



EDITORIAL

Epidemiologic Approaches to Disasters: Reducing Our Vulnerability

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Disasters are an increasing global health concern. On average, one disaster per week requires external international assistance somewhere in the world. Recent events, most notably the tsunami of December 26, 2004, have emphasized mankind's vulnerability to these events and the necessity for preparedness. These ecologic disruptions are emergencies of great magnitude that overwhelm existing resources, resulting in a call for outside help (1).

A March 16, 2005, *New York Times* article outlined "15 Nightmares for Disaster Planning" (2). As could be predicted because of the tragic events of September 11th, the majority of those making the top 15 list were related to terrorist attacks, including bioterrorism as well as chemical, radiologic, and cyber attacks. Notably, natural disasters, including pandemic flu, hurricanes, and earthquakes, also made this priority list. The potential deaths and health impacts of natural disasters can dwarf those related to terrorism, as documented by the more than 200,000 deaths related to the recent Indian Ocean tsunami and the pandemic flu of 1918, believed to have caused as many as 40 million deaths worldwide (3).

Focusing on the theme of Epidemiologic Approaches to Disasters, the 2005 issue of *Epidemiologic Reviews*, the *Journal's* sister publication, is a substantial and timely addition to our understanding of the health impacts of disasters. The information provided will assist the development of strategies and interventions important to the public's health. The focus is predominantly on a spectrum of *natural disasters*, including floods, weather disturbances,

and earthquakes (4–7). *Man-made disasters* can be defined as technological events or emergencies occurring in human settlements (1). These are also described in articles dealing with the Chernobyl nuclear power plant accident (8) and civil conflicts in Africa (9).

The role of public health in disasters is certainly not new but is now being recognized and highlighted. This emphasis on preparedness was engendered by the tragic events of September 11, 2001, and the subsequent concerns about anthrax, smallpox, and "dirty" bombs. Throughout history, the definition of public health activities has been forged by the need for collective action to counter hazards: controlling transmissible disease, removing environmental threats, and providing a safe drinking water and food supply (10).

All of these are of prime importance in the aftermath of contemporary disasters. However, the recent concerns about terrorism have put local public health agencies back on the front lines with respect to public safety. New techniques of surveillance, informatics, and communication are key tools. Public health infrastructure is integral to preparedness, not only for terrorism but also for natural and other man-made disasters (11).

In the life cycle of a disaster event, activities to protect the public health of a community include preparation before the event, capacity to predict and identify occurrence of the adverse incidents, and measures in the aftermath to reduce the rate of injury, illness, and death. Epidemiology is a discipline that can inform and guide public health efforts aimed at prevention and preparedness tasks related to

disasters. For example, in this issue, Ebi and Schmier (12) describe early warning systems for extreme weather events. Methods outlined in this review may help to predict and assist in the early recognition of floods or heat waves, bolstering preventive efforts to develop a disaster management strategy and reducing the vulnerability of potentially affected populations.

This year's *Epidemiologic Reviews* issue highlights the outstanding benefits of the epidemiologic approach when applied to the calamity of disaster. Description and quantification of the health impact are useful in planning the response for the required health services and social and environmental problems. Epidemiologic analysis can help in allocating limited resources to obtain maximal benefits in disaster situations. Ramirez and Peek-Asa (7), who describe traumatic injuries associated with earthquakes, provide this type of invaluable and highly detailed information relevant to the delivery of medical services, surveillance, provisions for the dead and evacuation of the injured, and search and rescue activity. Surveillance and epidemiology provide information that assists action not only during the event itself but also in planning for future disasters.

It has long been recognized that the impact of disasters extends to serious mental health and social consequences. The 1972 Buffalo Creek disaster devastated an Appalachian mountain community; 125 died, scores were injured, and thousands were displaced. Survivors reported nightmares, insomnia, guilt, despair, depression, and hopelessness (13). Several excellent contributions in this issue of *Epidemiologic Reviews* significantly extend our knowledge of this type of impact and provide excellent guidance on how to investigate this health problem (6, 14, 15). Galea et al. (14), writing about post-traumatic stress disorder (PTSD) after disasters, distinguish between the early-onset post-traumatic stress disorder that resolves quickly and this condition in those who experience it over a longer term. As the authors point out, understanding who is at risk for long-term PTSD and exploring PTSD patterns and trajectories can yield benefits in developing early intervention strategies.

All public health officials who have encountered health problems affecting their communities realize the importance of communication to the public and policy makers. Both the advantages and perils of this communication are heightened during disasters, when fear, concern, and misinformation abound. Vasterman et al. (16) have contributed an article about the role of the media in the aftermath of disaster. The value of certain communication strategies is affirmed through a careful analysis of the different roles played by media in disaster situations.

David Heyman, director of the homeland security program at the Center for Strategic and International Studies, a Washington, DC-based research organization, recently stated, "We have a great sense of vulnerability, but no sense of what it takes to be prepared" (2, p. 1). The 2005 issue of *Epidemiologic Reviews* demonstrates the importance of the

epidemiologic approach in preparing for disaster and how we can reduce our vulnerability.

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