# Public Health Briefs

# Health Consequences of the Snow Disaster In Massachusetts, February 6, 1978

ROGER I. GLASS, MD, MPH, PHILIP O'HARE, MA, AND J. LYLE CONRAD, MD

**Abstract:** On February 6, 1978, the largest New England blizzard of the century struck eastern Massachusetts. On request, four days later, the Center for Disease Control provided epidemiologic assistance. On-site disaster assistance provided decision-makers with immediate health surveillance information useful in helping the area return to normal. No outbreaks of infectious diseases and no significant increase in the number of deaths were observed in the week following the blizzard. Some of the deaths which occurred immediately after the blizzard might have been prevented if traffic had been banned earlier. (*Am J Public Health* 69:1047-1049, 1979.)

On February 6 and 7, 1978, the largest New England blizzard of this century struck eastern Massachusetts with record snowfall, northeasterly winds of over 125 miles per hour, and severe coastal flooding. On the night of the storm more than 1,000 coastal homes were flooded, 23,500 people were evacuated to temporary shelters, and thousands of persons were stranded in their cars. The Governor imposed a one-week ban on all traffic and non-essential work activities for eastern Massachusetts, and President Carter declared a national disaster qualifying the affected communities to receive financial relief and emergency assistance. Four days after the storm, and in face of mounting rumors of infectious disease outbreaks, medical-care delivery problems, and a rising death toll, the Center for Disease Control was asked by the Federal Disaster Assistance Administration (FDAA) to provide epidemiologic assistance to rapidly evaluate the health consequences of the disaster. This report presents the results of our surveys and demonstrates the value of on-site epidemiologic assistance following major disasters.

From the Special Studies Branch, Chronic Diseases Division, Bureau of Epidemiology, Center for Disease Control; and the Massachusetts Department of Public Health. Address reprint requests to Roger I. Glass, MD, MPH, Bureau of Epidemiology, CDC, Atlanta, GA 30333. Mr. O'Hare is currently with the Health Care Financing Administration, DHEW, Kansas City, MO. This paper, submitted to the Journal April 16, 1979, was revised and accepted for publication June 12, 1979. A preliminary report of this study was presented at the 106th Annual Meeting of the American Public Health Association, Los Angeles, October 1978. This study was supported by the Federal Disaster Assistance Administration.

## *Methods*

A "rumor clearinghouse" was set up at the FDAA headquarters in Boston to monitor infectious disease outbreaks and environmental hazards reported by state and local health department officials, disaster relief personnel, and the news media. Each report was investigated and the results were communicated daily to federal and state officials and representatives of the voluntary agencies.

Administrators at 15 eastern Massachusetts general hospitals, selected for their size and geographic distribution, were asked to provide information for the period January 30-February 14 on the daily number of emergency room visits and hospital admissions and discharges and to report those problems which caused them the greatest difficulty following the storm. Eight hospitals were visited at random to validate the required information.

Red Cross volunteers contacted town clerks in 57 eastern Massachusetts communities to determine the daily number of deaths in the period extending from one week before to one week after the blizzard, January 30-February 14. For the period February 6-10, a registry of all deaths potentially related to the storm in the same 57 communities was compiled. All information concerning the activities and circumstances surrounding each death was gathered from newspaper accounts, Red Cross files, and discussions with selected medical examiners and town clerks.

## *Results*

Seven suspected disease outbreaks or environmental health hazards were reported in the 10 days after the storm,

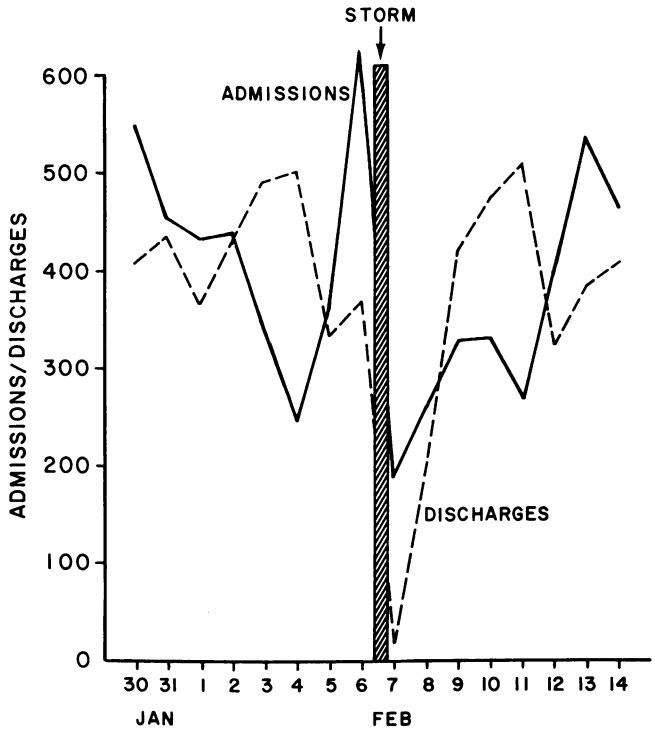


**FIGURE 1—Admissions and Discharges at 12 Hospitals, by Date, Massachusetts, January 30–February 14, 1978**

ranging from fears of chicken-pox and food poisoning at temporary shelters to questions of fecal contamination of drinking water and housing in flooded areas. No outbreaks of disease and no evidence of sewage backup could be found. Several unverified reports of disease outbreaks were widely circulated immediately after the storm when investigations were not conducted, but these ceased when epidemiologic verification became available.

In response to the storm, all hospitals suspended elective surgery and outpatient clinics for several days. Problems with the transportation of nonprofessional staff (e.g., food handlers, housekeepers) and nonmedical supplies (e.g., food, linen) were uniformly reported by administrators, and those hospitals dependent on outside suppliers of food and linen found themselves with little reserves. One facility reported transient loss of heating and several noted depletion of selected medical supplies (i.e., blood products, infant formula, plaster) which were replenished by neighboring hospitals.

Supply problems were aggravated by the peak occupancy rates reported by all hospitals. Hospital admissions at 12 hospitals providing full data declined to 200 on February 7, but discharges dropped nearly to zero (Figure 1). Emergency room visits also declined from an average of 1,200 per day to 450 and 900 visits on February 7 and 8, respectively (Figure 2). There was no rebound in either the number of emergency room visits or admissions during the week that followed the storm.

The daily number of deaths recorded by the 57 town clerks in the week after the storm was not significantly different from the number in the preceding week. Day-to-day variability of these data was great so that a small change could easily have been missed. Twenty-seven deaths were considered to be storm-related (Table 1) and the precipitating events for 20 other deaths were not sufficiently clear to make a judgment. Of the 27 storm-related deaths, eight occurred in people stranded in their automobiles, five of whom died of carbon monoxide inhalation; seven persons perished in sea-rescue operations; and six men succumbed to heart attacks while shoveling snow. Motor vehicle accident deaths were notably absent after the traffic ban took effect, since approximately one death per day would be from this cause. Only one death could be attributed in part to a lack of emergency transportation. Twenty of the 27 storm-related deaths occurred within 32 hours of the first snowfall, but only two

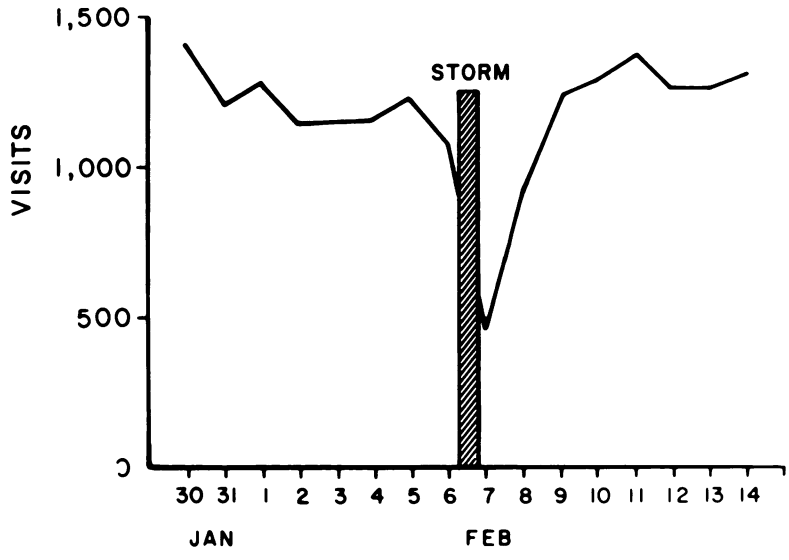


**FIGURE 2—Emergency Room Visits and Admissions at 12 Hospitals, by Date, Massachusetts, January 30–February 14, 1978**

**TABLE 1—Circumstances of Storm-Related Deaths, Massachusetts Blizzard 1978**

| Circumstances | | No. of Deaths |
|---|---|---|
| Stranded in automobile | | 8 |
| Asphyxia-CO intoxication | (5) | |
| Heart attack and cold exposure | (2) | |
| Accident | (1) | |
| Drowned during sea-rescue operations | | 7 |
| Heart attack while shoveling snow | | 6 |
| Lack of emergency transportation | | 1 |
| Various | | 5 |
| TOTAL | | 27 |

deaths occurred after 56 hours. Twenty-eight per cent of all deaths which occurred on February 7 were storm-related.

## *Discussion*

Although property damage and inconvenience caused by the New England Blizzard of 1978 were enormous, the relative health impact as assessed by these rapid post-disaster surveys was minimal[1]. Other health effects have been reported following this disaster which we did not examine in this survey; deaths from ischemic heart disease rose significantly in the week following the storm[2]; a change in the birth rate nine months after the storm is presently being examined; and many people reportedly suffered grief reactions, post-disaster syndrome, or "cabin fever" that required intervention from state mental health workers[3].

Public health interventions can diminish adverse health consequences of a disaster. Interventions taken before a predicted severe storm can save lives and minimize inconvenience. In Connecticut, early cancellation of work and a ban on traffic prevented drivers from being stranded on the road and probably alleviated this source of mortality. Establishment of a "rumor clearing house" after a disaster can speed the investigation of reported disease outbreaks, identify areas in need of emergency health services or supplies, and dispel false rumors before they have time to circulate[4, 5]. Finally, the uniform collection of data on the number, causes, and circumstances of death can be useful in assessing whether the disaster's effects are ongoing, relief policies are adequate (e.g., emergency transportation), and high-risk groups (i.e., dialysis patients) are receiving proper care[6]. The number of deaths remains the most publicized health measure of a disaster but no agency currently records this information. Furthermore, newspaper reports of a continuing rise in the death toll[7, 8] were traced to a delay in the recording of deaths rather than an excess due to a continuing problem.

Improved medical care following future disasters might be achieved by discharging hospital patients to their homes before the storm if this is considered medically safe or by use of emergency vehicles to transport patients after the storm has arrived. Contingency plans in hospitals should include the provision of transportation for the non-professional staff and increased food and linen reserves for facilities dependent upon outside suppliers.

## REFERENCES

1. Faich G: Health impact of the 1978 blizzard. Am J Public Health 69:1050-1052, 1979.
2. Glass RI, Zack MM: Increase in deaths from ischemic heart disease after blizzards. Lancet 1:485-487, 1979.
3. Project Concern: Crisis Counseling after the Blizzard of '78, Final Report. Massachusetts Department of Mental Health and Research for Social Change, Inc. Sponsored by the NIMH and FDAA. 1979.
4. Western K: The epidemiology of natural and man-made disasters. Dissertation for DTPH, London School of Tropical Medicine and Hygiene, 1972.
5. Spencer HC, Romero A, Feldman RA, et al: Disease surveillance and decision-making after the 1976 Guatemala earthquake. Lancet 2:181-184, 1977.
6. Center for Disease Control: Tornado Mortality—Wichita Falls, Texas. MMWR 28:193-194, 1979.
7. Claffey CE: Worst storm of century—17 die . . . The Boston Globe, Feb. 8, 1978, p 1.
8. New England Storm Victims. The Boston Globe, Feb. 11, 1978, p 4.

### *ACKNOWLEDGMENTS*

We wish to acknowledge the help and support of Joseph Winkle, Paul Hartzell, and William Wilcox, with the Federal Disaster Assistance Administration; Nicholas Fiumara, MD, Massachusetts Department of Health; Mary Guinan, Melanie Estes, and Isabella Woods, The American Red Cross; Philip J. Landrigan, MD, Stanley I. Music, MD, Gerald A. Faich, MD, and Richard C. Rose III, MD, of CDC; John Stoeckle, MD, Massachusetts General Hospital; and Barbara J. Stoll, MD.