
Journal of Urban Health: Bulletin of the New York Academy of Medicine Vol. 79, No. 1, March 2002

EDITORIALS AND COMMENTARIES

New York City, 2001: Reaction and Response

David Vlahov, Sandro Galea, and David Frankel

New York City was attacked on Tuesday, September 11, 2001. The North Tower of the World Trade Center (WTC) was hit by an American Airlines Boeing 767 passenger plane at 8:45 AM. NYC residents typically start work by that time. Instant Internet and 24-hour news channel access allowed New Yorkers in untold numbers to witness the event almost in real time. Then, as we watched reports of the first attack, a second plane struck the South Tower of the WTC.

The events of the next hour unfolded in rapid succession. Hundreds of thousands of residents in the metropolitan area—and around the nation—tried frantically to reach their loved ones working in the towers. The telephone lines failed. Internet connections froze; systems were unable to handle the overwhelming volume.

Soon after reports that firefighters and police officers were entering the buildings, Tower Two, then Tower One, collapsed. We heard reports that the Pentagon had been attacked, and then a number of other "fog-of-war" rumors, including the presence of a car bomb at the Mall in Washington, DC, and, perhaps more alarming for New Yorkers, that another four planes had been hijacked and remained unaccounted. We saw images we never imagined. Workers, some holding hands, jumped from over 100 stories; soot and debris covered workers streaming north like refugees; and an eerie, gradual, all-enveloping stillness blanketed the city as it seemed that all life in the city ground to a halt. The remainder of the day brought more experiences—long walks home amid crowds of office employees carrying briefcases; an uneasy, silent sky devoid of commercial aircraft; and a growing uncertainty about those responsible for the attack, their motivation, and America's potential response.

For many residents of New York City, these fears were coupled with uncertainty about the fate of family, friends, and acquaintances who had not been heard from since the event. In the days that followed the WTC attack, life in New York City proceeded at a surreally detached pace; many missed work, ongoing bomb threats evacuated landmark skyscrapers repeatedly, and the city's perpetual movement just stopped. Few cars were on the roads, and no cars at all were allowed in areas below 14th Street; subways were erratic and empty. The toll of dead and missing climbed above 5,000, with at least that many more injured in the attack. Latest reports suggest about 3,000 people died in the attacks. Residents of lower Manhattan were evacuated and have, only very slowly, returned to their homes. Some remain displaced, even now months after the attack. Companies with offices in the WTC complex worked out of employees' homes or quickly leased space further uptown in Manhattan or across the Hudson in New Jersey.

The event continues to dominate life in New York City. Telephone and Internet

outages remain common in many workplaces, subway service remains incomplete, and a vast area of downtown Manhattan remains inaccessible. On a casual stroll through the city, one comes across ad hoc curbside victim memorials adorned with flowers, candles, and pictures. Every firehouse is a shrine. More than 100,000 people in New York City will lose jobs as a result of the disaster; subway service will take time to return to its previous level; and the shape of lower Manhattan remains an enigma.

Soon after September 11, a slow stream of anthrax-laden letters made their way to crucial news organizations and even the governor's office. Media workers, then postal employees, contracted cutaneous and inhalational anthrax in the city and in New Jersey. In the past days, the first cases of persons who are neither media nor postal employees with inhalational anthrax have been diagnosed in Manhattan. Bomb and bioterrorism scares seem to cause subway evacuations of landmark buildings routinely as New Yorkers try to go on with some semblance of normalcy.

We are only beginning to appreciate the full scope of public health consequences of the WTC attack and the subsequent anthrax event. Apart from the persons who were directly injured and killed by these attacks, the events are likely to have a toll directly, and indirectly, on a significant proportion of residents of the metropolitan area. A review of the empirical literature regarding the range, magnitude, and effect of disasters showed that disasters are classified in three categories: natural disasters, technological disasters, and mass violence. Only 10% of the disasters reviewed were of the last type.[1]

Among 160 articles describing 120 distinct postdisaster samples, Norris[1] identified five sequelae of disasters: specific psychological problems (e.g., posttraumatic stress disorder [PTSD], depression, and anxiety); nonspecific distress; health problems and concerns; chronic problems in living; and psychosocial resource losses. Although disasters range in severity and in extent of their consequences, atypically strong disasters are associated with more significant sequelae. Norris postulated that the impact of disasters is greatest when at least two of four event factors are present: (1) the disaster caused widespread damage to property, (2) the disaster started serious and ongoing financial problems, (3) the disaster was caused by human intent, and (4) the disaster was associated with a high prevalence of trauma or loss of life. Applying these criteria to the WTC attack, this event meets the last three criteria (damage to property, although vastly expensive, was largely confined to an area in the southern end of Manhattan). This suggests that the health sequelae of the terrorist events in New York City will be substantial and lasting.

The closest example of a trauma similar to the WTC disaster in the United States is the Oklahoma City bombing. Both events were premeditated, surprise events that resulted in significant loss of life and that had significant consequences on national policies and the overall US attitude to disasters and their aftermath. The Oklahoma City bombing on April 19, 1995, was the deadliest attack on US soil since World War II until the WTC attack. In the Oklahoma City bombing, 168 persons were killed, over 800 were injured, and more than 12,000 persons were involved in the rescue efforts.[2] A survey of the Oklahoma City metropolitan area found that 61.5% of adults reported experiencing at least one direct result of the bombing; in population terms, this amounted to 433,000 adults.[3] Residents of Oklahoma surveyed reported doubling of alcohol use, smoking more, or starting smoking. Reports of stress, psychological distress components, and intrusive thoughts related to the bombing site were also double in Oklahomans compared to a control community. These differences persisted into 1996, a year after the bomb-

ing.[3] In a different study, 182 of 255 adult survivors were selected from a confidential registry interviewed approximately 6 months postdisaster; among these survivors, 45% had a postdisaster psychiatric diagnosis, and 34.3% had PTSD.[4] A clinical needs assessment 7 weeks after the bombing found that more than 40% of students in grades 6 to 12 knew someone injured in the bombing, and more than a third knew someone killed.[5]

Evidence from other disaster situations suggests that psychological sequelae of the WTC attack (particularly PTSD and major depression) and substance abuse are likely to be particular problems in the coming months.[6–10] There are suggestions that risk factors for other diseases, such as cardiac disease, may be elevated in the postdisaster period.[11] In the 7 weeks since the WTC attacks, there has been a tremendous concerted effort on the part of federal, state, and municipal public health agencies to provide immediate assistance to those directly affected by the WTC attacks. The real challenge, however, may just be starting. Although persons who were more directly involved in the disaster are at higher risk of postdisaster psychological sequelae, other high-risk groups may include the elderly, marginalized groups, and specific ethnic minorities.[12] The population concentration and racial/ethnic diversity of New York City suggests that there may be marked disparities in direct and indirect sequelae of the WTC attacks.

Twenty times more people died in the WTC attack than in the Oklahoma City bombing. There is no comparable example on a similar scale of intentionally caused loss of human life in recent US history. As the country adjusts to a new era in which fear of terrorism is very much a reality, New York City learns to cope with the consequences of the attack. Public health, long the poor stepchild of the medical industrial complex, has risen remarkably to the occasion, working to maintain disease surveillance in the face of escalating costs and risks that change daily. The immediate postdisaster phase is now giving way to a longer, more protracted, and more difficult phase of the public health response. Public health providers and researchers are called to the task of providing ongoing support to the population of the metropolitan area; continue to cope with almost daily, new, revelations about the extent of potential bioterrorism; and to extract lessons from this disaster that can guide future preparedness.

Upcoming issues of the *Journal of Urban Health* will be devoted to the events of September 11, 2001, and their confusing and terrifying aftermath. The hearts of those associated with this *Journal* go to those who have lost friends and family in this tragedy.

REFERENCES

1. Norris FH. *50,000 Disaster Victims Speak. An Empirical Review of the Empirical Literature*. National Center for PTSD; 2001. Available at: http://www.musc.edu/cvc/norris1.htm. Accessed January 11, 2002.
2. Tucker P, Boehler SD, Dickson W, Lensgraf SJ, Jones D. Mental health response to the Oklahoma City bombing. *J Okla State Med Assoc*. 1999;92(4):168–171.
3. Smith DW, Christiansen EH, Vincent R, Hann NE. Population effects of the bombing of Oklahoma City. *J Okla State Med Assoc*. 1999;92(4):193–198.
4. North CS, Nixon SJ, Shariat S, et al. Psychiatric disorders among survivors of the Oklahoma City bombing. *JAMA*. 1999;282(8):755–762.
5. Pfefferbaum B, Nixon SJ, Krug RS, et al. Clinical needs assessment of middle and high school students following the 1995 Oklahoma City bombing. *Am J Psychiatry*. 1999; 156:1069–1074.

6. Caldera T, Palma L, Penayo U, Kullgren G. Psychological impact of the hurricane Mitch in Nicaragua in a one-year perspective. *Soc Psychiatry Psychiatr Epidemiol*. 2001;36(3): 108–114.
7. Freedy JR, Saladin ME, Kilpatrick DG, Resnick HS, Saunders BE. Understanding acute psychological distress following natural disaster. *J Trauma Stress*. 1994;7(2):257–273.
8. Takatorige T. Drinking habits and characteristics of urban male residents with high alcohol intake—analysis of temporary housing residents after the great Hanshin Earthquake. *Nippon Koshu Eisei Zasshi*. 2001;48(5):344–355.
9. Godleski LS. Tornado disasters and stress response. *J Ky Med Assoc*. 1997;95(4):145–148.
10. Deering CG, Glover SG, Ready D, Eddleman HC, Alarcon RD. Unique patterns of comorbidity in posttraumatic stress disorder from different sources of trauma. *Comp Psychiatry*. 1996;37(5):336–346.
11. Bland SH, Farinaro E, Krogh V, Jossa F, Scottoni A, Trevisan M. Long term relations between earthquake experiences and coronary heart disease risk factors. *Am J Epidemiol*. 2000;151(11):1086–1090.
12. Fothergill A, Maestas EG, Darlington JD. Race, ethnicity and disasters in the United States: a review of the literature. *Disasters*. 1999;23(2):156–173.