



HHS Public Access

Author manuscript

Health Aff (Millwood). Author manuscript; available in PMC 2021 October 22.

Published in final edited form as:

Health Aff (Millwood). 2020 December ; 39(12): 2128–2135.

Mitigating Health Disparities After Natural Disasters: Lessons From The RISK Project

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Abstract

Climate change exacerbates the severity of natural disasters, which disproportionately affect vulnerable populations. Mitigating disasters' health consequences is critical to promoting health equity, but few studies have isolated the short- and long-term effects of disasters on vulnerable groups. We filled this gap by conducting a fifteen-year (2003–2018) prospective study of low-income, predominantly Black parents who experienced Hurricane Katrina: the Resilience in Survivors of Katrina (RISK) Project. Here we describe this project and synthesize lessons from work that has resulted from it. Our findings can guide policy makers, service providers, and health officials in disaster planning and response. We synthesize them into an organizational schema of five priorities: Primary efforts should be aimed at preventing exposure to trauma through investments in climate resilience and by eliminating impediments to evacuation, health care policies should promote uninterrupted and expanded access to care, social services should integrate and strive to reduce the administrative burden on survivors, programs should aid survivors in forging or strengthening connections to their communities, and policy makers should fund targeted long-term services for highly affected survivors.

Natural disasters harm human health and well-being, and the size of the population exposed to disasters is increasing as climate change intensifies extreme weather events, damages

protective ecosystems, and causes sea level rise that leads to coastal flooding.¹ The risks associated with natural disasters exacerbate existing social and racial/ethnic inequities in health, with low-income people and members of racial/ethnic minority groups more likely to live in disaster-prone areas and in lower-quality housing that is less safe when disasters occur.² Although climate change affects health through a variety of pathways, disaster mitigation and response planning are increasingly important targets for health equity interventions. However, most studies either lack the predisaster data required to estimate the effects of disasters on health or follow local survivors only briefly after the traumatic event, obscuring long-term health needs. Moreover, few disaster studies are adequately powered to explore outcomes for socially vulnerable groups, even though low-income people and members of racial/ethnic minority groups are most at risk for disaster exposure and have fewer resources to buffer against their effects.³ These limitations hamper the creation of evidence-based policy, programming, and service delivery designed to protect health and promote health equity.

We address these limitations by drawing on lessons from our study, the Resilience in Survivors of Katrina (RISK) Project, many findings from which have been reported previously in the published literature.⁴ The RISK Project is a fifteen-year (2003–2018) longitudinal study of 1,019 low-income, primarily Black parents who were enrolled in community college in 2003. In contrast to most disaster research, RISK examines both short- and long-term mental and physical health outcomes and includes prior health and vulnerability data that can be modeled as confounders or effect modifiers. The RISK Project, therefore, increases understanding of how the experience of surviving a major disaster interacts with prior individual- and community-level vulnerabilities and resources to engender mental and physical health outcomes over time. These insights in turn can inform decision making on policies and programs to address disasters' effects on the well-being of vulnerable people.

The aims of this article are twofold. The first goal is to identify and articulate the lessons learned from our study, drawing from published work resulting from it, to equip policy makers, public agencies, and service providers with five priorities that may be relevant when preparing for and responding to the next disaster. These are priorities that our research suggests organizations and governments should consider when acting to reduce the health impacts of disasters. The second goal is to position each of our prescribed priorities in context by engaging with reviews of the literature or individual studies with predisaster data or an unaffected comparison group and by providing examples of how governments, agencies, or service providers have addressed the identified problems. Although the most effective or efficient policy response will vary because of a host of factors, these examples represent potential actions for decision makers to consider.

Specifically, to mitigate the impacts of natural disasters on human health, we argue first for primary prevention of exposure to trauma through investments in climate resilience and the elimination of impediments to evacuation when major disasters strike. Because disasters will still affect people, we next argue for the provision of health care policies that promote uninterrupted and expanded access to health care. Then, to address survivors' health holistically, we argue for integrated social services that reduce the administrative burden

on survivors and for programs to aid survivors in forging or strengthening connections to their social and geographic communities. Finally, we argue for targeted long-term health services for highly affected survivors.

These five priorities represent an organizational schema comprising key results from all thirty-eight articles published using RISK Project data. We focus particularly on the twenty-nine studies that analyze health, which makes up the bulk of our research agenda. These urgencies are therefore partially a function of the researchers' disciplinary composition and interests: sociologists, psychologists, economists, and urban planners who study neighborhoods, migration, mentorship, and health. We conclude by discussing the limitations and outlining avenues of future research.

The RISK Project

SAMPLE

The RISK Project leverages prospectively collected predisaster data and a twelve-year follow-up period to uniquely examine how disasters affect health and how postdisaster conditions mitigate or exacerbate risks. The study began in 2003 as a randomized controlled trial of the effects of economic and academic supports on community college retention. We recruited a sample of 1,019 students at two community colleges in New Orleans, Louisiana: Delgado Community College and Louisiana Technical College. Eligibility requirements restricted the sample to parents ages 18–34 earning less than 200 percent of the federal poverty level. The original sample comprised predominantly young (average age, twenty-five), low-income (average monthly income, \$993), Black (83 percent), and unmarried (75 percent unmarried and not cohabitating) mothers. Although the original study enrolled seventy-seven men (8 percent of the sample), the RISK Project has recontacted only women since 2010.

Online appendix exhibit A1 provides the project timeline and information on data gathered.⁵ Baseline data were collected during enrollment from 2003 to 2004. Hurricane Katrina interrupted a twelve-month follow-up, after which the randomized controlled trial was repurposed as the RISK Project. Since then, we have fielded three survey waves in 2006–07, 2009–10, and most recently, 2016–18. In addition to the health, social support, economic resources, and geocoded neighborhood information gathered at each wave, we have collected detailed social network data, information on respondents' children (for example, behavior, health, and schooling), genetic data, and a full residential history. The study is also mixed methods research, including data from 168 in-depth interviews conducted with 113 survivors residing in New Orleans and Houston, Texas. The response rate for each postdisaster wave is extremely high for disaster research on a vulnerable demographic group (>70 percent). In total, 94 percent ($n = 882$) of all female respondents have completed at least one post-Katrina survey.

LIMITATIONS

Several limitations of the RISK Project study are necessary to consider. First, although our data are well equipped to answer questions about the disaster-related experiences of

a particularly marginalized group—low-income, primarily Black mothers—our findings might not generalize more broadly. The relative benefits of policy action in our five areas may vary for other groups, but we nevertheless believe that they form a comprehensive guide to address health inequities, broadly understood. A second limitation is that the respondents were all enrolled in community college at baseline, so they are likely unique in some ways. Third, the case of Hurricane Katrina is unique among natural disasters, as it affected an urban area with particularly high levels of concentrated, racialized poverty. The health consequences of disasters are in part a product of the socioeconomic, cultural, and demographic features of the affected population, so they will vary across other contexts. Finally, some RISK Project studies, and particularly those focusing on physical health, have been limited by the health markers we collected before the research became the RISK Project, given the importance of baseline measurements to the estimation of independent consequences.

Policy Priorities From The RISK Project

PRIMARY PREVENTION OF DISASTER EXPOSURE

Similar to reviews of the literature, we consistently find that exposure to trauma harms mental and physical health,² and our prospectively collected predisaster data add confidence that it is the trauma of living through disaster—and not endogenous personal characteristics—that drives adverse outcomes. For example, those who experienced more stressors in the weeks after Hurricane Katrina had higher levels of post-traumatic stress and psychological distress and more physical health complaints one year later than those experiencing fewer stressors, even after adjustment for pre-Katrina social, economic, and health-related vulnerabilities.⁶ The mental health effects of trauma exposure persisted four and even twelve years post-Katrina, particularly for co-occurring mental health conditions.^{7,8} Our data show that the traumas more harmful to health are not those related to property damage but, rather, bereavement, fear for one's life, and uncertainty about the safety of loved ones.^{9,10} For respondents with weak social networks, losing a pet was particularly damaging to mental health.^{9,11}

Urbanization and population growth put more people at risk of experiencing trauma and loss as a result of climate-related extreme events. Yet widening social inequalities have left vulnerable/marginalized groups particularly susceptible to these extreme events. Structural racism, which manifests in both inequitable locational proximity to hazards and stark disparities in the resources people can use to respond to disaster, among other vulnerabilities, is at the root of racialized disaster impacts and must be dismantled through a broad range of antiracist social and economic policies.¹² Still, policy makers can take incremental, evidence-based steps to keep residents safer and to reduce racial/ethnic and social disparities in disaster-related trauma exposure. Protecting coastal wetlands adds a buffer against storm damage without imposing the inequitable costs often associated with hardening coastlines.¹³ Writing building codes that elevate new buildings, protecting critical infrastructure, and retrofitting existing buildings to become more flood resilient also have support as effective and cost-effective primary prevention measures, as evidenced in an analysis of New York City's flood resilience options.¹⁴ Reforming the national flood

insurance program so that it discourages risky development without exacerbating racialized and social inequities in the housing market is another priority.¹⁵

Given that millions of people already live in risky environments and that disaster resilience efforts will not entirely prevent exposure, policy makers must also address potential barriers to timely evacuation. We have shown that trauma exposure was reduced among those with higher incomes and those who had access to cars, with qualitative data suggesting that these resources enabled people to evacuate when, where, and with whom they chose.⁶ Officials must ensure that evacuation options meet the needs of residents who lack financial means and personal transportation. Cost-free public transport, affordable short-term housing accommodation, and clear transportation evacuation procedures are crucial. Policies should also prohibit employers from penalizing workers who evacuate early.

Our research has also demonstrated the harmful effects of family separation in the evacuation process: Lacking knowledge of the safety of their children and other relatives in the week after Katrina was associated with poor health many years later.¹⁶ Systems that quickly locate and reunite loved ones, including the National Emergency Child Locator Center and the Federal Emergency Management Agency's (FEMA's) National Emergency Family Registry and Locator System, should likewise be strengthened.

IMPROVE POSTDISASTER HEALTH CARE

Even with hazard mitigation, stronger building and zoning codes, better evacuation planning, and other primary prevention measures, natural disasters will continue to affect people each year. For these survivors, the postdisaster period is often a time when health care need, including mental health, is particularly high, but access is especially difficult.¹⁷ The RISK Project further underscores this finding, leading to our second policy priority: ensuring accessible and continuous postdisaster health care that encompasses mental health services. By observing health changes from before to after a disaster, RISK Project data have clarified that trauma-induced, postdisaster mental health problems increase the risk for physical health complaints. For example, disaster-induced mental health problems predict asthma attacks, migraine headaches, back pain, and digestive problems, even after predisaster health status is controlled for.^{18,19}

Underscoring the critical role of uninterrupted health care for disaster survivors, RISK Project data show that survivors who were unable to obtain medical care or medications in the week after Katrina had higher rates of posttraumatic stress, psychological distress, and poor or fair self-reported health four years postdisaster, and for posttraumatic stress, twelve years later.⁹ These effects remained after adjustment for preexisting health and socioeconomic characteristics. Interruptions in health care may have long-term consequences if the health issues that go untreated are more likely to worsen or become chronic or if being unable to obtain care causes psychological trauma, which in turn affects well-being.

Additional analyses show that people with preexisting health conditions were at much greater risk of experiencing health care lapses in the week after Katrina. Forty-five percent of those who had psychological distress at baseline could not obtain required medical care,

versus 21 percent of those without distress. Similar disparities were observed in access to necessary medications (44 percent versus 28 percent). Because experiencing trauma may be particularly impactful for people with preexisting conditions, their needs must be given special consideration in response plans. Relatedly, those in poor mental health before the hurricane were at higher risk for adverse mental health after it, and traumatic events that occurred before Katrina influenced disaster recovery trajectories and long-term well-being.^{8,20,21}

Health services research offers several models that could prove useful in postdisaster settings. Care coordination interventions and physical co-location of services to create “medical homes” have proved effective in postdisaster settings.²² Stepped-care models that shift the delivery of psychological treatments of common mental health problems to a supervised paraprofessional have helped expand the reach and availability of mental health services.²³ Counseling after Hurricane Katrina created space for mental health stability or improvement,^{20,21} as well as posttraumatic growth.²⁴ Finally, ensuring continued health care access requires infrastructural changes, such as programs for loss of coverage with a disaster-related job loss and federal policies that expand Medicaid disproportionate share hospital payments.²⁵

SOCIAL SERVICES INTEGRATION

Similar to the difficulties faced in accessing postdisaster health care services, vulnerable survivors often experience material and economic losses, creating needs that may be best served by government programs, nonprofit organizations, or social services organizations. Prior studies on crises and mass trauma show that need is particularly acute because survivors are often unable to rely on family and friends as a result of displacement or co-occurring stress owing to the community-wide burdens of a disaster.²⁶ Unfortunately, because such agencies are often poorly integrated and difficult to navigate, many of those in need of a range of services in the months after a disaster do not receive it.²⁷⁻²⁹

Although most studies on assistance programs provide quantitative insight into funding amounts, fewer explore the lived experiences of trying to obtain assistance in the postdisaster period. Our qualitative interviews thus provide rare insight into the burden placed on disadvantaged families after disasters. One central theme that emerged in discussions with survivors about assistance access was inordinate waiting times. When asked whether she received any kind of assistance, including from FEMA, one respondent lamented her experience: “There were [supports in place], but I just didn’t feel like going through the hassle of standing in the lines, waiting on the phones, and get[ting] up to the door and there’s no more of this or there’s no more funds or...” Another interviewee said, “It was us going out and seeking.... It wasn’t them that had a designated place where you can go get help.... I think we were in line maybe about five or six hours.”

Among those who did receive assistance, financial support from government programs and other organizations proved critical to relocation and settlement, especially when kinship-based support was unavailable.³⁰ Our study’s unique composition of young adults with children also lends insight into the difficulties in obtaining help as a parent. One RISK Project study suggested that schools can be an important screening site for children

experiencing distress, as frequent school moves and parental stress may cause difficulties for children.³¹ Similarly, because many vulnerable survivors attempt to access a variety of social services agencies, strengthening their connections to each other and to health care providers may afford opportunities to detect latent health problems.³²

For decision makers motivated to integrate services and reduce administrative burdens, reports from local governments and research organizations provide promising examples. First, our findings offer support for proposals in the social work literature for a “disaster-assistance safety net” complete with antipoverty programs aimed at getting survivors back on their feet quickly.³³ Critically, these programs must be crafted to address structural inequities that mar the delivery of existing FEMA and other government programs. Second, a case management approach that holistically and comprehensively addresses survivors’ needs has been adopted by several nonprofits and local governments, including the Florida Housing Coalition after Hurricane Irma.³⁴ Although the president has the authority to provide funds to local governments for case management services, more states should include such provisions in their disaster response budgeting.³⁵

AID SURVIVORS IN SOCIAL SUPPORT AND COMMUNITY BUILDING

Social services provisions are critical, but they will not address all concerns because disasters also affect well-being through the disruption of communities. This is especially problematic, as many disaster studies document that social support aids in recovery.³⁶ Evidence from the RISK Project further clarifies that post-disaster well-being is affected not only by post-disaster perceived social support but also by predisaster social support and changes in social support over time.³⁷ Our fourth priority is therefore to strengthen community ties—among both those displaced and those who returned—to foster support that can promote health.

Qualitative interviews illuminated why social support changed after Hurricane Katrina and how that affected health. For some, the stress of the hurricane and incompatible coping methods led to tensions between intimate partners.³⁸ Others lacked a sense of belonging in their new communities or were stressed by their inability to aid distant loved ones, feelings that in turn weakened well-being.³⁹ Greater social support not only shielded respondents from negative health outcomes but also was linked to greater happiness and posttraumatic growth.^{40,41}

To enhance survivors’ social support, research suggests that officials could invest in local groups, such as neighborhood associations or local religious organizations, to revitalize the community and to identify and respond to residents’ needs postdisaster.⁴² Funding could also be directed to programs designed to increase community cohesion—both in directly affected places and in places that receive a large number of evacuees or displaced people—which have been shown to enhance disaster preparedness and to prevent adverse health outcomes.⁴³

Steps should also be taken to offset the deterioration of social support in the aftermath of a disaster. When displacement cannot be avoided, FEMA guidelines suggest relocating survivors to areas in close proximity, a practice that may foster a greater sense of belonging

and enable access to “wraparound services” (for example, schools, transport, grocery stores).⁴⁴ Couples, family, and group therapy should be made available to survivors to nurture existing relationships. RISK Project interviews highlight that disasters need not destroy social ties or community; for some, Hurricane Katrina ultimately strengthened ties to social support networks.

TARGETED, LONG-TERM SERVICES FOR HIGHLY AFFECTED SURVIVORS

Disasters may lead to health adversity for many years, and the pathways through which disasters affect long-term health can be direct (for example, via disaster trauma) or indirect (for example, via a new residential environment).⁴⁵ As a consequence, immediate improvements in health care, service infrastructure, or social support might not entirely mitigate the persistent impacts. Although it is clear from other studies that the health effects of disasters linger, there is a dearth of prospective disaster studies that begin before the event and extend beyond several years, let alone more than a decade afterward.²

Our results at the four-year follow-up fall in line with other studies documenting persistent high prevalence of adverse mental health and physical functioning.³² We found that four years later, 32.0 percent of respondents still experienced posttraumatic stress related to Hurricane Katrina. Our unique reinterviews showed that twelve years after Katrina, the prevalence of posttraumatic stress had decreased to 16.7 percent.⁸ Three factors increased the likelihood of experiencing posttraumatic stress at twelve years post-Katrina: greater trauma during the disaster, preexisting medical conditions, and bereavement because of the disaster. Two experiences in particular—fearing for one’s life and lacking access to medical care or necessary medications—predicted greater odds of having posttraumatic stress more than a decade later.¹⁰ More disaster-related trauma also predicted physical symptoms (back pain, migraines, or stomach problems) and lower self-rated health four years later. Our findings on the decade-long health consequences of disasters are shared by a handful of other studies, including recent work showing the persistent effects of the 2004 Indian Ocean earthquake and tsunami on physical health.⁴⁶

Thus, whereas effective approaches to health care services are universal in nature in the immediate postdisaster period, decision makers should prioritize targeted health services for a small but highly affected group in the long term. Although our study’s prevalence of posttraumatic stress aligns with the prevalence documented in other studies, the broad range of posttraumatic stress prevalence in the literature suggests that officials should be prepared for many outcomes and needs.⁴⁷ A second consistent finding is the persistent health problems among bereaved families and friends. To address this health risk, providers should ensure that services begin in the immediate postdisaster period for those who lost a loved one, and policymakers should fund longer-term mental health services for the bereaved.

Several examples from New Orleans stand out for addressing the long-term health needs of disaster survivors. At the ten-year anniversary of Hurricane Katrina, the New Orleans Health Department published a comprehensive behavioral health resource guide to raise awareness about a new outpatient infrastructure and crisis hotlines. The mayor’s office also funded mobile mental health services for people attending the ten-year anniversary

activities, a Metropolitan Human District Services hotline, and a public messaging campaign of mindfulness during the commemorations.⁴⁸

Future Research

Although our study is informative in many ways to decision makers, continued rigorous research and policy deliberations are both necessary to address key limitations and outstanding questions in the field. Climate change brings to the forefront debates about “managed retreat” from areas likely to experience repeated shoreline flooding, storm damage, or drought, which clashes with the desires of many individuals to rebuild their homes and communities.⁴⁹ Future research should explore whether there is a health cost to the trading of community and social ties for better economic opportunities and less vulnerability to future disasters.

Another pressing need is for research that explicitly targets the intersections of natural disasters, climate change, and health inequities. The evidence is clear that there are long-standing structural issues of racism in disaster impact, mitigation, and response policy, including within FEMA, and therefore any new policy should be actively antiracist.^{28,50} Finally, climate change is particularly devastating in certain places, including along the Gulf Coast. Future research should interrogate the cumulative effects of multiple disaster exposure, including human-created disasters, for health. One promising approach is a life-course perspective, but this type of inquiry will require streams of funding for long-term research projects and innovative plans for data collection.

Discussion

People and their communities will experience extreme weather events in the future as human activity changes the climate, and the disasters that will result have the potential to exacerbate health inequities. Policy makers and public health officials therefore face the difficult task of how to best prepare for and how to respond to mitigate disasters’ health consequences and inequities. During the past fifteen years, the RISK Project has formed a body of knowledge about the effects of disasters for a vulnerable group of survivors, and our findings point decision makers toward critical areas in which interventions will likely have beneficial effects. In reviewing our study’s findings, we outlined five priorities that highlight opportunities to combat disasters’ health consequences by reducing exposure, addressing needs in their aftermath, and continuing support over the longer term.

Natural disasters are just one way that climate change affects human health. Direct heat stress, vectorborne infectious diseases, crop failure,⁵¹ and other health risks stemming from climate change will also require health equity responses that span from preexposure mitigation to post-exposure response. These mitigation and response strategies must be designed and implemented in ways that also benefit marginalized and vulnerable populations.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Support for the RISK Project comes from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (Grant Nos. P01HD082032, R01HD057599, and R01HD046162); National Science Foundation (Grant No. BCS-0555240); John D. and Catherine T. MacArthur Foundation (Grant No. 04-80775-000 HCD); Robert Wood Johnson Foundation (Grant No. 23029); Princeton Center for Economic Policy Studies; and Harvard Center for Population and Development Studies. Ethan Raker appreciates receiving support from a Malcolm H. Wiener PhD Scholarship at the Harvard Kennedy School. Meghan Zacher acknowledges receiving support from the Brown Population Studies and Training Center (Grant No. P2CHD041020). The authors thank Tyler Woods, Justin Preston, and Cyanea Y. S. Poon for their research assistance. The opinions expressed in this article are the authors' own and do not reflect the view of the funding bodies.

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