of other measure areas.

Finally, the conceptual framework for community allostatic load is focused on the interaction of acute and chronic stress, then on factors that appear to be critical in mitigating or reducing stress levels as these levels accumulate. The framework has not yet been tested to further discern the impacts of cumulative stress on the community's well-being or the ultimate trajectory of the community. While the hypothesis is that cumulative stress that is not handled well at the community level results in poor community outcomes, further study is needed to fully test this point.

Summary

Despite the limitations articulated in the previous section and the fact that this community allostatic load framework should be viewed as formative work in a new area, there are important benefits to this research. The concept of community allostatic load uniquely knits together streams of work on individual stress, community resilience, community well-being, and trauma in a new way to help community leaders understand the interplay of the stress experience and the deleterious effects of compounding stress on communities as a whole. By putting these ideas under the umbrella of allostatic load, communities might be better able to isolate factors that mitigate or exacerbate stress when negative events happen. Community allostatic load, if properly framed and measured, could be a barometer that enables communities to assess how they are handling current stress levels and where pressures could mount when experiencing an acute event. Future research should deepen the examination of the mechanisms of community-level stress response, as well as the dynamics of community organization and community systems that support healthier stress management. In this report, we used a definition of community that was geographically bounded, but future studies could also examine whether and how the framework (foundational issues, alleviating and exacerbating factors) may apply to culturally based or other types of communities.

Key Informant Protocol

This appendix shows the complete list of potential questions. Because interviews were tailored by community stress type and by type of informant, not every informant was asked every question.

Background Information

In this section, I'll ask you some basic questions about your background and your community.

[Background information may be able to be filled in prior to the interview, but we should also confirm this during the interview.]

1. Respondent's initials:
2. What is the name of the community you live in?
3. What is the name of the community you work in?
4. What do you do for a living?
5. Have you ever worked for the government or a service provider in your community?
6. How long have you lived (and/or worked) in the community?
7. In general, how would you describe your community?
 - Do you enjoy living (and/or working) there?

Research Topic: Triggering Event

In this section, we'll briefly discuss a specific event your community has experienced (we'll discuss the event in more detail in later sections of the interview).

8. How would you describe what happened during this event (e.g., shooting, epidemic, foreclosure crisis)?
 - Who was involved?
 - What provoked the event or got it going? (I.e., was there a specific incident that contributed to the event or reason that the event occurred?)
 - How did this event impact your community?
 - Has an event like this happened in the past?
9. Were certain parts of the community (e.g., certain populations/certain areas) more or less impacted by the event?

10. Are there policies or regulations that contributed to the impact of this event? For example, were there policies that might have made response to the event more difficult either community-wide or for particular groups?

Research Topic: Stresses/Drivers

In this section, we'll discuss community conditions, both before and after the event occurred.

Stresses/Challenges

11. What stresses or challenges [give examples like inequality, racial segregation, poverty] were in place *before* the event? This means, what was the state of the community before this event occurred?
12. What stresses or challenges [give examples like inequality, racial segregation, poverty] were in place *after* the event? Once the event hit, what kinds of conditions were experienced? Were the same conditions in place or did they change in any way?

Community's Perceptions of Community Conditions and Well-Being

13. How would you describe the community's perceptions (e.g., trust) of community conditions and general well-being (e.g., how well is the community functioning) *before* the event?
14. How would you describe the community's perceptions (e.g., trust) of community conditions and general well-being (e.g., how well is the community functioning) *after* the event?

Community's Perceptions of Government

15. How would you describe the community's perceptions (e.g., trust) of the government *before* the event? Was this a community that was involved in local decisionmaking? How cohesive would you say the community was around a common vision for what the community should be?
16. How would you describe the community's perceptions (e.g., trust) of the government *after* the event? Did the event change how the community interacted with government leaders? How so, or in what ways?

Research Topic: Response/Mitigating Factors

In this section, we'll discuss your community's response to this event.

17. How do you think your community responded to this event (positively or negatively)?
 - Were certain stakeholders in the community (e.g., the health department, city government) more actively involved in responding to the event? Who were those people/organizations?
 - Did certain stakeholders in the community react more positively than others? Did some stakeholders react more negatively than others?

18. Did your community work in collaboration with other stakeholders outside your community to respond to this event?
 - If yes, who were the individuals that were involved? Why did they engage? (Probe: Were there historical reasons, other experiences of collaboration that informed this event, other?)
 - If not, how do you think external stakeholders could have been involved? To what extent were these stakeholders not engaged because of lack of awareness, lack of prior engagement in other community activities, else?
19. How would you describe collaboration among relevant stakeholders prior to the event?
20. In general, is there an anger/blaming mentality in the community or a solution-oriented (i.e., let's just fix it) mentality, or both?
 - Has this mentality changed over time?
 - Why do you describe the mentality in this way? What are the key drivers in your view?
21. What factors (e.g., policies, community conditions) do you think may have been in place that lessened the impact of this event?
22. What factors do you think should have been in place to prevent or lessen the impact of this event?
 - Why weren't these factors in place?
 - (Probe if not stated: community engagement, dissemination of information, etc.)
23. Were any government-level policies created because of this event to prevent another similar event from happening? If not government, any other actions taken by the community? What were those/what were the key elements to the plans/policies, and how has it been working?
24. Are there any ongoing efforts to build community well-being after the event? What are they?

Research Topic: Recovery

In this section, we'll discuss how your community has recovered from this event.

25. How is the community now in terms of getting back to "normal" or back on its feet after the event?
 - Is the problem persisting or has your community addressed the problem?
 - (If the problem has been addressed) How did you know your community had returned to pre-event conditions? Did the community start to address related issues in any way as a result of what occurred?
 - (If the problem has been addressed) What factors have helped the community get there?
 - (If the problem has not been addressed or not been fully addressed) Why do you think this problem is still ongoing? (Probe: Are there impediments in messaging, community organization, or other structural issues?)

26. As a result of this crisis, do you feel that certain community members have formed networks or interacted?
 - Why have these individuals interacted? What have they specifically aligned around?
 - Do you feel that these networks have impacted community recovery from the crisis?
27. How else do you think the event has impacted the community (e.g., how people work together, how people communicate, knowledge of community resources)?
28. Do you know of any other communities that experienced a similar event?
 - If yes, how was the event handled there? Similarly? Differently?
29. What things would you want to measure or have data on to assess recovery from this crisis—in other words, what are the most important factors for understanding whether the community has recovered or not?
30. What is the community watching for to understand whether a similar event might be on the horizon?
 - What specific signals is your community using? Or, what should your community be using?
 - If you were to advise another community that may experience something like this in the future, what markers of response and recovery would you use? What tells you that the community is ready to respond, and then to recover most effectively?
31. Are there activities now that you have in place to make sure future challenges like these aren't as difficult?

Recommendations

32. Is there anyone else you would recommend for us to speak with about this event?

Potential Community Allostatic Load Measure Areas

Tables B.1–B.5 outline sample measures that complement the community allostatic load framework. They show the measures of foundational issues, chronic stress, acute shocks, exacerbating factors, and alleviating factors.

Table B.1
Measure Area: Foundational Issues

| Construct | Key Component | Potential Measurement Area | Sample Measure | Likely Data Source | |
|---------------|------------------------------------|--|--|---|--------------------------|
| Opportunity | Intergenerational poverty | Chronic non-income poverty | Chronic, transient poverty | Administrative/secondary | |
| | | Intergenerational equity | Intergenerational transmission of income | Administrative/secondary | |
| | | | Intergenerational transmission of education | Administrative/secondary | |
| | | | Intergenerational transmission of health | Administrative/secondary | |
| | | Intergenerational mobility | Relationship between social standing as child compared with social standing as adult | Administrative/secondary | |
| | Inequality | Income inequality | | Gini coefficient | Administrative/secondary |
| | | | | 80/20 differential (see RWJF County Health Rankings and Roadmaps) | Administrative/secondary |
| | | | | Percentage with income below federal poverty level | Administrative/secondary |
| | | | | Percentage receiving public assistance and distribution by gender, race/ethnicity, etc. | Administrative/secondary |
| | | | Disadvantage concentration | Ranking on disadvantaged concentration | Administrative/secondary |
| Unemployment | Unemployment rate | Level of unemployment in local area | Administrative/secondary | | |
| Disinvestment | Withdrawal of homeowner investment | Census tract distribution on number and value of mortgages | Administrative/secondary | | |

Table B.1—Continued

| Construct | Key Component | Potential Measurement Area | Sample Measure | Likely Data Source | |
|-----------|--|---|--|--|--------------------------|
| | | Withdrawal of landlord investment | Change in loan amounts per housing unit | Administrative/secondary | |
| | | Lending pattern changes | | | |
| | | Concentration of community development corporations | Level of reinvestment (inverse of disinvestment), by total dollars or percentage | Administrative/secondary | |
| | | Vacancy | Rate or distribution of vacancies | Administrative/secondary | |
| Place | Deteriorated built environment (or positive reverse) | Affordable housing | Production of affordable housing | Administrative/secondary | |
| | | | Production of livable housing | Administrative/secondary | |
| | | Quality of housing | Reported housing pest infestations; household lead exposure | Administrative/secondary | |
| | Lack of healthy or public spaces | Distribution of green space | | Square acreage, or concentration of green space | Administrative/secondary |
| | | | | Areas of public open space | Administrative/secondary |
| | | | | Residents living within one-quarter mile of a park | Administrative/secondary |
| | | Presence of well-being amenities | Index of well-being amenities (e.g., community spaces, libraries) | Administrative/secondary | |
| | Lack of attractive resources | Pride in place | Percentage noting that they think their community is beautiful | Survey | |
| | | Arts and culture investment | Percentage of investment in culture and arts | Administrative/secondary | |
| | Segregation/enclaves of marginalization | Residential segregation | | Diversity exposure | Administrative/secondary |
| | | | Evenness | Administrative/secondary | |
| People | Social connections | Social support | Percentage that can rely on someone for social, emotional, and/or instrumental support | Survey | |
| | | Connection to institutions | Percentage reporting that they have at least one community organization that can provide support | Survey | |

Table B.1—Continued

| Construct | Key Component | Potential Measurement Area | Sample Measure | Likely Data Source |
|---|--|--|---|--------------------------|
| | | Network density | Network scores on personal relationships and connections to others | Survey |
| | Discrimination | | Organizational density (e.g., see RWJF County Health Rankings and Roadmaps) | Administrative/secondary |
| | | Race-related events/experience | Schedule of racist events | Administrative/secondary |
| | | Perceived racism | Scales of perceived racism (e.g., cultural, institutional, individual, collective) | Survey |
| | | Race-related stress | Index of race-related stress | Survey |
| | Destructive social norms | Public policies of discrimination | Polices related to redlining | Administrative/secondary |
| | | | Policies related to law enforcement (e.g., differential enforcement) | Administrative/secondary |
| | | | Elimination of wealth disparities | Administrative/secondary |
| | | Early childbearing | Percentage of teen parents | Administrative/secondary |
| | | Violence | Percentage of violent crimes, percentage of violent crimes toward youth | Administrative/secondary |
| | | Educational attainment | Percentage graduating high school (on time) | Administrative/secondary |
| | | Substance use | Percentage with substance use issues | Administrative/secondary |
| Civil | Disenfranchisement | Investment in civil-society organizations | Relative presence of nonprofits by neighborhood | Administrative/secondary |
| | Disconnect from larger city structures/norms | Representation of civil society on city committees | Number of civil-society organizations on government-led committees | Administrative/secondary |
| | | | Leadership of government committees and community action groups led by nonprofits or NGOs | Administrative/secondary |
| | Low political, social efficacy | Civic health | Civic health index | Administrative/secondary |
| | | Political efficacy | Sense of political efficacy scale | Survey |
| | | | Collective political efficacy | Administrative/secondary |
| | Powerlessness | | Fear of powerlessness | Survey |
| Perception of decisionmaking capacities | | | Survey | |
| Low trust in institutions | Institutional trust | Relative confidence in institutions | | |

Table B.2
Measure Area: Chronic Stress

| Construct | Key Component | Potential Measurement Area | Sample Measure | Likely Data Source |
|-------------------------|------------------------|-----------------------------|---|--|
| Residential instability | Demographic shifting | Rapid population aging | Proportion of population under age 15 and population over age 65 (aged/child ratio) | Administrative/secondary |
| | | Racial/ethnic mix | Composition of nonwhite residents | Administrative/secondary |
| | Population permanency | Tenure in community | Percentage of population that has been in community greater than ten years | Administrative/secondary |
| | | | Percentage of residents that are multigenerational in community | Administrative/secondary |
| | Migration patterns | Immigration flows | Change in foreign-born population | Administrative/secondary |
| | Housing stability | Housing security | Percentage who report ability to pay rent or mortgage in the next time frame | Survey |
| | | | Housing stock | Percentage of permanent dwellings in community relative to population size |
| | | Eviction rate | Percentage or number of evictions | Administrative/secondary |
| | Population loss | Change in population size | Absolute change in population based on prior census | Administrative/secondary |
| | | Net reproductive rate | Rate of replacement/fertility indicator | Administrative/secondary |
| Isolation | Social isolation | Lack of social support | Percentage without social support, particularly among historically vulnerable populations (seniors) | Survey |
| | | Disconnection | Percentage of population without connection to social institution/low levels of social interaction | Survey |
| | Despair | General life satisfaction | Life satisfaction scale rating (0–10) | Survey |
| | | Hopelessness | Beck Hopelessness scale | Survey |
| | | Sense of optimism/pessimism | Survey | |
| Violence | Interpersonal violence | Intimate partner violence | Percentage reporting experience of violence in relationship (e.g., physical, emotional, financial) | Survey |
| | | Aggression | Percentage reporting engagement in physical altercation | Survey |
| | Community violence | Homicide rate | Percentage of homicides and other violent offenses | Administrative/secondary |

Table B.2—Continued

| Construct | Key Component | Potential Measurement Area | Sample Measure | Likely Data Source |
|----------------------|--------------------------|---------------------------------------|--|--------------------------|
| | | Violence exposure | Percentage of children exposed to violence | Administrative/secondary |
| | | | Percentage of adults exposed to community violence (community violence exposure scale) | Administrative/secondary |
| Poor health | Self-rated health | Reported health status | Percentage reporting poor health | Survey |
| | Quality of life | Physical and emotional health quality | Health-related quality-of-life scales, SF-12 on mental and physical impairment | Survey |
| | Chronic disease | Disability | Disability-adjusted life years | Administrative/secondary |
| | | Prevalence of disease | General prevalence of disease and distribution by subpopulations | Administrative/secondary |
| | Access to care | Insurance | Percentage coverage by subpopulation | Administrative/secondary |
| | | Distribution of health centers | Percentage of federally qualified health centers relative to population | Administrative/secondary |
| | | | Health provider shortage area | Administrative/secondary |
| Power imbalance | Political representation | City council composition | Percentage of council that maps to community demography | Administrative/secondary |
| | Civic engagement | Voting | Percentage voting by subpopulation | Administrative/secondary |
| | | Voter suppression | Existence of voter-suppression policies | Document review |
| Community narratives | Community history | Experience of stress | Qualitative assessments of cultural and community narratives | In-depth interviews |
| | Stories of resilience | Legacy of response and recovery | | Social media survey |

Table B.3
Measure Area: Acute Shocks

| Construct | Key Component | Potential Measurement Area | Sample Measure | Likely Data Source |
|----------------------------|--------------------------------------|---------------------------------------|---|--------------------------|
| Environmental crisis | Environmental hazards | Environmental exposures | Percentage of population exposed to poor air and bad water quality | Administrative/secondary |
| | Industry event | Contamination | Percentage of a community affected by a spill | Administrative/secondary |
| | Climate shifts | Heat changes | Relative change in heat index over time | Administrative/secondary |
| | | Water changes | Sea-level rise | Administrative/secondary |
| Police–community conflicts | Officer-related incidents | Officer-involved shootings | Number of officer-involved shootings (some tracking attempted nationally but less systematic) | Administrative/secondary |
| | | Police shootings | Number of officers shot or killed | Administrative/secondary |
| | Community complaints | Community grievances | Number of formal filings about police misconduct | Administrative/secondary |
| Health crisis | Drug use | Opioid use prevalence | Percentage of population with overuse or substance use disorder | Administrative/secondary |
| | Acute or infectious disease exposure | Incidence of new communicable disease | Exposure to new pathogen that affects parts or all of the community | Administrative/secondary |
| Economic crisis | General recession | Economic downturn | Job loss | Administrative/secondary |
| | Housing | Foreclosure rates | Spike in housing foreclosures | Administrative/secondary |
| | Industry shift | Company or sector closure | Closure of key industry | Administrative/secondary |
| Domestic terror | Terrorism | Man-made attack | Experience of terrorist incident in community | Administrative/secondary |
| | Mass violence | Mass shooting | Recency of mass violence or attack | Administrative/secondary |

NOTE: The acute shocks are measured mostly through general community tracking, but we list some suggestions here.

Table B.4
Measure Area: Exacerbating Factors

| Construct | Key Component | Potential Measurement Area | Sample Measure | Likely Data Source |
|--|---|--|--|--|
| Limited acknowledgment/recognition of stress | History of community actively addressing community foundational/stress issues | Experience addressing a chronic stress | Demonstrable shifts in population indicators in relation to chronic stress | Administrative/secondary |
| | | Public official discussion of chronic stress | Coded statements or messages by public leaders discussing stress | Media analyses |
| Slow or inequitable response time | Quality of crisis response | Role of external organizations in response | Level of external engagement in response and proportion to internal actors | Key informant interviews, observations |
| | | Response by government (i.e., time and quality) | Time to recovery (e.g., economic, social) | Administrative/secondary |
| | | Public communication (by whom and for whom) | Coded messages from public officials; ability to answer questions | Media analyses |
| | | Level of knowledge about event | Awareness by subpopulations in community | Key informant interviews, observation |
| | | | Community has tools to act using knowledge by affected groups | Document review |
| Organization of civil-society organization/NGO community | Depth and diversity of civil-society organizations | Range of civil-society organizations, addressing diversity in population | Representation of civil-society organizations for minority groups in community | Key informant interviews, observation |
| | | Connection of civil-society organizations in government planning | Representation and roles of organizations on government or policy-related activities | Key informant interviews, observation |
| Low structural action/policy movement | Community engagement processes | Community-review boards for addressing community issue | Use of boards to address problem | Document review |
| | | Structural supports for community problem-solving | Presence of feedback mechanisms for response and problem resolution | Document review |

NOTE: These and the alleviating factors are newer constructs. They are more difficult to measure but are key to understanding community allostatic load. This measurement can include survey and administrative data but most likely requires organizational or policy review, media analyses, and qualitative data collection.

Table B.5
Measure Area: Alleviating Factors

| Construct | Key Component | Potential Measurement Area | Sample Measure | Likely Data Source |
|---|---|--|---|--|
| Response quality (<i>This is the inverse of the crisis response construct in Table B.4.</i>) | Success of response/effective response | Role of external organizations in response | Level of external engagement in response, proportion to internal actors | Key informant interviews, observations |
| | | Response by government (i.e., time and quality) | Time to recovery (e.g., economic, social) | Administrative/secondary |
| | | Public communication (by whom and for whom) | Coded messages from public officials; ability to answer questions | Media analyses |
| | History of effective response to prior events | Level of knowledge about event | Awareness by subpopulations in community | Key informant interviews, observations |
| Organization of NGOs (<i>This is also the inverse of the civil-society items in Table B.4.</i>) | Depth and diversity of civil-society organizations | Range of civil-society organizations, addressing diversity in population | Representation of civil-society organizations for minority groups in community | Key informant interviews, observations |
| | | Connection of civil-society organizations in government planning | Representation and roles of organizations on government or policy-related activities | Key informant interviews, observations |
| | | | Presence of governing bodies that bring together government and NGOs in meaningful ways (shared accountability and mission) | Document review |
| Trust in leaders and institutions | Trust in institutions | Relative trust of residents in leadership action and messaging | Sentiment analysis of community confidence in local leadership (social media/media analyses) | Social media analyses |
| | Leadership quality | Identification of effective leaders | Coalescing of residents around effective leaders for gathering information | Key informant interviews, observations |
| Social cohesion | Connection of groups during the immediate response and long-term recovery | Relative engagement and alignment of subpopulations in response and recovery | Collective comment on community response and experience | Media analyses |
| | | Reciprocity | Percentage of neighborhoods, subgroups reporting sharing or mutual exchange of resources (network analysis dimension) | Survey |

Table B.5—Continued

| Construct | Key Component | Potential Measurement Area | Sample Measure | Likely Data Source |
|---|---|--|---|--|
| Communication and education about event | Quality of information/materials | Material cultural responsiveness and clarity | Percentage of materials that use effective communication science and clarity of messaging, are action-oriented, and are linguistically and culturally diverse | Document review |
| | | | Relative use of community leaders from diverse sectors for messaging | Key informant interviews, observations |
| | Diffusion of messages | Engagement of subpopulations in message crafting and uptake | Percentage of populations reporting that information was able to be received and used | Survey |
| Shared experience | Community narrative | Media expressions around event or stress | Coding of stress and resilience proportion | Media analyses |
| | | Content of community dialogue | Community dialogue represents community working cohesively | Key informant interviews, observations |
| | Policy choices in response and recovery | Adoption and/or implementation of policies that address equity | Representation of policy choices in recovery does not exacerbate demographic and social group differences | Document review |

NOTE: These and the exacerbating factors are newer constructs. They are more difficult to measure but are key to understanding community allostatic load. There are two sides of the construct in some case measures. This measurement can include survey and administrative data but most likely requires organizational or policy review, media analyses, and qualitative data collection.

References

- Abelson, Julia, John Eyles, Christopher B. McLeod, Patricia Collins, Colin McMullan, and Pierre-Gerlier Forest, "Does Deliberation Make a Difference? Results from a Citizens' Panel Study of Health Goals Priority Setting," *Health Policy*, Vol. 66, No. 1, October 2003, pp. 95–106.
- Abelson, Julia, Pierre-Gerlier Forest, John Eyles, Patricia Smith, Elisabeth Martin, and Francois-Pierre Gauvin, "Deliberations About Deliberative Methods: Issues in the Design and Evaluation of Public Participation Processes," *Social Science and Medicine*, Vol. 57, No. 2, July 2003, pp. 239–251.
- Abramson, David M., Lynn M. Grattan, Brian Mayer, Craig E. Colten, Farah A. Arosemena, Ariane Rung, and Maureen Lichtveld, "The Resilience Activation Framework: A Conceptual Model of How Access to Social Resources Promotes Adaptation and Rapid Recovery in Post-Disaster Settings," *Journal of Behavioral Health Services and Research*, Vol. 42, No. 1, January 2015, pp. 42–57.
- Adger, W. Neil, "Social Vulnerability to Climate Change and Extremes in Coastal Vietnam," *World Development*, Vol. 27, No. 2, February 1999, pp. 249–269.
- Andersson, Mette, "Immigrant Youth and the Dynamics of Marginalization," *Young (Nordic Journal of Youth Research)*, Vol. 11, No. 1, February 2003, pp. 74–89.
- Baezconde-Garbanati, Lourdes, Jennifer Unger, Cecilia Portugal, Jane L. Delgado, Adolph Falcon, and Marcela Gaitan, "Maximizing Participation of Hispanic Community-Based/Non-Governmental Organizations (NGOs) in Emergency Preparedness," *International Quarterly of Community Health Education*, Vol. 24, No. 4, 2005–2006, pp. 289–317.
- Bar-On, Dan, Jeannette Eland, and Rolf J. Kleber, "Multigenerational Perspectives on Coping with the Holocaust Experience: An Attachment Perspective for Understanding the Developmental Sequelae of Trauma Across Generations," *International Journal of Behavioral Development*, Vol. 22, No. 20, 1998, pp. 315–338.
- Baum, Nancy M., Peter D. Jacobson, and Susan D. Goold, "'Listen to the People': Public Deliberation About Social Distancing Measures in a Pandemic," *American Journal of Bioethics*, Vol. 9, No. 11, 2009, pp. 4–14.
- Beckie, Theresa M., "A Systematic Review of Allostatic Load, Health, and Health Disparities," *Biological Research for Nursing*, Vol. 14, No. 4, 2012, pp. 311–346.
- Bhalla, Ajit, and Frédéric Lapeyre, "Social Exclusion: Towards an Analytical and Operational Framework," *Development and Change*, Vol. 28, No. 3, July 1997, pp. 413–433.
- Bloom, Sandra L., *Creating Sanctuary: Toward the Evolution of Sane Societies*, New York and London: Routledge, 1997.
- Boardman, Jason D., "Stress and Physical Health: The Role of Neighborhoods as Mediating and Moderating Mechanisms," *Social Science and Medicine*, Vol. 58, 2004, pp. 2473–2483.
- Bodilly, Susan J., Jennifer Sloan McCombs, Nate Orr, Ethan Scherer, Louay Constant, and Daniel Gershwin, *Hours of Opportunity: Lessons from Five Cities on Building Systems to Improve After-School, Summer School, and Other Out-of-School-Time Programs*, Vol. 1, Santa Monica, Calif.: RAND Corporation, MG-1037-WF, 2010. As of May 22, 2018:
<https://www.rand.org/pubs/monographs/MG1037.html>
- Brody, Gene H., Man-Kit Lei, David H. Chae, Tianyi Yu, Steven M. Kogan, and Steven R. H. Beach, "Perceived Discrimination Among African American Adolescents and Allostatic Load: A Longitudinal Analysis with Buffering Effects," *Child Development*, Vol. 85, No. 3, May/June 2014, pp. 989–1002.

- Brown, Tony N., R. Jay Turner, and Thomas R. Moore, "The Multidimensionality of Health: Associations Between Allostatic Load and Self-Report Health Measures in a Community Epidemiologic Study," *Health Sociology Review*, Vol. 25, No. 3, 2016, pp. 272–287.
- Bynner, John, "Agenda for Youth Research in the Next Century: A British Perspective," *Young (Nordic Journal of Youth Research)*, Vol. 5, No. 4, December 1997, pp. 34–49.
- Cannon, Terry, "Vulnerability, 'Innocent' Disasters and the Imperative of Cultural Understanding," *Disaster Prevention and Management*, Vol. 17, No. 3, 2008, pp. 350–357.
- Cerdá, Magdalena, Jeffrey D. Morenoff, Ben B. Hansen, Kimberly J. Tessari Hicks, Luis F. Duque, Alexandra Restrepo, and Ana V. Diez-Roux, "Reducing Violence by Transforming Neighborhoods: A Natural Experiment in Medellín, Colombia." *American Journal of Epidemiology*, Vol. 175, No. 10, May 2012, pp. 1045–1053.
- Chandra, Anita, Joie D. Acosta, Stefanie Howard, Lori Uscher-Pines, Malcolm V. Williams, Douglas Yeung, Jeffrey Garnett, and Lisa S. Meredith, "Building Community Resilience to Disasters: A Way Forward to Enhance National Health Security," *RAND Health Quarterly*, Vol. 1, No. 1, 2011. As of June 18, 2018: <https://www.rand.org/pubs/periodicals/health-quarterly/issues/v1/n1/06.html>
- Collins, Timothy W., "The Political Ecology of Hazard Vulnerability: Marginalization, Facilitation, and the Production of Differential Risk to Urban Wildfires in Arizona's White Mountains," *Journal of Political Ecology*, Vol. 15, 2008, pp. 21–43.
- Coumans, Moniek, and Marinus Spreen, "Drug Use and the Role of Homelessness in the Process of Marginalization," *Substance Use and Misuse*, Vol. 38, Nos. 3–6, 2003, pp. 311–338.
- Cutter, Susan L., "Vulnerability to Environmental Hazards," *Progress in Human Geography*, Vol. 20, No. 4, 1996, pp. 529–539.
- Cutter, Susan L., Lindsey Barnes, Melissa Berry, Christopher Burton, Elijah Evans, Eric Tate, and Jennifer Webb, "A Place-Based Model for Understanding Community Resilience to Natural Disasters," *Global Environmental Change*, Vol. 18, No. 4, October 2008, pp. 598–606.
- Cutter, Susan L., Brya J. Boruff, and W. Lynn Shirley, "Social Vulnerability to Environmental Hazards," *Social Science Quarterly*, Vol. 84, No. 2, June 2003, pp. 242–261.
- Dash, Nicole, Walter Gillis Peacock, and Betty Hearn Morrow, "And the Poor Get Poorer: A Neglected Black Community," in Walter Gillis Peacock, Betty Hearn Morrow, and Hugh Gladwin, eds., *Hurricane Andrew: Ethnicity, Gender, and the Sociology of Disasters*, London and New York: Routledge, 1997, pp. 206–225.
- Diez-Roux, Ana V., "Bringing Context into Epidemiology: Variables and Fallacies in Multilevel Analysis," *American Journal of Public Health*, Vol. 88, No. 2, February 1998, pp. 216–222.
- Djalante, Riyanti, "Adaptive Governance and Resilience: The Role of Multi-Stakeholder Platforms in Disaster Risk Reduction," *Natural Hazards and Earth Systems Science*, Vol. 12, 2012, pp. 2923–2942.
- Doerfel, Marya L., Lisa V. Chewning, and Chih-Hui Lai, "The Evolution of Networks and the Resilience of Interorganizational Networks after Disasters," *Journal of Communication Monographs*, Vol. 80, No. 4, 2013, pp. 533–559.
- Doerfel, Marya L., and Müge Haseki, "Networks Disrupted: Media Use as an Organizing Mechanism for Rebuilding," *New Media and Society*, Vol. 17, No. 3, 2015, pp. 432–452.
- Dowd, Jennifer B., Amanda M. Simanek, and Allison E. Aiello, "Socio-Economic Status, Cortisol and Allostatic Load: A Review of the Literature," *International Journal of Epidemiology*, Vol. 38, No. 5, October 2009, pp. 1297–1309.
- Fothergill, Alice, and Lori A. Peek, "Poverty and Disasters in the United States: A Review of Recent Sociological Findings," *Natural Hazards*, Vol. 32, No. 1, May 2004, pp. 89–110.
- Freitag, Robert C., Daniel B. Abramson, Manish Chalana, and Maximilian Dixon, "Whole Community Resilience: An Asset-Based Approach to Enhance Adaptive Capacity Before a Disruption," *Journal of the American Planning Association*, Vol. 80, No. 4, 2014, pp. 324–335.
- Freudenburg, William R., "Risk and Recreancy: Weber, the Division of Labor, and the Rationality of Risk Perceptions," *Social Forces*, Vol. 71, No. 4, June 1993, pp. 909–932.

- Freudenburg, William R., "The 'Risk Society' Reconsidered: Recreancy, the Division of Labor, and Risks to the Social Fabric," in Maurie J. Cohen, ed., *Risk in the Modern Age: Social Theory, Science, and Environmental Decision-Making*, Houndmills, UK, and New York: Palgrave, 2001, pp. 107–120.
- Fullilove, M., "Psychiatric Implications of Displacement: Contributions from the Psychology of Place," *American Journal of Psychiatry*, Vol. 153, No. 15, April 1996, pp. 1516–1523.
- Gaillard, J. C., and Jake Rom Cadag, "From Marginality to Further Marginalization: Experiences from the Victims of the July 2000 Payatas Trashslide in the Philippines," *Jambá: Journal of Disaster Risk Studies*, Vol. 2, No. 3, 2009, pp. 197–215.
- Geronimus, Arline T., Margaret Hicken, Danya Keene, and John Bound, "'Weathering' and Age Patterns of Allostatic Load Scores Among Blacks and Whites in the United States," *American Journal of Public Health*, Vol. 96, No. 5, May 2006, pp. 826–833.
- Gilbert, Mads, "Bridging the Gap: Building Local Resilience and Competencies in Remote Communities," *Prehospital and Disaster Medicine*, Vol. 23, No. 4, July–August 2008, pp. 297–300.
- Goltz, James D., "Are the Media Responsible for the Disaster Myths? A Content Analysis of Emergency Response Imagery," *International Journal of Mass Emergencies and Disasters*, Vol. 2, No. 3, 1984, pp. 345–368.
- Gone, Joseph P., "Redressing First Nation Historical Trauma: Theorizing Mechanisms for Indigenous Culture as Mental Health Treatment," *Transcultural Psychiatry*, Vol. 50, No. 5, 2013, pp. 683–706.
- Grabska, Katarzyna, "Marginalization in Urban Spaces of the Global South: Urban Refugees in Cairo," *Journal of Refugee Studies*, Vol. 19, No. 3, 2006, pp. 287–305.
- Graham, Carol, and Sergio Pinto, "Unequal Hopes and Lives in the USA: Optimism, Race, Place, and Premature Mortality," *Journal of Population Economics*, 2018.
- Granovetter, Mark, "The Strength of Weak Ties," *American Journal of Sociology*, Vol. 78, No. 6, 1973, pp. 1360–1380.
- Granovetter, Mark, "The Strength of Weak Ties: A Network Theory Revisited," *Sociological Theory*, Vol. 1, No. 1, 1983, pp. 201–233.
- Green, Tiffany L., and William A. Darity, "Under the Skin: Using Theories from Biology and the Social Sciences to Explore the Mechanisms Behind the Black-White Health Gap," *American Journal of Public Health*, Vol. 100, Supplement 1, April 2010, pp. S36–S40.
- Halverson, Jeffrey R., Scott W. Ruston, and Angela Trethewey, "Mediated Martyrs of the Arab Spring: New Media, Civil Religion, and Narrative in Tunisia and Egypt," *Journal of Communications*, Vol. 63, No. 2, April 2013, pp. 312–332.
- Handmer, John W., and Stephen R. Dovers, "A Typology of Resilience: Rethinking Institutions for Sustainable Development," *Industrial and Environmental Crisis Quarterly*, Vol. 9, No. 4, 1996, pp. 482–511.
- Hooker, Claire, Catherine King, and Julie Leask, "Journalists' Views about Reporting Avian Influenza and a Potential Pandemic: A Qualitative Study," *Influenza and Other Respiratory Viruses*, Vol. 6, No. 3, May 2011, pp. 224–229.
- Howard, Jeffrey T., and P. Johnelle Sparks, "Does Allostatic Load Calculation Method Matter? Evaluation of Different Methods and Individual Biomarkers Functioning by Race/Ethnicity and Educational Level," *American Journal of Human Biology*, Vol. 28, No. 5, September–October 2016, pp. 627–635.
- Huynh, Mary, Jennifer D. Parker, Sam Harper, Elsie Pamuk, and Kenneth C. Schoendorf, "Contextual Effect of Income Inequality of Birth Outcomes," *International Journal of Epidemiology*, Vol. 34, No. 4, August 2005, pp. 888–895.
- Iwasaki, Keiko, Yasuyuki Sawada, and Daniel P. Aldrich, "Social Capital as a Shield Against Anxiety Among Displaced Residents from Fukushima," *Natural Hazards*, Vol. 89, No. 1, June 2017, pp. 405–421.
- Kahneman, Daniel, Alan B. Krueger, David A. Schkade, Norbert Schwarz, and Arthur A. Stone, "A Survey Method for Characterizing Daily Life Experience: The Day Reconstruction Method," *Science*, Vol. 306, No. 5702, December 2004, pp. 1776–1780.

Kailes, June Isaacson, and Alexandra Enders, "Moving Beyond "Special Needs": A Function-Based Framework for Emergency Management and Planning," *Journal of Disability Policy Studies*, Vol. 17, No. 4, 2007, pp. 230–237.

Karoly, Lynn A., *Preschool Adequacy and Efficiency in California: Issues, Policy Options, and Recommendations*, Santa Monica, Calif.: RAND Corporation, MG-889- PF/WKKF/PEW/NIEER/WCJVSF/LAUP, 2009. As of May 23, 2018: <https://www.rand.org/pubs/monographs/MG889.html>

Keim, Mark E., "Building Human Resilience: The Role of Public Health Preparedness and Response as an Adaptation to Climate Change," *American Journal of Preventive Medicine*, Vol. 35, No. 5, November 2008, pp. 508–516.

Kretzman, John, and John P. McKnight, "Assets-Based Community Development," *National Civic Review*, Vol. 85, No. 4, Winter 1996, pp. 23–29.

Lamberson, P. J., and Scott E. Page, "Tipping Points," *Quarterly Journal of Political Science*, Vol. 7, No. 2, April 2012, pp. 175–208.

Lenton, Timothy M., Hermann Held, Elmar Kriegler, Jim W. Hall, Wolfgang Lucht, Stefan Rahmstorf, and Hans Joachim Schellnhuber, "Tipping Elements in the Earth's Climate System," *Proceedings of the National Academy of Sciences*, Vol. 105, No. 6, February 12, 2008, pp. 1786–1793.

López, Carolina C., "The Struggle for Wholeness: Addressing Individual and Collective Trauma in Violence-Ridden Societies," *Explore: The Journal of Science and Healing*, Vol. 7, No. 5, September–October 2011, pp. 300–313.

Mamula-Seadon, Ljubica, and Ian McLean, "Response and Early Recovery Following 4 September 2010 and 22 February 2011 Canterbury Earthquakes: Societal Resilience and the Role of Governance," *International Journal of Disaster Risk Reduction*, Vol. 14, No. 1, December 2015, pp. 82–95.

Mani, Anandi, Sendhil Mullainathan, Eldar Shafir, and Jiaying Zhao, "Poverty Impedes Cognitive Function," *Science*, Vol. 341, No. 6149, August 2013, pp. 976–980.

Maton, Kenneth I., and Deborah A. Salem, "Organizational Characteristics of Empowering Community Settings: A Multiple Case Study Approach," *American Journal of Community Psychology*, Vol. 23, No. 5, October 1995, pp. 631–656.

Mauss, Daniel, Marc N. Jarczok, and Joachim E. Fischer, "The Streamlined Allostatic Load Index: A Replication of Study Results," *Stress: The International Journal of the Biology of Stress*, Vol. 19, No. 6, 2016, pp. 553–558.

McCosker, Anthony, "E-Framing Disaster: Affective Encounters with Raw and Autonomous Media Continuum," *Continuum: Journal of Media and Cultural Studies*, Vol. 27, No. 3, 2013, pp. 382–396.

McEntire, David A., "Trigger Agents, Vulnerabilities, and Disaster Reduction: Towards a Holistic Paradigm," *Disaster Prevention and Management*, Vol. 10, No. 3, 2001, pp. 189–196.

McEwen, Bruce S., "Protective and Damaging Effects of Stress Mediators," *New England Journal of Medicine*, Vol. 338, No. 3, January 1998, pp. 171–179.

McEwen, Bruce S., and Peter J. Gianaros, "Stress- and Allostasis-Induced Brain Plasticity," *Annual Review of Medicine*, Vol. 62, No. 1, 2011, pp. 431–445.

McEwen, Bruce S., and Teresa Seeman, "Protective and Damaging Effects of Mediators of Stress: Elaborating and Testing the Concepts of Allostasis and Allostatic Load," *Annals of the New York Academy of Sciences*, Vol. 896, No. 1, December 1999, pp. 30–47.

McLaughlin, Paul, and Thomas Dietz, "Structure, Agency and Environment: Toward an Integrated Perspective on Vulnerability," *Global Environment Change*, Vol. 18, No. 1, February 2008, pp. 99–111.

Michaelson, Juliet, Saamah Abdallah, Nicola Steuer, Sam Thompson, and Nic Marks, *National Accounts of Well-Being: Bringing Real Wealth onto the Balance Sheet*, London: New Economics Foundation, January 2009. As of May 23, 2018: https://b3cdn.net/nefoundation/2027fb05fed1554aea_uim6vd4c5.pdf

- Mohatt, Nathaniel V., Azure B. Thompson, Nghi D. Thai, and Jacob Kraemer Tebes, "Historical Trauma as Public Narrative: A Conceptual Review of How History Impacts Present-Day Health," *Social Science and Medicine*, Vol. 106, April 2014, pp. 128–136.
- Moore, Melinda, Anita Chandra, and Kevin C. Feeney, "Building Community Resilience: What Can the United States Learn from Experiences in Other Countries?" *Disaster Management and Public Health Practice*, Vol. 7, No. 3, June 2013, pp. 292–301.
- Morello-Frosch, Rachel, and Edmond D. Shenassa, "The Environmental 'Riskscape' and Social Inequality: Implications for Explaining Maternal and Child Health Disparities," *Environmental Health Perspectives*, Vol. 114, No. 8, August 2006, pp. 1150–1153.
- Mullainathan, Sendhil, and Eldar Sharif, *Scarcity: Why Having Too Little Means So Much*, New York: Time Books, Henry Holt and Company, LLC, 2013.
- Nelkin, Dorothy, "An Uneasy Relationship: The Tensions Between Medicine and the Media," *Lancet*, Vol. 347, 1996, pp. 1600–1603.
- Neumayer, Eric, and Thomas Plümper, "The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events on the Gender Gap in Life Expectancy, 1981–2002," *Annals of the Association of American Geographers*, Vol. 97, No. 3, 2007, pp. 551–566.
- Norris, Fran H., Susan P. Stevens, Betty Pfefferbaum, Karen W. Wyche, and Rose L. Pfefferbaum, "Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness," *American Journal of Community Psychology*, Vol. 41, No. 1–2, March 2008, pp. 127–150.
- O'Campo, Patricia, Blair Wheaton, Rosane Nisenbaum, Richard H. Glazier, James R. Dunn, and Catharine Chambers, "The Neighbourhood Effects on Health and Well-Being (NEHW) Study," *Health and Place*, Vol. 31, 2015, pp. 65–74.
- O'Neill, Rory, Simon Pickvance, and Andrew Waterston, "Burying the Evidence: How Great Britain Is Prolonging the Occupational Cancer Epidemic," *International Journal of Occupational and Environmental Health*, Vol. 13, No. 4, 2007, pp. 428–436.
- Özerdem, Alpaslan, and Tim Jacoby, *Disaster Management and Civil Society: Earthquake Relief in Japan, Turkey, and India*, Vol. 1, New York and London: Palgrave Macmillan and I. B. Tauris, 2006.
- Pant, Annjali T., Thomas D. Kirsch, Italo R. Subbarao, and Yu-Hsiang Hsieh, "Faith-Based Organizations and Sustainable Sheltering Operations in Mississippi After Hurricane Katrina: Implications for Informal Network Utilization," *Prehospital and Disaster Medicine*, Vol. 23, No. 1, February 2008, pp. 48–54.
- Patterson, Olivia, Frederick Weil, and Kavita Patel, "The Role of Community in Disaster Response: Conceptual Models," *Population Research and Policy Review*, Vol. 29, No. 2, April 2010, pp. 127–141.
- Pelling, Mark, and Kathleen Dill, "Disaster Politics: Tipping Points for Change in the Adaptation of Sociopolitical Regimes," *Progress in Human Geography*, Vol. 34, No. 1, 2009, pp. 21–37.
- Pfefferbaum, Betty J., Rose L. Pfefferbaum, and Fran H. Norris, "Community Resilience and Wellness for Children Exposed to Hurricane Katrina," in Ryan P. Kilmer, Virginia Gil-Rivas, Richard G. Tedeschi, and Lawrence G. Calhoun, eds., *Helping Families and Communities Recover from Disaster: Lessons Learned from Hurricane Katrina and Its Aftermath*, Washington, D.C.: American Psychological Association, 2009, pp. 265–288.
- Picou, J. Steven, Brent K. Marshall, and Duane A. Gill, "Disaster, Litigation, and the Corrosive Community," *Social Forces*, Vol. 82, No. 4, June 2004, pp. 1493–1522.
- Pinderhughes, Howard, Rachel A. Davis, and Myesha Williams, *Adverse Community Experiences: A Framework for Addressing and Preventing Community Trauma*, Oakland, Calif.: Prevention Institute, 2015.
- Ranabir, Salam, and K. Reetu, "Stress and Hormones," *Indian Journal of Endocrinology and Metabolism*, Vol. 15, No. 1, January–March 2011, pp. 18–22.
- Riley, Carley, Brita Roy, Nurit Harari, Anita Vashi, Pina Violano, Ann Greene, Georgina Lucas, Jerry Smart, Teresa Hines, Stacy Spell, Sharon Taylor, Barbara Tinney, Maurice Williams, and Emily A. Wang, "Preparing for Disaster: A Cross-Sectional Study of Social Connection and Gun Violence," *Journal of Urban Health*, Vol. 94, No. 5, October 2017, pp. 619–628.

- Ritchie, Liesel Ashley, "Individual Stress, Collective Trauma, and Social Capital in the Wake of the *Exxon Valdez* Oil Spill," *Sociological Inquiry*, Vol. 82, No. 2, May 2012, pp. 187–211.
- Robert Wood Johnson Foundation, "Building a Culture of Health," webpage, undated. As of November 1, 2017:
<https://www.rwjf.org/en/cultureofhealth.html>
- Rosenbaum, James E., "Changing the Geography of Opportunity by Expanding Residential Choice: Lessons from the Gautreaux Program," *Housing Policy Debate*, Vol. 6, No. 1, 1995, pp. 231–269.
- Rovai, Eugenie, "The Social Geography of Disaster Recovery: Differential Community Response to the North California Earthquakes," *Yearbook of the Association of Pacific Coast Geographers*, Vol. 56, 1994, pp. 49–74.
- Salvadori, Marina I., Jessica M. Sontrop, Amit X. Garg, Louise M. Moist, Rita S. Suri, and William F. Clark, "Factors That Led to the Walkerton Tragedy," *Kidney International*, Vol. 75, Supplement 112, February 2009, pp. S33–S34.
- Selye, Hans, *The Physiology and Pathology of Exposure to Stress*, Oxford, UK: Acta, Inc., 1950.
- Slade, Gary D., Anne E. Sanders, and Kunthel By, "Role of Allostatic Load in Socio-Demographic Patterns of Pain Prevalence in the U.S. Population," *Journal of Pain*, Vol. 13, No. 7, July 2012, pp. 666–675.
- Snow, Jon, "How the Media Are Failing the Health Service," *BMJ*, Vol. 337, 2008, p. a572.
- Sotero, Michelle M., "A Conceptual Model of Historical Trauma: Implications for Public Health Practice and Research," *Journal of Health Disparities Research and Practice*, Vol. 1, No. 10, Fall 2006, pp. 93–108.
- Stewart, Geoffrey T., Ramesh Kolluru, and Mark Smith, "Leveraging Public-Private Partnerships to Improve Community Resilience," *International Journal of Physical Distribution and Logistics Management*, Vol. 39, No. 5, June 2009, pp. 343–364.
- Theall, Katherine P., Zoë H. Brett, Elizabeth A. Shirtcliff, Erin C. Dunn, and Stacy S. Drury, "Neighborhood Disorder and Telomeres: Connecting Children's Exposure to Community Level Stress and Cellular Response," *Social Science and Medicine*, Vol. 85, May 2013, pp. 50–58.
- Tierney, Kathleen, Christine Bevc, and Erica Kuligowski, "Metaphors Matter: Disaster Myths, Media Frames, and Their Consequences in Hurricane Katrina," *The Annals of the American Academy of Political and Social Science*, Vol. 604, No. 1, 2006, pp. 57–81.
- U.S. Department of Homeland Security, Federal Emergency Management Administration, "Disasters," webpage (filtered by the year 1997), undated. As of May 22, 2018:
<http://www.fema.gov/disasters>
- Varda, Danielle M., Anita Chandra, Stefanie A. Stern, and Nicole Lurie, "Core Dimensions of Connectivity in Public Health Collaboratives," *Journal of Public Health Management and Practice*, Vol. 14, No. 5, September/October 2008, pp. E1–E7.
- Vlahov, David, Sandro Galea, Emily Gible, and Nicholas Freudenberg, "Perspectives on Urban Conditions and Population Health," *Cadernos de Saúde Pública*, Vol. 21, No. 3, May/June 2005, pp. 949–957.
- Waugh, William L., "Coordination or Control: Organizational Design and the Emergency Management Function," *International Journal of Disaster Prevention and Management*, Vol. 2, No. 4, 1993, pp. 17–31.
- Weinstein, Emily, Jessica Wolin, and Sharon Rose, *Trauma Informed Community Building: A Model for Strengthening Community in Trauma Affected Neighborhoods*, San Francisco, Calif.: Health Equity Institute, 2014. As of May 23, 2018:
<http://bridgehousing.com/PDFs/TICB.Paper5.14.pdf>
- Williams, David R., and Selina A. Mohammed, "Discrimination and Racial Disparities in Health: Evidence and Needed Research," *Journal of Behavioral Medicine*, Vol. 32, No. 1, February 2009, pp. 20–47.
- Williams, David R., Harold W. Neighbors, and James S. Jackson, "Racial/Ethnic Discrimination and Health: Findings from Community Studies," *American Journal of Public Health*, Vol. 98, Supplement 1, September 2008, pp. S29–S37.
- Wisner, Ben, and Henry R. Luce, "Disaster Vulnerability: Scale, Power, and Daily Life," *GeoJournal*, Vol. 30, No. 2, 1993, pp. 127–140.

Yong-Chan, Kim, and Jinae Kang, "Communication, Neighbourhood Belonging and Household Hurricane Preparedness," *Disasters*, Vol. 34, No. 2, April 2009, pp. 470–488.

Young, H. Peyton, *Equity: In Theory and Practice*, Princeton, N.J.: Princeton University Press, 1994.