possible and then wait out the storm. It does not matter which option is chosen because those who leave suffer in that they always need to return home. However, when a house—or country—is damaged, flooded, or burned, what are people returning to?

The frequency of these disasters and the size of the populations affected have moved this public health issue from that of manageable emergencies into the realm of humanitarian crises. The response to disaster outcomes needs to change as well as the preparatory work beforehand and the funding, support, and rebuilding that occur afterward. I do not know the solution to these problems, and in fact there is probably not a single correct solution. As someone who lived through a category 1 hurricane, I am merely making a call for change and a plea for action. I have seen what can happen in these types of scenarios, and I am also aware of how much worse the consequences can be. AJPH

Tara Rava Zolnikov, PhD, MS

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Disasters Through the Lens of Disparities: Elevate Community Resilience as an Essential Public Health Service

See also Zolnikov, p. 27; Rodríguez-Díaz, p. 30; Dzau et al., p. 32; and Woodward and Samet, p. 33.

Weather experts, using wind speed, declared September 2017 the most active Atlantic hurricane season on record. However, wind speed is but one measure of impact. A comprehensive assessment of the immediate and long-term consequences of disasters requires a holistic, "whole community" approach, a term coined by the Federal Emergency Management Agency to encourage a multisectoral strategy to disaster management. However, intransigent disparities faced by many communities living in the path of disasters makes this an elusive concept.

CUMULATIVE COMMUNITY VULNERABILITY

Disasters, natural and technological, profoundly affect the health and well-being of communities, especially those in disaster-prone regions. From Hurricane Katrina, the September 11th attacks, and the Deepwater Horizon oil spill to the salvos of Harvey, Irma, and Maria, disasters continue to be addressed as isolated, acute events. Vulnerable communities face cumulative, not isolated, threats, and disparities exacerbate the impact of each overlaying risk domain. For example, Hurricane Katrina, well recognized as both a natural and technological disaster, demonstrated the triple threat burden: historic health disparities, persistent environmental health risks, and living in a disaster-prone area. The Deepwater Horizon oil spill's impact on communities of Vietnamese American fisherfolk exemplified the cumulative insults of natural and technological disasters as well as this community's socioeconomic and health disparities.[1] Against this backdrop, I examine the impact of Harvey, Irma, and Maria on communities.

Protecting the most vulnerable is the proven strategy to protect all. Recent disasters showed that this principle was again ignored in Texas, Florida, and Puerto Rico. Although self-preparedness is an important first step in disaster management, those who live from paycheck to paycheck do not have the luxury of buying three days' worth of water and food. Even if this was possible, examples from all three disasters showed that response resources were significantly delayed for the most vulnerable communities. Prominently in Puerto Rico, eight days postdisaster, communities still lacked safe drinking water, basic food supplies, transportation, and electricity. Indeed, the success of a disaster response is most accurately determined by the receivers, not the providers.

POLICY AND HEALTH DISCONNECT

To date, we have failed our most vulnerable communities in a three-pronged fashion: (1) failing to recognize that a community's degree of disaster preparedness directly influences its capacity to recover, (2) failing to address disaster recovery as a long-term process requiring sustained investments of financial resources and human capital, and (3) ignoring disparities as chronic stressors that communities face.

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The degree to which a community endures disparities and environmental health threats is directly related to its ability to prepare adequately and recover effectively from disasters. Protecting all communities to the greatest extent possible from natural and technical disasters is the government's obligation; yet, existing policies, including the Stafford Act,[2] address primarily disaster response, and aid is released only after policymakers declare the state of emergency. Regardless of how early this occurs before a disaster, the timing fails those suffering recalcitrant health and social inequities.[3]

The recent hurricanes vividly displayed the disconnect between policy and timely disaster response. In the aftermath of Hurricane Irma, a nursing home in Hollywood, Florida, was allowed to operate with minimal liability insurance, and multiple residents lost their lives. The home delayed evacuation to a nearby hospital until days after losing electricity, leaving residents in heat stress incompatible with life. Although the minimal liability insurance was not the cause of this tragedy, disaster-oriented policies would incentivize more effective and timely action. Similarly, it took almost nine days after Hurricane Maria before the Jones Act was lifted, allowing foreign freight ships to transport food and water to Puerto Rican residents—US citizens disconnected from governmental aid on the mainland.[4]

DISASTER RECOVERY AS LONG-TERM PROCESS

When the spotlight disappears from communities in the acute postdisaster phase, so does the assurance that recovery aid will reach those most in need. Sustained disaster recovery requires the ability to apply for aid; however, lack of transportation and inadequate basic documentation hamper this ability for vulnerable populations, including those in immigrant communities. As was the case in the aftermath of Hurricane Katrina, rebuilding fragile homes and infrastructure was often not an option. Building for community protection calls for a holistic community-driven and participatory approach beyond individual "survival assistance."[5]

THE IMPACT OF CHRONIC STRESSORS

Many communities affected by the recent disasters rank at the bottom of leading health indicators and face what are now recognized as slow-moving shocks and stressors affecting overall health and well-being: inadequate housing, a poor built environment that hampers access to healthy foods and transportation, environmental pollution manifested in PM2.5 (particulate matter with a diameter of 2.5 μm or less) and greenhouse gases at levels of public health concern, and neurotoxicants such as lead and mercury in drinking water and seafood. Collectively, the burden of these stressors prevents already vulnerable communities from preparing effectively, let alone beginning to recover from the more acute stressors posed by natural and technological disasters. Hence, ignoring these chronic stressors by investing only in the aftermath of acute disasters is a disconnect between the policies intended to protect public health from disasters and the resulting adverse effect on those whose health is most at risk.

CLIMATE CHANGE AS GLOBAL CHRONIC HEALTH STRESSOR

Although the severity and timing of Hurricanes Harvey, Irma, and Maria were unprecedented, climate change is projected to increase the frequency and magnitude of extreme climatic events in the Caribbean and the US Gulf Coast (http://www.ipcc.ch/report/ar5/syr). The 2017 North Atlantic hurricane season, as well as the droughts and flooding in the Caribbean over the past two decades, illustrate the high potential for devastation resulting from these storms.[6] Many Caribbean countries, particularly small island developing nations, are especially vulnerable to climate change because of their reliance on tourism, agriculture and fishing industries, weak infrastructure, high rates of poverty, and environmental degradation. The failure of the United States to develop and implement public health–driven climate change policies disproportionately affects our Caribbean neighbors.

ELEVATE COMMUNITY RESILIENCE

As with the global epidemic of noncommunicable diseases, we fail to invest where the benefits are most sustainable: prevention. Analogously, investing in disaster preparedness positively affects the success of each subsequent disaster management phase, from detection and response to mitigation and recovery. Yet, despite lessons learned from previous disasters, response funds far exceed preparedness funds.

The root causes of poor disaster recovery can be stopped only by countering the devastating impacts of acute as well as chronic stressors. Disaster aid must prioritize those most vulnerable, regardless of race, ethnicity, income, and citizen status. One potentially daring but promising strategy is to elevate community resilience as an essential public health service and consequently integrate community resilience measures as performance benchmarks of federal, state, and local health agencies. Such benchmarks would be monitored through institutional accreditation processes and incentivized by funding allocations. James Hospedales, executive director of the Caribbean Public Health Agency, says it best: "Normally we can 'manage' one storm; we are very resilient. But multiple storms with 15 countries and territories hit, and some more than once, that is overwhelming our normal resilience" (personal communication). Efforts under way to better quantify community resilience should accelerate us on this path forward.[7] AJPH

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Maria in Puerto Rico: Natural Disaster in a Colonial Archipelago

See also Zolnikov, p. 27; Lichtveld, p. 28; Dzau et al., p. 32; and Woodward and Samet, p. 33.

The devastation caused by Hurricane Maria exposed the colonial condition of Puerto Rico. If anything has been evidenced in the aftermath of the hurricane, besides the sociopolitical crisis in Puerto Rico, it is the ability of the people of Puerto Rico to overcome adversity. In this process we witnessed solidarity and commitment to the restoration of our communities. I could share many examples, but would like to highlight two, that, to my understanding, best represent this.

First, the Puerto Rican diaspora played a major role in the preparation for and response to the natural disaster. During and after the impact of Hurricane Maria, we witnessed Puerto Ricans not currently living in the islands supporting and organizing aid for those in Puerto Rico. Social media became a place to share their hopes, frustrations, and readiness to assist. In Puerto Rico, there are nearly 3.5 million residents, but there are many more Puerto Ricans not living on the islands. Yet, distance has not curtailed their commitment to Puerto Rico. I and many others are thankful to the Puerto Rican diaspora for the pressure they exerted upon politicians and in the national and international media. Their interventions made the humanitarian crisis experienced in Puerto Rico visible, helped in the emergency response, and sustained public discussion.

Secondly, community-level actions were fundamental in restoring access to neighborhoods and, ultimately, saving lives. One major failure after the impact of Hurricane Maria was the time it took national and federal authorities to reach rural areas of Puerto Rico. When media were able to reach these areas, most of the images and stories shared showed communities rallying to assist elders in getting drinking water, clearing debris from roads, and organizing shared cooking spaces.

The experience of Puerto Rico is shared with that of other countries in the Caribbean region known to be in the "Hurricane Alley." Although certain disasters and public health emergencies can be predicted in this region, it is not only their geographical location, but also their colonial or postcolonial status, with chronic financial and public health implications, that increases their vulnerability to such disasters.

AN UNINCORPORATED TERRITORY

Puerto Rico is an organized but unincorporated territory of the United States of America since 1898, after the Spanish–American War. Nearly half of the adults in the United States do not know that Puerto Ricans are fellow citizens,[1] yet Puerto Ricans are US citizens by birth since 1917. As an unincorporated territory of the United States, Puerto Rico lacks self-determination, and Puerto Ricans on the islands do not have full representation in Congress and cannot vote for president. Furthermore, because of Puerto Rico's territorial status, US federal mandates take precedence over local legislation and policies in all areas of governance.

As a territory, Puerto Rico also contributes to the annual appropriation of funding to the Federal Emergency Management Agency (FEMA), and relies on its support in case of emergencies. However, the destruction brought by Hurricane Maria exposed colonial laws that limit the scope of actions that Puerto Rico has in response to emergencies. Examples of these laws are The Merchant Marine Act of 1920, also known as the Jones Act, and the Puerto Rico Oversight, Management, and Economic Stability Act or PROMESA. The Jones Act established that the maritime waters and ports of Puerto Rico are controlled by US agencies.[2] Under this kind of control, the cost of consumer goods arriving to Puerto Rico can be higher than in the continental United States. The Jones Act also restrains the ability of non-US vessels and crews to engage in commercial trade with Puerto Rico. Similarly, in 2016, PROMESA was imposed on Puerto Rico and its inhabitants as a way to deal with the economic crisis.[3] PROMESA limits the Puerto Rican government's disaster response by restricting the amount of resources the state can mobilize locally in attending to the crises brought by the 2017 hurricane season.

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