

Investigating the Public Health Impact of Hurricane Sandy

Michael J. Reilly, DrPH, MPH; Linda C. Degutis, DrPH, MSN; Stephen S. Morse, PhD



On October 29, 2012, Superstorm Sandy made landfall near Atlantic City, New Jersey, covering an area of over 900 miles and exposing millions of residents to storm surge, floodwaters, and hurricane force winds. Devastating damage was caused to homes, businesses, and critical infrastructure, particularly in New Jersey and New York.¹ An unprecedented natural disaster for this densely populated part of the country, the storm and its aftermath claimed 117 lives; more than half of the deaths caused by Hurricane Sandy occurred within the first 48 hours following the storm.¹



Damage and destruction to nearly 10,000 homes caused the displacement of individuals and families from affected areas, which required the provision of mass care and shelter to thousands. Nearly 8 million homes and businesses were without power for days and weeks. Storm damage to the supply chain resulted in gas stations without the ability to obtain fuel. Those stations that did have fuel but did not have a backup generator were unable to fuel vehicles. This lasted nearly 2 weeks and added to the shortage of critical personnel who depended on their own transportation, such as hospital staff and emergency responders. The power failures also resulted in the need to evacuate acute care hospitals and nursing facilities in the middle of the storm. Some facilities that were considered well prepared discovered unanticipated weaknesses, such as failure of backup generators as the result of flooding in unexpected locations. These actions put the lives of patients and health care workers at risk in facilities that chose not to evacuate prior to the storm.²



In the days and weeks following the storm, a second wave of public health concerns emerged. The storm and its impact on the health care infrastructure made the access and provision of medical care and disease management difficult for those with chronic illnesses. The total and partial destruction of acute care hospitals, the closure of pharmacies, and the closure of private physicians' offices owing to power loss or lack of staff able and willing to report to work contributed to the exacerbation of many chronic illnesses. Although there were numerous concerns related to the continuity of health care delivery systems, domestic mold contamination was a great concern for public health officials and one of the most pervasive complaints of the public in the aftermath of Hurricane Sandy.

In the days following Hurricane Sandy, homeowners returned to their homes to assess the damage and plan to repair and rebuild. As the result of several factors including the overwhelming number of homes requiring construction and remediation of flood and water damage, the lack of available contractors to take on projects, and the delays in processing insurance claims, many homeowners took it upon themselves to perform mold remediation and mucking and gutting work to remove damaged materials in their homes and attempt to rebuild. This led to the exposure of homeowners, volunteers, and other non-professional laborers to mold and other environmental contaminants. Characterizing the numbers of individuals who were

exposed to environmental contamination and identifying those who developed illness proved to be another major challenge for health departments.

Unlike many previous disasters, the Disaster Relief Appropriations Act of 2013 provided funding to the US Department of Health and Human Services (HHS) to commission research to investigate a variety of the areas of concern following Sandy. Mechanisms for funding were made through the Office of the Assistant Secretary for Preparedness and Response (ASPR), the Centers for Disease Control and Prevention (CDC), the National Institute for Occupational Safety and Health (NIOSH), and the National Institute of Environmental Health Sciences (NIEHS). In total, 31 initial projects were funded to evaluate areas of resiliency and recovery and to identify problems and solutions in areas related to health care delivery, the public health system response, risk communication, worker safety, environmental and occupational hazards, and the overall physical and mental health impacts on the general population.

It is from these 31 initial projects and the 13 additional companion projects funded by HHS that the body of literature presented in this special issue of *Disaster Medicine and Public Health Preparedness* is drawn. Many of the articles presented here, and those featured in subsequent issues of the Journal, attempt to illuminate the lessons learned from the experience of Hurricane Sandy and how we can use these lessons to better improve and inform our response to future disasters and public health emergencies. Many of the findings from articles in this collection reemphasize fundamentals of disaster response that are already well known but are not well practiced. Other findings are less intuitive and contribute new insights into the response and recovery from hurricanes and coastal storms that should be shared with public health emergency planners and the emergency management community to inform planning and ensure that we are learning from past experiences. Many effective responses are improvised during disasters but are not often recorded.

The importance of post-disaster research to evaluate how disasters affect specific populations and the effectiveness of health care institutions and public health agencies in preparing and responding to these events is critical in minimizing morbidity and mortality following the next disaster. It is laudable that a mechanism was available by which researchers could devote time and resources to thoughtfully analyze the public health issues surrounding the response and recovery from Hurricane Sandy; however, this is often not the case following a disaster. Even when appropriations are made for disaster research, as was the case following Hurricane Sandy, investigators had to wait over a year after the event to receive funding and begin research. During this period of time, data may become lost or unavailable, recall of critical events and

timelines become less clear, and study design becomes more difficult.

Although “rapid” research mechanisms exist for certain types of research, agencies like ASPR, CDC, NIOSH, and NIEHS should set aside more funding for immediate post-disaster research or identify mechanisms where “seed” funding can be provided for brief demonstration projects that would lead to larger awards if investigators are able to show that data collected immediately following an event are relevant and may inform an improved response. Another important consideration for funding agencies is whether it is more important for policy makers to have a collection of works published 4 years following a disaster or whether preliminary findings could be useful to officials still engaged in the response or recovery to an incident. There were also differences in resilience and rates of recovery in different areas and communities, providing a unique opportunity to better understand what qualities make for resilience and how it can be enhanced. For this, both immediate post-disaster studies and sustained follow-up are needed.

We are delighted to have been asked to edit this special issue of *Disaster Medicine and Public Health Preparedness*. The articles received and that appear within this issue provide important insights into the public health response and recovery to major natural disturbances as well as lessons that can be applied to any disaster or public health emergency.

Michael J. Reilly, DrPH, MPH
Center for Disaster Medicine
School of Health Sciences and Practice
New York Medical College
Valhalla, New York
michael_reilly@nysmc.edu

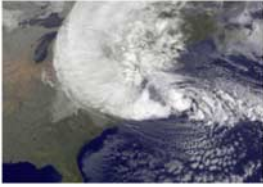
Linda C. Degutis, DrPH, MSN
Defense Health Horizons and
The Avielle Foundation
Atlanta, Georgia
ldegutis@gmail.com

Stephen S. Morse, PhD
Department of Epidemiology
Mailman School of Public Health
Columbia University
New York, New York
ssm20@columbia.edu

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Cover Images:



Superstorm Sandy making landfall. Image courtesy NASA



Mantoloking bridge, NJ. Image courtesy NSF



Damage to home at Union Beach, NJ. Image courtesy Patsy Lunch/FEMA



Staten Island, NY. Image courtesy Michael Reilly, MD

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