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## EDITORIALS AND COMMENTARIES

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# Disasters and the Health of Urban Populations

Sandro Galea

The average number of reported disasters worldwide, based on International Federation of the Red Cross criteria, increased from an average of 428 per year between 1994 and 1998 to 707 per year between 1999 and 2003.<sup>1</sup> Although definitions of disasters vary, most definitions concur that disasters may be attributed to natural, technological, or human causes. During the past decade, several high profile disasters have sharpened the media and scientific focus on disasters. In terms of natural disasters, the horrific Southeast Asian tsunami at the end of 2004, claiming more than 200,000 lives worldwide, highlighted both the devastation that natural disasters can wreak and their unpredictability. Our increasing reliance on technology comes hand in hand with a greater risk of the possible consequences of this reliance. The dam collapse at Buffalo Creek and the threatened nuclear power plant failure at Three Mile Island were two of the sentinel events of the past decades that increased our awareness of the threat of technological disasters. With respect to human-made disasters, two unprecedented terrorist attacks, the bombing of the Murrah Federal Building in Oklahoma City in 1995 and the attacks on the World Trade Center in New York City in 2001, brought home the notion that human-made mass traumatic events are a source of concern in the United States. Two-and-a-half years after the September 11, 2001 terrorist attacks, on March 11, 2004, the Madrid train bombings were the largest single terrorist attack in Europe. In addition, other mass traumatic events continue to threaten the health of populations worldwide. There are approximately 16 wars being fought today.<sup>2</sup> In 2004, there were 17,084,100 refugees around the world,<sup>3</sup> ensuring that the consequences of these wars would continue for years to come.

Despite growing governmental and international interest in preventive measures against disasters, it is becoming ever clearer that no preventive measure will ever successfully prevent all disasters. As such, it is imperative that we improve our understanding of the consequences of disasters so that we may guide public health efforts that may mitigate them. Four articles in this issue of the *Journal* highlight different aspects of disaster consequences,<sup>4-7</sup> frame key emerging issues in the field, and suggest the direction for disaster research in coming years.

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The consequences of disasters extend far beyond the direct victims that have traditionally been considered affected by disasters. Beyond the immediate physical injury and death that may accompany a disaster, physical and mental health consequences may manifest both among victims of a disaster and in the general population.<sup>6,8</sup> Immunomodulation and stress processes may account for some of the long-term relation between disaster exposure and poor health.<sup>9</sup> The role of the social and economic consequences of disasters in shaping long-term health should not be underestimated. For example, we know that disaster-related job loss and unemployment are risk factors for long-term psychopathology.<sup>10</sup> As disaster research moves into the mainstream, cross-disciplinary work that includes public health, economics, and other social sciences will illuminate what are likely to be complex relationships between the different consequences of disaster and their role in shaping population health.

Research that has considered the complex relations between different domains of disaster consequences remains limited but essential. This is certainly in part attributable to academic disciplinary boundaries. Perhaps, equally important is the fact that it is substantially difficult, both methodologically and conceptually, to depict nonlinear and reciprocal relationships between the social, economic, and health consequences of disasters. Although economic downturns after disasters may well affect mental health in the long term, we know little about the economic consequences of this disaster-related psychopathology itself.

Ultimately, although the consequences of disasters are likely to extend to whole populations, there remain special populations that may be disproportionately affected by disasters and as such, merit particular research attention. These groups, including groups defined by race/ethnicity<sup>4,11</sup> or by a particular behavior,<sup>5</sup> may be especially vulnerable to the consequences of disasters and may experience disasters differently than the rest of the population. Work that has systematically assessed *why* such groups experience disasters differently is limited,<sup>11</sup> but critical if we are to understand how to optimally mitigate the consequences of disasters.

Although none of the disaster-related articles included in this issue explicitly consider the role played by the urban environment, the urban context is the implicit contextual determinant in all of this work. As more and more of the world's population is living in cities,<sup>12</sup> we need to consider how features of the urban environment directly or indirectly shape the consequences of disasters. Features of the urban physical environment that are likely to influence the impact of disasters include, for example, structural safety of buildings (a key determinant of survival in the Bam earthquake among other such events), density of built structures, and quality of roads. Social cohesion, among other aspects of the social environment, may play a particularly important role in shaping the consequences of disasters in densely populated urban areas. Research that elucidates how features of the urban environment may influence the health, social, and economic consequences of disasters, and how these factors together shape the health of urban populations represents the next frontier in disaster research.

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