

Disease Surveillance and Emergency Services at the 1982 World's Fair

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Abstract: We designed a special surveillance system to detect health complaints of visitors to the 1982 World's Fair. Heat-related illness occurred during the first month of the Fair but was substantially reduced by public education, environmental modification, and provision of additional water fountains. There was no disruption of emergency health services in the communities surrounding the Fair. Advance planning and the provision of on-site medical services can minimize the public health impact of large gatherings. (*Am J Public Health* 1987; 77:861-863.)

Introduction

The World's Fair and Energy Exposition was held in Knoxville, Tennessee from May 1 to October 31, 1982. In preparation for this event, we found little published information about the impact of such large gatherings on community emergency health services, the incidence of accidents and illness, or the potential for spread of communicable diseases. Therefore, we established a surveillance system to determine the health needs of World's Fair visitors and their impact on health care delivery.

Methods

Surveillance efforts focused on three concentric geographic areas: the Fair site itself, metropolitan Knox County where the Fair was located, and the 15 surrounding rural counties. On the Fair site, emergency care was provided at a 10-bed infirmary staffed by three nurses each shift and was supported by emergency medical technicians and communications personnel: two ambulances, four mini-ambulances, and two golf carts were used for patient transportation.

All 23 emergency rooms in the 16-county area were monitored for visits for selected health complaints. Computerized summary reports were prepared weekly and distributed to the health departments and participating hospitals.

Results

Surveillance at the Fair Site

During the six months it was open, 11,127,786 visits to the Fair (23,014-102,842 visitors per day) were recorded. There were 24,747 infirmary visits and mini-ambulance calls answered (23/10,000 visits); 911 patients required transportation to nearby hospitals for further medical care. The rates

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of selected health complaints are shown in Figure 1. Headaches and foot blisters were the most common, each occurring at a rate of 5/10,000 visits. Cuts and falls occurred at a rate of 2/10,000 visits.

Heat-induced fainting occurred most frequently during the first month of the Fair (Figure 1), principally among high school band members who marched in the daily afternoon parades and often stood in full dress uniform for up to two hours before the parade began. To prevent such heat-related illness, bands were advised to wear lighter uniforms and to avoid long periods of standing before marching. In addition, the local radio advised all Fair visitors to wear summer clothing. Black-top walkways were painted white to minimize heat retention and additional drinking fountains were installed. An infirmary annex was maintained at 68°F for the treatment of visitors complaining of heat. The subsequent decline in the rate of fainting was dramatic, despite the hotter temperatures in July and August (Figure 1).

Other health complaints occurred at low rates. Febrile illnesses, particularly in young children, were seen at a rate of 0.2/10,000 visits. Diabetic emergencies occurred at a rate of 0.08/10,000 and seizures occurred at a rate of 0.06/10,000 visits. Complaints of chest pain occurred 394 times (0.4/10,000 visits). There were 12 episodes of cardiac arrest, 10 of which were successfully resuscitated on the fair grounds.

There were 101 food-service establishments on the fair grounds. The health department quickly discovered that optimal food-handling practices were not maintained unless

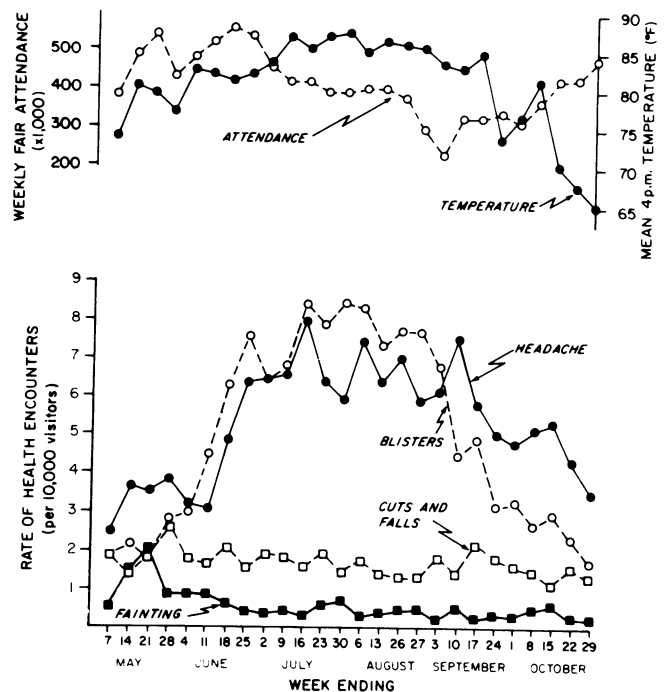


FIGURE 1—Surveillance at the World's Fair Site: Fair Attendance, Mean 4 pm Temperatures, and Rates of Selected Health Complaints, by Week, among Visitors to the Fair, Tennessee, 1982

food inspectors were present on the fair grounds every day. No food-borne outbreaks occurred. Gastrointestinal complaints (abdominal pain, nausea, or vomiting) occurred at a rate of 3/10,000 visits.

Surveillance at Knox County Hospitals

The number of emergency room visits to Knox County hospitals during the six months of the Fair was 71,825, only slightly over the number of visits during the comparable months of the preceding year (70,962). Visits for gastrointestinal illness did not vary with Fair attendance. Only one food-borne outbreak occurred; it was traced to a Knoxville restaurant. Emergency room visits for heat exhaustion in Knox County reflected the problems of band members on the fair grounds discussed earlier.

Of the 189 deaths in the emergency rooms, 75 (40 per cent) were cardiac arrests and 18 (10 per cent) were the result of automobile accidents. Emergency room deaths, however, did not vary with fair attendance or temperatures.

Surveillance in 15 Surrounding Counties

The number of visits to emergency rooms in the 15 surrounding counties during the months of the Fair was 94,499, compared to 91,862 during comparable months of the preceding year. One episode of food-borne illness was detected; it was traced to salad eaten in another state. A water-borne outbreak of gastroenteritis also occurred at a campsite where the water chlorinating system was inadequate to meet increased demand. There were almost no cases of heat exhaustion. Two cases of measles were diagnosed in visitors; there was no spread from these cases to Tennessee residents.

There was no increase in the number of cases of primary and secondary syphilis in either Knox County or the East Tennessee region when the months of the Fair were compared to the comparable months in the preceding year. Knox County recorded a 7.5 per cent increase in reported gonorrhea, but investigation revealed no association between this increase and Fair attendance.

Discussion

Despite a large influx of tourists, our surveillance system documented relatively low rates of medical complaints, and no disruption of emergency health services in the communities surrounding the Fair. Multidisciplinary advance planning,¹⁻⁷ excellent on-site medical services, and cooperative crowds combined to minimize morbidity and the public health impact of large numbers of visitors. Data from surveillance systems also are valuable when it is necessary to refute false rumors of disease.

Heat-related illness was the major preventable health risk of the Fair. The surveillance system quickly identified this problem and remedial measures were instituted promptly.

Most of the literature describing the public health implications of large gatherings concerns illnesses experienced at rock music festivals.⁸⁻²¹ Up to 10 per cent of the spectators at such music festivals seek medical care. Combining the experience from nine rock festivals,⁸⁻¹⁵ headaches were the most common complaint (about 30/10,000 spectators/day); minor trauma also occurred frequently (20/10,000 spectators/day). Foot blisters and sunburn were major causes of morbidity at festivals where the weather was unusually sunny and hot. Drug and alcohol use were important causes of serious illness and injuries at these festivals.

Lower rates occurred among large crowds gathered for papal visits in England; headaches were observed at a rate of 12/10,000, blisters at a rate of 6/10,000, and lacerations and abrasions at a rate of 4/10,000 visitors.^{22,23} Cardiac events at football games,²⁴⁻²⁷ heat illness among religious pilgrims,²⁸ and medical and psychiatric complaints at an anti-war demonstration^{29,30} also have been described.

Not all parties concerned with large gatherings regard public health efforts favorably. Tour agencies may not inform travelers of expected health risks or offer advice concerning appropriate clothing. On-site food vendors may resist the installation of adequate numbers of public water fountains and the event's promoters may not be inclined to place medical facilities in highly visible or accessible locations. The medical community may object to the provision of free on-site emergency services. However, these objections can be reduced if quantitative data about the risks involved are available. We encourage both public health officials and medical practitioners to participate in the planning for future large gatherings of people such as occur at World's Fairs, Expositions, and Olympic Games.

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New MIT Program to Deal with Chemicals in the Environment

The Massachusetts Institute of Technology has publicly committed itself for the next decade to a lead role in breaking the "gridlock of conflicts" blocking progress on the use, storage and disposal of hazardous chemicals. In an announcement released in mid-May, MIT called on industry, government agencies and public interest groups to join with it by financially supporting a 10-year plan of research and education—the MIT Program on Hazardous Substances Management. A key aim is to link the development of technology with new conflict-avoidance techniques and to bring together at the neutral university setting the three parties involved in these highly charged issues: the public, industry and government.

The range of research activities will include basic research, applied research, field work, and case studies. The goal—to achieve the necessary technological and policy breakthroughs to solve the problem posed by hazardous chemicals in the environment.

On the education side, a sequence of four graduate courses, involving all five of MIT's schools, has been developed, to provide MIT graduates with broad expertise in this area. The educational thrust is to develop a strong hazardous substances program for both undergraduate and graduate students.

The MIT announcement said the university is seeking \$10 million to fund the first five years of the program. To reach this goal, MIT is seeking contributions of \$1 million spread over five years from 10 corporations. The Dow Chemical Company has become the first of the founding companies. The MIT announcement was made in conjunction with a two-day symposium: "Hazardous Substance Management: The MIT Approach," at which several research projects were described.

Reflecting the extraordinary complexity of the problem, the interdisciplinary program will draw on the expertise of specialists in the fields of: destruction of hazardous wastes; containment of wastes at old disposal sites; changes in manufacturing techniques; toxicology and human health effects; movement of chemicals through the environment; risk assessment; monitoring techniques; mediation of science-intensive disputes; regulatory law and economics.

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