

Chapter 8

Public Health Emergency Preparedness and Response

Public health crossed the threshold of a new century as an admittedly important but poorly understood contributor to the American way of life. Despite its contributions to population health status and quality of life throughout the twentieth century, the visibility and economic valuation of public health activities remained low. This situation changed rapidly after the terrorist attacks on the World Trade Center and Pentagon on September 11, 2001 and the bioterrorism events spreading anthrax through the U.S. postal system the following month. The nation responded quickly in the aftermath of these events, elevating international terrorism, bioterrorism preparedness, and emergency response to the top of the national agenda. Within months more than \$2 billion was made available to federal, state, and local public health agencies for emergency preparedness and response activities, with additional funding allocated the following year. This explosion of attention, resources, and expectations typifies the history of public health in America, a dramatic health-related event focusing its spotlight on a largely neglected public health infrastructure followed by rapid infusion of resources to resuscitate the system.

This chapter describes the early years of efforts to enhance public health emergency preparedness, as well as some of the successes, failures, and lessons encountered along the way. The intent is to initiate an examination of whether public health preparedness will become one of the Public Health Achievements in Twenty-first Century America. In the process, this chapter will focus on several key questions:

- What is public health preparedness?
- What are the key components of preparedness?
- Is the public health system currently prepared?
- What can be done to become better prepared?

PUBLIC HEALTH ROLES IN EMERGENCY PREPAREDNESS AND RESPONSE

Previous chapters, especially Chapters 1 and 5, introduce and describe a framework for modern public health responses that is organized around six major functions:¹

- preventing epidemics and the spread of disease
- protecting against environmental hazards

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- preventing injuries
- promoting and encouraging healthy behaviors
- responding to disasters and assisting communities in recovery, and
- assuring the quality and accessibility of health services

Although only one of those functions explicitly refers to public health's role in responding to emergencies, all six drive the public health approach to emergency preparedness and response. Public health emergency preparedness and response efforts seek to prevent epidemics and the spread of disease, protect against environmental hazards, prevent injuries, promote healthy behaviors, and assure the quality and accessibility of health services. Each of these is expected by the public and each is evident in effective preparedness and response related to public health emergencies. Together they make preparedness and response a special and particularly critical component of modern public health practice.

For public health emergencies, preparedness and response are inextricably linked.² Preparedness is based on lessons learned from both actual and simulated response situations. Effective response is all but impossible without extensive planning and thoughtful preparation. Public health roles in health-related emergencies illustrate both facets.

Public Health Surveillance

Many public health emergencies are readily apparent, but others may not manifest themselves immediately. Effective preparedness and response rely on monitoring disease patterns, investigating individual case reports, and using epidemiological and laboratory analyses to target public health intervention strategies. For example, foodborne illness outbreaks may involve individuals who remain in the same location after being exposed making it easier to identify a common exposure pattern when these individuals seek medical care. Alternatively, an exposure at a convention or family reunion is more difficult to detect because individuals may present for medical care far from the location of exposure. Whether within the same community or in distant locations, it is often difficult for individual medical practitioners to recognize that an outbreak or widespread epidemic is occurring. Prompt recognition and reporting of cases to health authorities is a critical link in the public health chain of protection. A relatively new component of public health surveillance involves bio-surveillance, the early detection of abnormal disease patterns and non-traditional early disease indicators such as pharmaceutical sales, school and work absenteeism, and animal disease events.

Epidemiologic Investigation and Analysis

Once reported, public health agencies can uncover unusual patterns that help identify outbreaks and continuing risks. Public health professionals may use sophisticated analytic tools, such as pattern recognition software and geographic information systems, to determine patterns in disease cases. These surveillance activities help to ensure that disease outbreaks are identified quickly

and that appropriate response actions, such as the issuance of health alerts for area providers and communication with response partners, are initiated. Many current disease surveillance systems act in a passive manner (that is, they rely on providers to initiate disease reports); however, public health agencies are increasingly using active surveillance activities, such as when public health workers proactively seek information from providers and other sources to monitor disease trends. In the event of an actual or threatened public health emergency, active surveillance activities are deployed and/or expanded.

Surveillance activities trigger more extensive and focused epidemiological investigations in order to determine the identity, source, and modes of transmission of disease agents. Epidemiological investigations seek to determine what is causing the disease, how the disease is spreading, and who is at risk. Answers to these questions inform efforts to mount rapid and effective interventions. Methods of obtaining epidemiological information, often characterized as disease detective activities, include contacting patients, obtaining detailed information on location and types of possible exposures, and examining both clinical specimens (such as blood and urine) and environmental samplings (such as food, water, air, and soil). Epidemiological investigations require trained personnel and, in many cases, are quite human resource-intensive in terms of the quantity and quality of manpower needed. Laboratory capacity to support these investigations is critical.

Laboratory Investigation and Analysis

In many situations, laboratories provide the definitive identification of causative agents, both biological and chemical, and through various fingerprinting activities link cases to a common source. Capabilities to identify rare or unusual diseases are often not present in every community, necessitating linkages with higher level laboratories. Specimens may be sent for analysis and confirmation to a regional or state public health laboratory or possibly even to a Centers for Disease Control and Prevention (CDC) reference laboratory. Some specialized capabilities found at these higher level laboratories include serotyping to determine the antigenic profile of a microorganism and DNA fingerprinting to not only identify the type of microorganism causing an infectious disease, but to also pinpoint the particular strain of bacterium or virus involved. In this way, public health authorities can determine if reported disease cases are part of the same outbreak, and therefore linked to a common source. Public health laboratories must rely on specialized protective laboratory equipment and facilities due to the dangerous agents with which they work. Some agents, such as smallpox, require special biocontainment equipment and procedures; laboratories are rated in terms of the level of safety they can provide.

Intervention

The primary reason for collecting, analyzing, and sharing information on disease is to control that disease. Expending resources for surveillance and analysis makes little sense if actions do not follow. Interventions that protect

individuals from risks associated with environmental hazards are many, including setting standards for health and safety, inspecting food production and importation facilities, monitoring environmental conditions, abating conditions that foster infectious disease (for example, insect and animal control), and enforcing private-sector compliance with established standards. Disease and injury risks associated with these biological and chemical hazards, whether naturally occurring or initiated by man, are reduced through rigorous monitoring and enforcement activities. Public health agencies also play a substantial role in remediation of environmental hazards by decontaminating sites and facilities after they are identified. The extent of remediation necessary can vary greatly, just as the nature and extent of the contamination varies with different disease agents and their ability to remain viable outside a human host or animal/insect vector.

Risk Communication

Epidemiological and laboratory investigations drive the initiation of actions intended to limit the spread of disease and to prevent additional cases in the community. The range of possible actions can be quite broad, including restraining the activities of individuals through isolation and quarantine and imposing temporary or permanent barriers around sources of contamination (for example, sealing buildings, closing restaurants, and cutting off water supplies). In severe and unusual circumstances, special emergency powers may be put into effect limiting human and animal travel and/or restricting certain types of business activity. In these situations, the importance of effective public education and information activities to communicate risk to the public cannot be overstated. Commonly encountered examples include notices to boil drinking water when contaminated water supplies are suspected and product recalls and food safety advisories for potentially contaminated food products. The dissemination of information on mail handling practices during the anthrax attacks in late 2001 served both public education and risk communication purposes.

Promoting and encouraging healthy behaviors during public health emergencies represents another public health intervention strategy. It is not uncommon in the event of a natural disaster or terrorist attack for the most devastating effects to take the form of social disruption and infrastructure damage. The psychological effects of fear and terror, together with disruption of infrastructure components such as electricity, water, and safe housing, may create more casualties than any initial terrorist's biological or chemical assault. Such conditions can also foster toxicity and infectious disease threats, such as occurred with the mass evacuation of the area around the World Trade Center leading to the abandonment of food supplies in surrounding homes and restaurants. Public health officials in New York City took steps to secure these premises to avoid the proliferation of rodents and other pests that otherwise could have resulted in secondary health threats.

Preparedness Planning

Organizing responses to emergencies is another public health role that assures the availability and accessibility of medical and mental health services. Preparedness and planning cannot eliminate all biological, chemical, radiation, and mass casualty threats. But coordinated, community-wide planning for emergency medical and public health responses assures that emergency medical services and medical treatment services are deployed in a rapid and effective manner. Such planning foresees the need for public health measures to be activated in order to assure the safety of responders and to prevent secondary effects due to further disease transmission and injury risk. Planning for these coordinated responses includes monitoring available response resources, establishing action protocols, simulating emergency events to improve readiness, training public and private-sector personnel, assessing communication capabilities, supplies, and resources, and maintaining relationships with partner organizations to improve coordination.

Community-Wide Response

Public health agencies play an important, but not exclusive, role in community-wide responses to emergencies (Figure 8–1). In many response situations private sector medical care providers deliver the bulk of the triage and treatment services needed when a mass casualty emergency occurs. Although less involved with direct care, public health agencies play key roles in coordinating and overseeing the delivery of services as well as communicating with providers, the media, and the public. Supervision of decontamination and triage often falls to public health authorities. Countermeasures such as antibiotics, antitoxins, and chemical antidotes, as well as prophylactic medications and vaccines must be obtained, deployed, and delivered. Public health plays an active role in situations necessitating deployment of Strategic National Stockpile pharmaceuticals, supplies, and equipment. In some situations, public health professionals also provide direct medical care. Public health also contributes through mobilization of regional and national assets and resources when local resources are overwhelmed. Some emergency situations, such as the anthrax attacks of 2001, prompted public fear and overreactions resulting in mountains of unknown powdery substances being tested and thousands of individuals unnecessarily initiating prophylactic antibiotic treatments. That situation and others over recent years argue that the worried well can stress response systems even more than those actually affected.

Unique Aspects of Bioterrorism Emergencies

Across the spectrum of possible public health emergency scenarios, bioterrorism threats represent a particularly challenging form of public health emergency. Bioterrorism is the threatened or intentional release of biological agents (viruses, bacteria, or their toxins) for the purpose of influencing the



Figure 8-1 News Media Ad in Early 2002 Promoting Public Health Infrastructure as a Front Line of Defense against Bioterrorism. *Source:* Health Track Coalition, 2002.

conduct of government or intimidating or coercing a civilian population to further political or social objectives. These agents (see Exhibits 8-1 and 8-2) can be released by way of the air (as aerosols) food, water, or insects. Biological, chemical, radiation, and mass casualty threats that are intentionally inflicted differ from naturally occurring disease and injury threats in a number of important aspects. Central to these differences, bioterrorism is a criminal act requiring its prevention and response to include criminal justice, military, and intelligence agencies that are not likely to be familiar with naturally occurring disease outbreaks. Law enforcement agencies, including the Federal Bureau of Investigation, have lead responsibility for responding to a bioterrorism attack. In addition, bioterrorism attacks may involve disease agents that occur infrequently in nature and with which neither public health officials nor clinicians have had much experience. It is increasingly possible to genetically engineer chimeras to create, for example, microorganisms that blend the pathogenic qualities of multiple disease agents. Since such organisms do not

Exhibit 8–1 Biological Agents with Bioterrorism Potential*Category A*

- Variola major (smallpox)
- Bacillus anthracis (anthrax)
- Yersinia pestis (plague)
- Clostridium botulinum (botulism)
- Francisella tularensis (tularemia)
- Filoviruses (Ebola and Marburg hemorrhagic fevers)
- Arenaviruses (Lassa fever, Argentine hemorrhagic fever)

Category B

- Coxiella burnetii (Q fever)
- Brucella species (brucellosis)
- Burkholderia mallei (glanders)
- Alphaviruses (Venezuelan encephalomyelitis, eastern and western equine encephalomyelitis)
- Ricin toxin (Ricinus communis)
- Epsilon toxin (Clostridium perfringens)
- Staphylococcus enterotoxin B
- Foodborne and waterborne pathogens
 - Salmonella species
 - Shigella dysenteria
 - Escherichia coli O157:H7
 - Vibrio cholerae
 - Cryptosporidium parvum

Category C

- Nipah virus
- Hantaviruses
- Tickborne hemorrhagic fever viruses
- Tickborne encephalitis viruses
- Yellow fever
- Multi-drug resistant tuberculosis

Source: Centers for Disease Control and Prevention, 2003.

exist in nature, they would be completely unknown to public health and medical experts. Attacks related to biological or chemical threats initiated by a bioterrorist would not likely follow known epidemiological patterns, diminishing the value of using past experience with disease transmission and manifestation to identify the source or cause.

It is likely that bioterrorists would seek to be covert, expending great energy and attention to assure the delayed discovery of the disease to maximize the population's exposure. Intentional outbreaks may develop in multiple locations simultaneously, thereby straining local, state, and federal response efforts. With many emerging and re-emerging infectious disease threats (Ebola Virus, Sudden Acute Respiratory Syndrome, West Nile Virus, Hantavirus, etc.), it is increasingly difficult to predict the precise nature of the next public health emergency. It could result from a chance mutation of a microorganism or it could result from the intentional act of terrorists. Multiple

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Exhibit 8–2 Chemical Agents with Bioterrorism Potential

- | | |
|--|--|
| • Albrin | • Lewisite (L, L-1, L-2, L-3) |
| • Adamsite (DM) | • LSD |
| • Agent 15 | • Mercury |
| • Ammonia | • Methylchloroarsine (MD) |
| • Arsenic | • Mustard Gas (H) (Sulfur Mustard) |
| • Arsine (SA) | • Mustard/Lewisite (HL) |
| • Benzene | • Mustard/T |
| • Bromobenzylcyanide (CA) | • Nitrogen Mustard (HN-1, HN-2, HN-3) |
| • BZ | • Nitrogen Oxide (NO) |
| • Cannabinoids | • Paraquat |
| • Chlorine (CL) | • Perfluroisobutylene (PHIB) |
| • Chloroacetophenone (CN) | • Phenodichloroarsine (PD) |
| • Chloropicrin (PS) | • Phenothiazines |
| • CNB (CN in Benzene and Carbon Tetrachloride) | • Phosgene (CG) |
| • CNC (CN in Chloroform) | • Phosgene Oxime (CX) |
| • CNS (CN and Chloropicrin in Chloroform) | • Phosphine |
| • CR | • Potassium Cyanide (KCN) |
| • CS | • Red Phosphorous (RP) |
| • Cyanide | • Ricin |
| • Cyanogen Chloride (CK) | • Sarin (GB) |
| • Cyclohexyl Sarin (GF) | • Sesqui Mustard |
| • Diphenylchloroarsine (DA) | • Sodium Azide |
| • Diphenylcyanoarsine (DC) | • Sodium Cyanide (NaCN) |
| • Diphosgene (DP) | • Soman (GD) |
| • Distilled Mustard (HD) | • Strychnine |
| • Ethyldichloroarsine (ED) | • Sulfur Trioxide-Chlorosulfonic Acid (FS) |
| • Ethylene Glycol | • Tabun (GA) |
| • Fentanyl and Other Opioids | • Teflon and Perfluroisobutylene (PHIB) |
| • Hydrofluoric Acid | • Thallium |
| • Hydrogen Chloride | • Titanium Tetrachloride (FM) |
| • Hydrogen Cyanide (AC) | • VX |
| | • White Phosphorus |
| | • Zinc Oxide (HC) |

Source: Centers for Disease Control and Prevention, 2003.

threats are possible, necessitating preparedness and response systems that can address a wide variety of unknown and unanticipated hazards. This concept of multiple threats and unknown hazards has led many experts to advocate for a robust public health infrastructure capable of responding to many different forms of emergencies.

Workplace Preparedness

Public health emergencies, including those related to terrorism, have many different visages and many different venues. Yet most of the direct victims of terrorism in the United States in recent years have been people at

work, including the victims of the bombing of the federal building in Oklahoma City, those who died in the World Trade Center and the Pentagon on September 11, 2001, and the victims who contracted anthrax transmitted through the mail later in that same year.

Acts of terrorism intend to make people feel powerless and believe that they cannot take steps to prevent such incidents or mitigate their consequences. But experience to-date in battling other workplace safety risks ("Public Health Achievements in Twentieth-Century America: Improvements in Workplace Safety" below) suggests that there are steps that can be taken by employers and employees. The workplace is, in effect, a key line of defense for homeland security. This is recognized formally in the formation and scope of responsibilities for the new federal Department of Homeland Security, as well as in the response of the business community after 2001 in taking tangible steps to enhance security.

Example

Public Health Achievements in Twentieth-Century America: Improvements in Workplace Safety

Public health interventions address priority health problems. Efforts to improve workplace safety demonstrate the importance of the workplace in both routine and public health emergency preparedness efforts.

At the beginning of this century, workers in the United States faced remarkably high health and safety risks on the job. Through efforts by individual workers, unions, employers, government agencies, scientists, and others, considerable progress has been made in improving these conditions. Despite these successes, much work remains, with the goal for all workers to have productive and safe working lives and retirements free from long-term consequences of occupational disease and injury. Using the limited data available, this report documents large declines in fatal occupational injuries during the 1900s, highlights the mining industry as an example of improvements in worker safety, and discusses new challenges in occupational safety and health.

Data from multiple sources reflect the large decreases in work-related deaths from the high rates and numbers of deaths among workers during the early twentieth century. The earliest systematic survey of workplace fatalities in the United States in this century covered Allegheny County, Pennsylvania, from July 1906 through June 1907; that year in the one county, 526 workers died in "work accidents"; 195 of these were steel workers. In contrast, in 1997, there were 17 steel worker fatalities nationwide. The National Safety Council estimated that in 1912, work-related injuries resulted in 18–21,000 deaths. In 1913 the Bureau of Labor Statistics documented approximately 23,000 industrial deaths among a workforce of 38 million, equivalent to a rate

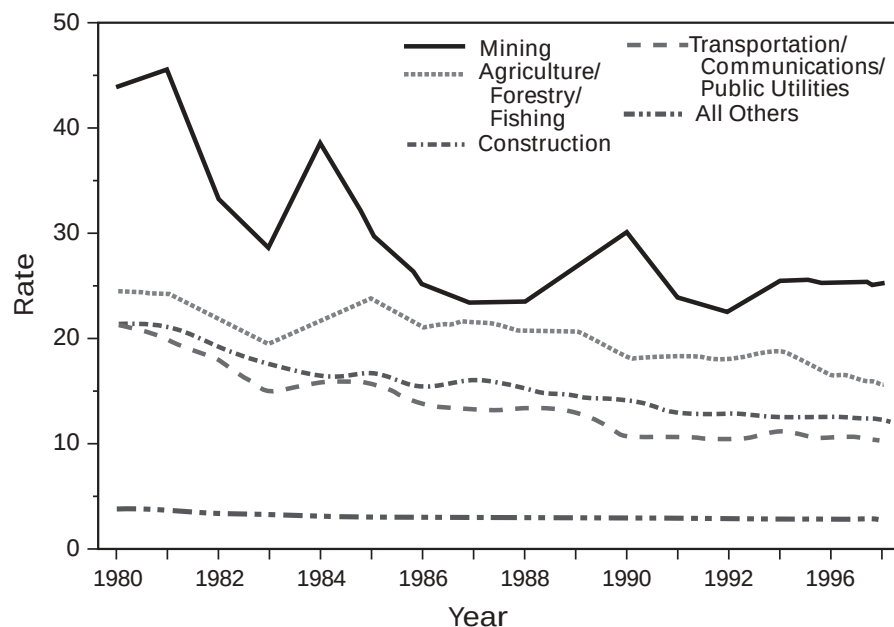


Figure 8-2 Occupational Injury Death Rates (per 100,000 Workers), by Industry Division and Year, United States, 1980–1995. *Source:* Reprinted from *Achievements in Public Health, United States, 1900–1999: Improvements in Workplace Safety*, *Morbidity and Mortality Weekly Report*, Vol. 48, No. 22, pp. 461–469, the Centers for Disease Control and Prevention, 1999.

of 61 deaths per 100,000 workers. Under a different reporting system, data from the National Safety Council from 1933 through 1997 indicate that deaths from unintentional work-related injuries declined 90 percent, from 37 per 100,000 workers to 4 per 100,000. The corresponding annual number of deaths decreased from 14,500 to 5,100; during this same period, the workforce more than tripled, from 39 million to approximately 130 million.

More recent and probably more complete data from death certificates were compiled from CDC's National Institute for Occupational Safety and Health (NIOSH) National Traumatic Occupational Fatalities (NTOF) surveillance system. These data indicate that the annual number of deaths declined 28 percent, from 7,405 in 1980 to 5,314 in 1995 (the most recent year for which complete NTOF data are available). The average rate of deaths from occupational injuries decreased 43 percent during the same time, from 7.5 to 4.3 per 100,000 workers. Industries with the highest average rates for fatal occupational injury during 1980–1995 included mining (30.3 deaths per 100,000 workers), agriculture/forestry/fishing (20.1), construction (15.2), and transportation/communications/public utilities (13.4) (Figure 8-2). Leading causes of fatal occupational injury during the period include motor vehicle-related injuries, workplace homicides, and machine-related injuries (Figure 8-3).

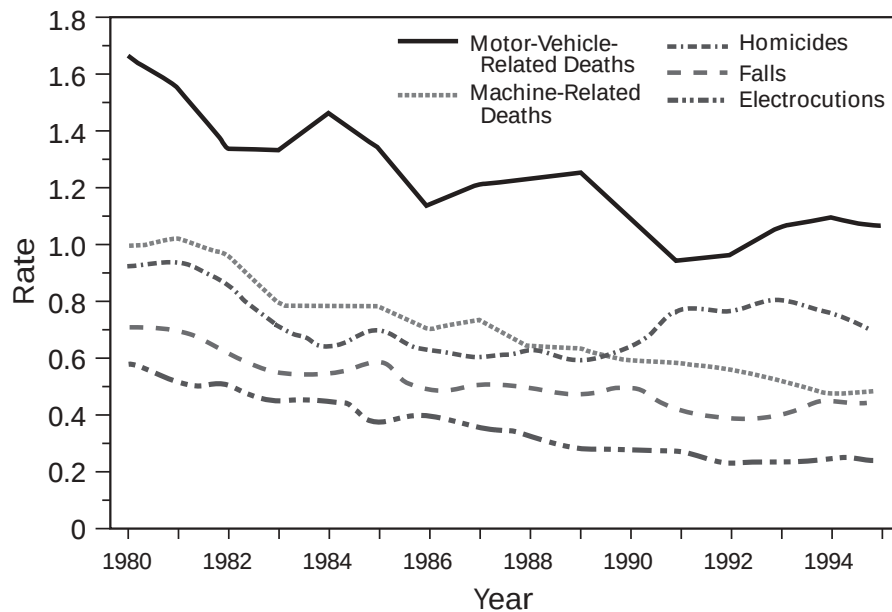


Figure 8-3 Rates (per 100,000 Workers) for Leading Causes of Occupational Injury Deaths, by Cause and Year, United States, 1980–1995. *Source:* Reprinted from Achievements in Public Health, United States, 1900–1999: Improvements in Workplace Safety, *Morbidity and Mortality Weekly Report*, Vol. 48, No. 22, pp. 461–469, the Centers for Disease Control and Prevention, 1999.

The decline in occupational fatalities in mining and other industries reflects the progress made in all workplaces since the beginning of the century in identifying and correcting the etiologic factors that contribute to occupational health risks. If today's workforce of approximately 130 million had the same risk as workers in 1933 for dying from injuries, an additional 40,000 workers would have died in 1997 from preventable events. The declines can be attributed to multiple, interrelated factors, including efforts by labor and management and by academic researchers to improve worker safety. Other efforts to improve safety were developed by state labor and health authorities and through the research, education, and regulatory activities undertaken by government agencies (e.g., the U.S. Bureau of Mines [USBM], the Mine Safety and Health Administration [established as the Mining Enforcement and Safety Administration in 1973], the Occupational Safety and Health Administration [OSHA, established in 1970], and NIOSH). Efforts by these groups led to physical changes in the workplace, such as improved ventilation and dust suppression in mines; safer equipment; development and introduction of safer work practices; and improved training of health and safety professionals and of workers. The reduction in workplace deaths has occurred in the context of extensive changes in U.S. economic activity, the U.S. industrial mix, and workforce demographics. Society-wide

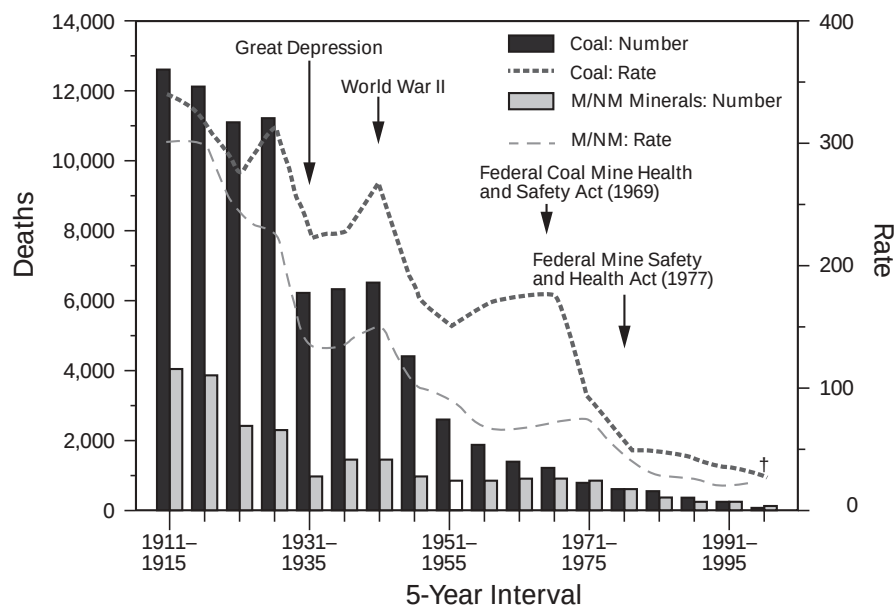
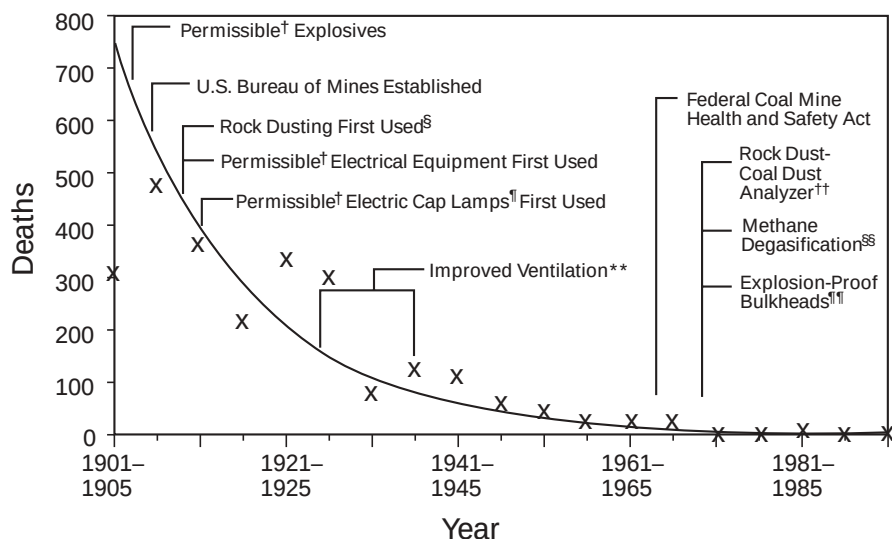


Figure 8–4 Number of Deaths and Fatality Rates (per 100,000 Workers) in Mining Coal and Metal/Nonmetallic (M/NM) Minerals, by 5-Year Interval, United States, 1911–1997. *Source:* Reprinted from Achievements in Public Health, United States, 1900–1999: Improvements in Workplace Safety, *Morbidity and Mortality Weekly Report*, Vol. 48, No. 22, pp.461–469, the Centers for Disease Control and Prevention, 1999.

progress in injury control also contributes to safer workplaces—for example, use of safety belts and other safety features in motor vehicles and improvements in medical care for trauma victims.

Only in some instances do data permit association of declines in fatalities with specific interventions. Before 1920, using permissible explosives and electrical equipment (which can be operated in an explosive methane-rich environment without igniting the methane), applying a layer of rock dust over the coal dust (which creates an inert mixture and prevents ignition of coal dust), and improved ventilation, such as reversible fans, led to dramatic reductions in fatalities from explosions (Figure 8–4). New technologies in roof support and improved mine design reduced the number of deaths from roof falls. However, technology also introduced new hazards, such as fatalities associated with machinery. An approximately 50 percent decrease in coal mining fatality rates occurred from 1966–1970 to 1971–1975 (Figure 8–5); 1971–1975 is the period immediately following passage of the 1969 Federal Coal Mine Health and Safety Act, which greatly expanded enforcement powers of federal inspectors and established mandatory health and safety standards for all mines. The act also served as the model for the 1970 Occupational Safety and Health Act. Following the



*Each X represents the 5-year average of the number of deaths resulting from explosions; the line is a smoothed regression line through the 5-year averages.

†Explosives and equipment that can be used in an explosive methane-rich environment without causing a methane explosion.

§The process of applying a layer of rock dust over the coal dust, which creates an inert mixture and inhibits a coal dust explosion.

¶Lamps worn on miners' caps.

**Ventilation improvements, including the use of reversible fans, reduce the concentration of methane and remove the explosive gas from the mine.

††A hand-held monitor that provides instantaneous readings of the rock-to-coal dust mixture to ensure that it is inert.

§§Techniques to remove methane from the coal bed before mining the coal.

¶¶Explosion-proof walls used to seal abandoned (mined-out) areas to protect workers in active parts of the mine.

Figure 8-5 Five-Year Averages of Annual Number of Deaths Related to Coal Mine Explosions, United States, 1901–1995. *Source: Reprinted from Achievements in Public Health, United States, 1900–1999: Improvements in Workplace Safety, *Morbidity and Mortality Weekly Report*, Vol. 48, No. 22, pp.461–469, the Centers for Disease Control and Prevention, 1999.

1977 Federal Mine Safety and Health Act, a 33 percent decrease in fatalities occurred in metal and nonmetallic mineral mining (1976–1980, compared with 1981–1985).

Similarly, the impact of more recent targeted efforts to reduce workplace fatalities can be illustrated by data on work-related electrocutions. During the 1980s, there were concerted research and dissemination efforts by NIOSH, changes to the National Electrical Code and occupational safety and health regulations, and public awareness campaigns by power companies and others. During this decade, work-related electrocution rates declined 54 percent, from 0.7 per 100,000 workers per year in 1980 to 0.3 in 1989; the number of electrocutions decreased from 577 to 329.

Although the decline in injuries in general industry since 1970 seems to have resulted from a variety of factors, some sources point to the Occupational Safety and Health Act of 1970, which created NIOSH

and OSHA. Since 1971, NIOSH has investigated hazardous work conditions, conducted research to prevent injury, trained health professionals, and developed educational materials and recommendations for worker protection. OSHA's regulatory authority for worksite inspection and development of safety standards has brought about safety regulations, mandatory workplace safety controls, and worker training. During 1980–1996, research findings indicated that training creates safer workplaces through increased worker knowledge of job hazards and safe work practices in a wide array of worksites.

Source: Adapted from Achievements in Public Health, United States, 1900–1999: Improvements in Workplace Safety, *Morbidity and Mortality Weekly Report*, Vol. 48, No. 22, pp. 461–469, the Centers for Disease Control and Prevention, 1999.

NATIONAL PUBLIC HEALTH PREPAREDNESS AND RESPONSE COORDINATION

The events of late 2001 resulted in the creation of a new federal Department of Homeland Security with extensive authority and powers related to domestic terrorism and security. In accord with the Homeland Security Act of 2002, several important public health functions were transferred into the new Department of Homeland Security in 2003, including the Strategic National Stockpile (SNS) of emergency pharmaceutical supplies and medical equipment. This new federal agency immediately became part of the American everyday experience through activities such as the national homeland security alert system summarized in Exhibit 8–3 with its color-coded levels of perceived threat.

Exhibit 8–3 Homeland Security Advisory System

1. Low Condition (Green)

This condition is declared when there is a low risk of terrorist attacks. Federal departments and agencies should consider the following general measures in addition to agency-specific protective measures they develop and implement.

- Refining and exercising as appropriate preplanned protective measures
- Ensuring personnel receive proper training on the Homeland Security Advisory System and specific preplanned department or agency protective measures
- Institutionalizing a process to assure that all facilities and regulated sectors are regularly assessed for vulnerabilities to terrorist attacks and that all reasonable measures are taken to mitigate these vulnerabilities.

continues

Exhibit 8-3 continued*2. Guarded Condition (Blue)*

This condition is declared when there is a general risk of terrorist attacks. In addition to the protective measures taken in the previous threat condition, federal departments and agencies should consider the following general measures in addition to the agency specific protective measures that they will develop and implement.

- Checking communications with designated emergency response or command locations
- Reviewing and updating emergency response procedures
- Providing the public with any information that would strengthen its ability to act appropriately

3. Elevated Condition (Yellow)

An elevated condition is declared when there is a significant risk of terrorist attacks. In addition to the protective measures taken in the previous threat condition, federal departments and agencies should consider the following general measures in addition to the agency specific protective measures that they will develop and implement.

- Increasing surveillance of critical locations
- Coordinating emergency plans, as appropriate, with nearby jurisdictions
- Assessing whether the precise characteristics of the threat require the further refinement of preplanned protective measures
- Implementing, as appropriate, contingency and emergency response plans

4. High Condition (Orange)

A high condition is declared when there is a high risk of terrorist attacks. In addition to the protective measures taken in the previous threat condition, federal departments and agencies should consider the following general measures in addition to the agency-specific protective measures that they will develop and implement.

- Coordinating necessary security efforts with federal, state, and local law enforcement agencies or any National Guard or other appropriate armed forces organizations
- Taking additional precautions at public events and possibly considering alternative venues or even cancellation
- Preparing to execute contingency procedures, such as moving to an alternate site or dispersing their workforce
- Restricting threatened facility access to essential personnel only

5. Severe Condition (Red)

A severe condition reflects a severe risk of terrorist attacks. Under most circumstances, the protective measures for a severe condition are not intended to be sustained for substantial periods of time. In addition to the protective measures taken in the previous threat condition, federal departments and agencies should consider the following general measures in addition to the agency specific protective measures that they will develop and implement.

- Increasing or redirecting personnel to address critical emergency needs
- Assigning emergency response personnel and pre-positioning and mobilizing specially trained teams or resources
- Monitoring, redirecting, or constraining transportation systems
- Closing public and government facilities

Source: U.S. Department of Homeland Security, 2003.

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The establishment of a new federal agency, however, did not substantially alter the configuration of public health responsibilities within the system of operational federalism described in Chapter 4. Federal agencies are significant contributors, but public health remains largely a state responsibility with the bulk of public health activity taking place at the local level. For public health emergencies, such as bioterrorism events or threats, preparedness and coordinated response across all levels of government are critical. Nonetheless there are significant issues related to intergovernmental relationships, resource deployment, and financing that make public health emergencies especially difficult challenges for the public health system. The following sections examine key aspects of the structure, operations, and problems in public health emergency preparedness and response at the national, state, and local levels.

Federal Agencies and Assets

More than 20 separate federal departments and agencies have roles in preparing for or responding to public health emergencies, including bioterrorist attacks. Within this constellation of agencies, the Departments of Health and Human Services (DHHS) and Homeland Security (DHS) play the most important public health roles.

Prior to 2003 the Department of Health and Human Services (DHHS) was the primary federal agency responsible for the medical and public health response to emergencies (including major disasters and terrorist events). Beginning in 2003 DHHS now shares center stage with the new Department of Homeland Security. DHHS discharges its responsibilities through several operating agencies, including the following:

- **Centers for Disease Control and Prevention (CDC):** CDC works with state public health agencies to detect, investigate, and prevent the spread of disease in communities. CDC provides support to state public health agencies in a variety of ways, including financial assistance, training programs, technical assistance and expert consultation, sophisticated laboratory services, research activities, and standards development. The Office of Terrorism Preparedness and Emergency Response coordinates efforts across the various CDC centers, institutes, and offices.
- **Health Resources and Services Administration (HRSA):** HRSA administers a state grant program to facilitate regional hospital preparedness planning and to upgrade the capacity of hospitals and other health care facilities to respond to public health emergencies. HRSA is also generally responsible for health care workforce development, including grant programs for curriculum development and continuing education for health professionals on bioterrorism preparedness and response.
- **Food and Drug Administration (FDA):** FDA has responsibilities both for ensuring the safety of the food supply and for assuring the safety and efficacy of pharmaceuticals, biologics, and medical devices. FDA fulfills its food safety responsibilities in partnership with the Department of Agriculture, which is responsible for the safety of meat, poultry, and processed egg products.

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- National Institutes of Health (NIH): NIH conducts and supports biomedical research, including research targeted at the development of rapid diagnostics and new and more effective vaccines and anti-microbial therapies.
- Office of Public Health Emergency Preparedness: OPHEP sets policy direction and coordinates public health emergency preparedness and response activities across the various DHHS agencies.

In March 2003, 23 federal agencies, programs and offices were fashioned into a new federal Department of Homeland Security (DHS). The new agency sought to bring a coordinated approach to national security from emergencies and disasters, both natural and man-made. DHS actively promotes an “all-hazards” approach to disasters and homeland security issues. The Federal Emergency Management Agency (FEMA), formerly an independent agency, became one of the major branches of the new DHS responsible for Emergency Preparedness and Response, tasked with responding to, planning for, recovering from, and mitigating against disasters under authority provided by the Stafford Act (Exhibit 8–4).

Within DHS, the Emergency Preparedness and Response Directorate coordinates emergency medical response in the event of a public health emergency, including the National Disaster Medical System and the Metropolitan Medical Response Systems (these are described later in this chapter). Other major directorates (divisions) of the new DHS include Border and Transportation Security,

Exhibit 8–4 Robert T. Stafford Disaster Relief and Emergency Assistance Act (P.L. 93–288, as amended)

The Congress hereby finds and declares that (1) because disasters often cause loss of life, human suffering, loss of income, and property loss and damage; and (2) because disasters often disrupt the normal functioning of governments and communities, and adversely affect individuals and families with great severity; special measures, designed to assist the efforts of the affected States in expediting the rendering of aid, assistance, and emergency services, and the reconstruction and rehabilitation of devastated areas, are necessary.

It is the intent of Congress, by this Act, to provide an orderly and continuing means of assistance by the Federal Government to State and local governments in carrying out their responsibilities to alleviate the suffering and damage which result from such disasters by—

- (1) revising and broadening the scope of existing disaster relief programs;
- (2) encouraging the development of comprehensive disaster preparedness and assistance plans, programs, capabilities, and organizations by the States and by local government;
- (3) achieving greater coordination and responsiveness of disaster preparedness and relief programs;
- (4) encouraging individuals, States, and local governments to protect themselves by obtaining insurance coverage to supplement or replace governmental assistance;
- (5) encouraging hazard mitigation measures to reduce losses from disasters, including development of land use and construction regulations; and
- (6) providing Federal assistance programs for both public and private losses sustained in disasters.

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Science and Technology, Information Analysis and Infrastructure Protection, and Management.

A variety of other federal agencies have organizational responsibilities related to bioterrorism and public health emergency preparedness. The Environmental Protection Agency (EPA) responds to emergencies involving chemicals and other hazardous substances. The Department of Defense indirectly supports public health preparedness through various research efforts on biologic and chemical weapons, intelligence gathering related to terrorism threats, and civil support functions in the event of an emergency that results in severe social unrest. The Department of Justice has lead responsibility for assessing and investigating terrorist threats, including those related to bioterrorism, and provides funds and assistance to emergency responders (police, fire, ambulance, and rescue personnel) at state and local levels. The Department of Veterans Affairs purchases drugs and other therapeutics for the Strategic National Stockpile and operates one of the nation's largest health care systems, which could provide critical surge capacity in the event of a mass casualty event. Several other federal agencies, including the Departments of Transportation, Commerce, and Energy also have potential roles to play in preparing for and responding to a public health emergency.

National Incident Management System

Prior to the establishment of the new Department of Homeland Security, the management of large scale health events was complicated by the involvement of so many different federal agencies. States have established a similar web of agencies to manage disasters and other emergencies with each developing its own form of an incident management system. In order to assure greater consistency across states and for interfaces between the federal government and states, a National Incident Management System (NIMS) was prescribed by a presidential directive in 2003 to cover all incidents (natural and unnatural) for which the federal government deploys emergency response assets. The Secretary of Homeland Security is responsible for the development and implementation of NIMS. Its success depends in large part on the establishment of consistent approaches within the states as to roles and responsibilities for both public health agencies and the hospital community (including their supporting health-care systems) in managing emergencies at the state and regional levels and developing and deploying incident management plans at sub-state levels.

Bioterrorism and other public health incidents fall within the scope of NIMS. To this end, the Department of Health and Human Services has the initial lead responsibility for the federal government and will deploy assets as needed within the areas of its statutory responsibility (such as the Public Health Service Act and the Federal Food, Drug, and Cosmetic Act) while keeping the Secretary of Homeland Security apprised regarding the course of the incident and nature of the response operations.

The Department of Homeland Security assumes responsibility for coordinating federal response operations, including those involving public health

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components, under certain conditions. DHS will coordinate the federal government's resources utilized in response to or recovery from terrorist attacks, major disasters, or other emergencies if and when any of the following four conditions applies:³

1. a federal department or agency acting under its own authority has requested the assistance,
2. the resources of state and local authorities are overwhelmed and federal assistance has been formally requested by state and local authorities,
3. more than one federal department or agency has become substantially involved in responding to the incident, or
4. DHS has been directed to assume responsibility for managing the domestic incident by the President.

For states and local governments to gain full benefit from the emergency response assets of the federal government, states must develop incident management systems that are interoperable with NIMS. Beginning in 2004, adherence to and compatibility with NIMS will be a condition of all grants and other awards from federal agencies for any aspect of state or local emergency preparedness and response.

Federal Emergency Medical Assets

Several national emergency response assets are available to state and local governments from the new DHS. These include the National Disaster Medical System (NDMS), the Metropolitan Medical Response Systems (MMRS), and the Strategic National Stockpile (SNS).

The NDMS now operates within the Emergency Preparedness and Response Directorate of DHS after being transferred from the Office of the Secretary of DHHS. NDMS brings together medical services from DHHS, DHS, Defense, and Veterans Affairs to augment local emergency medical services during a disaster or other large scale emergency. The NDMS has several operational components including Disaster Medical Assistance Teams (DMATs), Disaster Mortuary Teams (DMORTs), Federal Coordinating Centers, and Management Support Units.

DMATs are self-sustaining squads of licensed, actively practicing, volunteer professional and paraprofessional medical personnel who provide emergency medical care at the site of a disaster or other emergency. DMAT teams often triage, stabilize and prepare patients for evacuation in mass casualty situations. They are sent into these situations to supplement, rather than supplant or replace, local capacity. Once activated, these professionals are federalized, allowing them to practice with their current professional licenses in any jurisdiction. DMORTs include mortuary, dental, and forensic specialists who serve to augment the services of local coroners and medical examiners. Portable temporary mortuaries for mass casualty situations are provided when needed. Management support units provide command, coordination, and communication capabilities for DMATs and DMORTs and other federal assets. Federal Coordinating Centers recruit hospitals to participate in the NDMS and recruit health workers for the DMATs and DMORTs.

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The Metropolitan Medical Response System, involving more than 100 metropolitan communities, integrates existing emergency response systems at the local level, including emergency management, medical and mental health providers, public health agencies, law enforcement, fire departments, emergency medical services, and the National Guard. The MMRS seeks to develop a unified regional response to mass casualty events. MMRS was transferred from DHHS when the new DHS was established in 2003.

The Strategic National Stockpile (formerly National Pharmaceutical Stockpile) ensures the availability and rapid deployment of life-saving pharmaceuticals, antidotes, other medical supplies, and equipment necessary to counter the effects of nerve agents, biological pathogens, and chemical agents. The SNS stands ready for immediate deployment to any U.S. location in the event of a terrorist attack using a biological toxin or chemical agent directed against a civilian population. In the event of possible bioterrorist attack, a 12-hour push package containing 50 tons of stockpile materials can be immediately dispatched to predetermined Receipt, Store, and Storage (RSS) sites identified in state bioterrorism response plans. There are twelve 12-hour push packages centrally located around the U.S. for immediate deployment. Detailed deployment activities for SNS materials are prescribed in state and local emergency response plans.

Federal Funding for Public Health Infrastructure

Although multiple agencies provide federal funding for emergency preparedness, federal support for the public health infrastructure at the state and local levels is provided largely from grants and cooperative agreements with CDC. In 1999, for the first time, CDC awarded more than \$40 million for bioterrorism preparedness to states and cities for enhanced laboratory and electronic communication capacity and another \$32 million to establish a national pharmaceutical stockpile to ensure availability of vaccines, prophylactic medicines, chemical antidotes, medical supplies, and equipment needed to support a medical response to a biologic or chemical terrorist incident. At the time, these appeared to be large sums. In the wake of September 11, 2001 and the anthrax attacks the following month, increased concerns regarding homeland security led to a \$2.1 billion FY 2002 appropriation for CDC's anti-terrorism activities, over a twenty-fold increase from FY 1999 levels. The FY 2002 supplemental appropriations provided \$917 million for grants to states and localities to upgrade state and local capacity. Similar levels of funding were provided in 2003. The state and local activities impacted by this funding are described in subsequent sections of this chapter.

STATE AND LOCAL PREPAREDNESS COORDINATION

State Agencies and Assets

Similar to the federal pattern, states rely on a variety of agencies to deliver public health emergency services. Also similar to the federal model, these functions tend to be concentrated within a limited number of agencies at the state level with the state health department and state emergency management

agency playing the most significant roles. As described in Chapter 4, most state health departments are freestanding agencies (not part of a larger human services agencies), and most have responsibility for emergency medical service systems within the state. However, most states have an environmental health agency that is separate from the state health agency. Although these states may have a small environmental health section within the health agency, the environmental health agency is charged with monitoring environmental contaminants and remediation of hazardous conditions. Nearly all states have a separate emergency management agency (patterned after FEMA), although some states have established their own Departments of Homeland Security. In responding to a public health emergency, the state health agency works collaboratively with the state emergency management agency, as well as with the state environmental protection, law enforcement, public safety, and transportation agencies and, possibly, the National Guard.

States derive their powers and authority to act in public health emergencies from their public health laws as described in Chapter 4. There are concerns that existing public health laws may be inadequate in some states because they are obsolete and fragmented. A Model Public Health Emergency Powers Act has been used to assist states in examining and enhancing their legal framework for public health emergencies. The model act addresses key issues related to preparedness, surveillance, protection of persons, management of property, and public information and communications.⁴

Considerable differences exist among states in the breadth and depth of services provided within their jurisdictions and the degree to which public health service delivery responsibilities are delegated to local governments. In general, however, state governments are ultimately responsible for assuring adequate response to a public health emergency and tend to play certain key roles in preparedness and response, regardless of how decentralized a particular public health system might be. Except in the largest metropolitan local public health departments, local public health officials rely on state personnel and capacity for a number of key functions, including advanced laboratory capacity, epidemiological expertise, and serving as a conduit for federal assistance.

Incident Command Systems

In order to manage resources effectively and facilitate decision making during emergencies, incident command systems (ICS) are in wide use by police, fire, and emergency management agencies. Initially adopted for the fire service, ICS eliminates many common problems related to communication, terminology, organizational structure, span of control, and other difference across different disciplines and agencies in response to a critical incident. Critical incidents include any natural or manmade event, civil disturbance, or any other occurrence of unusual or severe nature that threatens to cause or actually causes the loss of life or injury to citizens and/or severe damage to property.

In managing critical incidents clear goals and objectives are established and communicated to responders, response plans are utilized, communications are effective, and resources are utilized in a timely and effective manner. ICS should not be considered an additional set of procedures; rather the system must

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become part of routine operations with personnel fully trained in its use and standard operating procedures reflective of the capabilities actually available.

One important key to effective ICS is the ability to size up the incident scene and make the initial call for resources. This allows responders to get control of the incident rather than playing catch-up for the rest of the incident. Appropriate initial size-up prevents unnecessary injury or loss of life, property or environmental damage, and negative perceptions on the responding agencies.

Key components of ICS include:

- Common terminology—Major organizational functions and units are named; in multiple incidents, each incident is named. Common names are used for personnel, equipment, and facilities. Clear terms are used in radio transmissions (for example, codes, such as “ten” codes, are not used).
- Modular organization—ICS develops “top down” from the first unit involved based on the specific incident’s management needs. Each ICS is staffed with a designated incident commander (responsible for safety, liaison, and information) with other functions (operations, planning, logistics, finance/administration) staffed as needed.
- Integrated communications—ICS uses a common communications plan and redundant two-way communications.
- A unified command structure—This is necessary when the incident is within a single jurisdiction with multiple agencies involved, or the incident is multi-jurisdictional, or individuals representing different agencies or jurisdictions share common responsibilities. All agencies involved contribute to the unified command process by determining overall goals and objectives, planning jointly for tactical activities, conducting integrated tactical operations, and maximizing the use of assigned resources.
- Consolidated action plans—Written action plans are necessary when the incident is complex and/or when several agencies and/or jurisdictions are involved. Action plans include specific goals, objectives, and support activities.
- A manageable span of control—The number of subordinates one supervisor can manage effectively should be between 3 and 7, with 5 being optimal.
- Designated incident facilities—These include the command post from which all incident operations, direction, control, coordination, and resource management are directed. Command posts can be fixed or mobile, but need adequate communications capabilities.
- Comprehensive resource management—This maximizes resource use, consolidates control, reduces communications load, provides accountability, and reduces freelancing.

The emergency management team functions at the emergency operations center (EOC), managing strategic decisions through the incident command structure. Ideally the team should be isolated from the confusion, media, and weather during the incident. EOC participants must have adequate authority and decision-making capability. EOC decisions could include issuing curfews,

circumventing normal bidding processes, emergency appointments, permanent or temporary relocation, emergency demolition of unsafe properties, or implementation of prophylaxis to populations. The EOC is supported operationally by incident command posts in the field, which are responsible for tactical decisions as well as oversight and command of responders at the scene.

Effective emergency operations plans and standard operating procedures simplify decision making during incidents. Training makes implementation of decisions easier for subordinates. When the level of preparation and practice exercises is inadequate, emergency operations plans can become overwhelmed by common incidents and unable to deal with those that are not fully anticipated. In such circumstances, decision making becomes complex and challenging. A comprehensively planned and frequently exercised organizational system is necessary to overcome these pitfalls.

As ICS became increasingly accepted as an effective framework for responding to incidents, its use has extended to other settings. For example, there has been much progress in development and deployment of hospital emergency incident command systems and table top exercises for hospitals. Several states have expanded on the ICS concept to develop standardized emergency management systems that formally incorporate ICS, mutual aid agreements, and multi-jurisdictional and inter-agency cooperation at the sub-state level resulting in coordinated and unified decisions throughout the state.

Local Agencies and Assets

The front line of response to public health emergencies is at the local level where local public health agencies (LPHAs) work collaboratively with other “first responders,” such as fire and rescue personnel, emergency medical service providers, law enforcement officers, hazardous materials teams, physicians, and hospitals in preparing for and managing the consequences of health-related emergencies. Although the relationships between state and local public health agencies vary greatly from state-to-state, and even from local jurisdiction-to-local jurisdiction within the same state, local government has significant responsibilities for dealing with emergencies in virtually all states. First responders play key roles in:

- recognizing public health emergencies, including those that result from terrorist attacks,
- identifying unique personal safety implications associated the emergency situation,
- identifying security issues that are unique to the event or to the emergency medical system response, and
- understanding basic principles of patient care based upon the type of emergency event encountered.

Focusing on the services most directly related to emergency preparedness and response, the vast majority of LPHAs carry out activities related to epidemiology and surveillance (84 percent), communicable disease control (94 percent), food safety (85 percent), and restaurant inspections (80 percent).⁵ (See Exhibit 7–1 in Chapter 7.) LPHAs are somewhat less likely to be

directly involved in emergency medical response (61 percent), and less than half of LPHAs operate laboratory services (45 percent), air quality (44 percent), animal control (40 percent), or water inspections (44 percent).⁵

In those cases where the LPHA is not responsible for these services, they are typically delivered by another agency of local government agency (for example, a fire department or environmental services agency), by a private agency (hospital or ambulance service), or the state. Even when services are offered by an LPHA, they may be quite limited in terms of scope or hours of availability. For example, although nearly half of LPHAs report providing laboratory services, these services may be quite limited in nature (for example, to support TB and STD testing). Many LPHAs that report having laboratory services are likely to rely on state public health labs for more specialized diagnostic needs.

The state of readiness among LPHAs has increased since 2001 when only about one-fourth of LPHAs had completed a comprehensive emergency response plan with another one-fourth indicating their plans were at least 80 percent complete. LPHAs have tailored the national threat advisory guidelines for public health emergencies. In general, LPHA threat advisory guidelines describe a spectrum of activities that range from planning through implementation. The activities that are undertaken at each threat level are summarized in Exhibit 8–5 and roughly equate to the preparedness and response concepts listed below:

- Low threat (green)—creating, developing, identifying
- General threat (blue)—reviewing, updating, distributing
- Significant threat (yellow)—evaluating, testing, verifying
- High threat (orange)—preparing to implement and implementing partially
- Severe threat (red)—fully implementing

Deployment of LPHA staff to assist in emergencies is limited by the size and qualification of the agency's workforce. More than half of all LPHAs have 13 or fewer staff members.⁵ Larger agencies generally have much higher staffing levels and a more comprehensive range of expertise, as was described in Chapters 4 and 6.

The configuration of LHPAs within a state or in a multi-state metropolitan area also varies across the country. Several states organize local public health activities at a regional or district level. Other states have virtually hundreds of LHPAs that serve towns or townships, some in counties or districts served by a larger LPHA. Some communities have no LPHA at all. Organizing preparedness and response efforts in these different circumstances present special problems in terms of multi-jurisdictional response, surge capacity, back-up, and mutual aid agreements. Several capacity assessment and enhancement tools are available from NACCHO and CDC to assist local assessment of readiness.^{6–8}

Medical Reserve Corps are locally based volunteer response teams that can be deployed in emergency situations. These multi-disciplinary teams often have ongoing relationships with local public health agencies and other community medical care providers that may include volunteer work on health promotion and screening projects or assistance with mosquito control activities in communities where West Nile Virus presents a risk. During emergencies, Medical

Exhibit 8–5 Homeland Security Advisory System Guidelines for Local Public Health Agencies

<i>Emergency Planning, Training, Staffing</i>	<i>Key Activities for Each Threat Condition</i>
	Green (Low) • Ensure personnel receive proper training on Homeland Security Advisory and agency protective measures/disaster plans • Ensure employee emergency notification system is current • Develop and train staff on staffing modification plans including 24/7 duty assignments • Train staff on local and state disaster plans • Develop and review roles and responsibilities in an emergency situation for each employee in the agency (all hazards plan which includes bioterrorism) Blue (guarded) • Review and update disaster plans specific to the agency (local health department medication distribution plan, smallpox pre- and post-event plans) • Provide training to key personnel on handling inquiries from the media Yellow (Elevated) • Coordinate emergency plans with nearby jurisdictions and review mutual aid agreements • Conduct employee emergency notification system drill • Be aware of large scale community events (sports, concerts, etc.) and include these in emergency planning • Review technical information on chemical and biological agents with all staff Orange (High) • Prepare to staff the agency's emergency operations center (EOC) or provide staff at the city/county EOC • Activate the employee emergency notification system and place staff on full alert • Review medication dispensing plans and mass vaccination plans with all staff Red (Severe) • Staff the agency's EOC or provide staff at the city/county EOC • Activate the agency's disaster preparedness plan • Activate the employee emergency notification system and secure as many additional staff as necessary to implement the agency's disaster preparedness plan • Prepare to implement the medication dispensing and mass vaccination plans • Coordinate preparedness and response activities with all public health partners and local jurisdictions (hospitals, physicians, local law enforcement, neighboring local health departments, emergency management agencies, and state health department) • Conduct a comprehensive disaster plan review with all staff to ensure an effective response in the event of a terrorist attack

continues

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Exhibit 8-5 continued*Communications*

Green (Low)

- Ensure all emergency communication systems are in operational condition (Health Alert Network, e-mail, fax, and pagers)
- Ensure staff have the technical information on chemical and biological agents necessary to respond to inquiries from the public or the media (fact sheets)
- Review procedure/protocol for disseminating information to the community and media during a public health emergency

Blue (Guarded)

- Alert all agency staff that the threat condition has been raised to Guarded (Blue)
- Assign a staff person to routinely monitor for faxes, e-mails, and correspondence from the state health agency
- Obtain technical information from the state health agency and the Centers for Disease Control and Prevention on biological and chemical weapons of mass destruction for possible dissemination to health care providers and the public

Yellow (Elevated)

- Alert all agency staff that the threat condition has been raised to Elevated (Yellow)
- Review media protocols with key personnel
- Brief key personnel at least weekly on threat status, changes in security, and potential action plans

Orange (High)

- Alert all agency staff that the threat condition has been raised to Elevated (Orange)
- Ensure that all members of the jurisdiction-wide bioterrorism committee are aware that the threat condition has been raised to High (Orange)
- Advise staff of shift modifications if the situation escalates
- Test all emergency communication systems

Red (Severe)

- Alert all agency staff that the threat condition has been raised to Severe (Red)
- Ensure that all members of the jurisdiction-wide bioterrorism committee are aware that the threat condition has been raised to Severe (Red)
- Issue periodic news releases with factual information on chemical and biological agents to reduce the potential for public panic
- Brief key personnel daily on threat status, changes in security, and potential action plans
- Check all emergency communications equipment on a daily basis

Administration

Green (Low)

- Maintain routine operations without security stipulations
- Continue to include employee safety and common sense practices in daily routines
- Report suspicious circumstances and/or individuals to law enforcement agencies

continues

Exhibit 8-5 continued*Public Health
Surveillance*

- Ensure all staff have issued current security credentials (ID badges)
- Build networking relationships with other agencies, inside and outside the health professions

Blue (Guarded)

- Increase liaison with local and state agencies to monitor the threat
- Prohibit casual access by unauthorized personnel
- Assess mail handling procedures

Yellow (Elevated)

- Ensure security of facility operations
- Check all essential equipment for operational readiness
- Check inventories of critical supplies and re-order if necessary

Orange (High)

- Ensure security of the agency's critical infrastructure
- Have designated staff continuously monitor for emergency communications from state health agency
- Have designated staff continuously monitor radio and TV stations for a possible change in threat condition

Red (Severe)

- Initiate or augment security staffing at department facilities
- Control building access and implement positive identification of all persons, include inspection of all incoming packages, brief cases, and deliveries
- Maintain continuous monitoring for emergency communications from state health agency, as well as continuous monitoring of radio and TV stations for breaking news concerning terrorist attacks within state or elsewhere in United States

Green (Low)

- Review agency procedures for handling reportable infectious diseases in the state

Blue (Guarded)

- Ensure information concerning reportable infectious diseases is coming into the agency from the health care providers within the jurisdiction

Yellow (Elevated)

- Request that hospitals (infectious control nurses and emergency departments), local laboratories, outpatient clinics, managed care organizations, and physicians report significant increases or clusters of illness of unknown etiology and review mandatory reporting procedures

Orange (High)

- Contact all hospitals (infectious control nurses and emergency departments), local laboratories, outpatient clinics, managed care organizations, and physicians and emphasize the importance of timely reporting of significant increases or clusters of illness of unknown etiology and review mandatory reporting procedures

Source: Illinois Department of Public Health, 2003.

Reserve Corps teams play predetermined roles such as providing local surge capacity for triage and medical care or assisting with deployment of Strategic National Stockpile materials. By 2004 it is expected that several hundred communities will participate in the Medical Reserve Corps program, either through start-up funding from the Health Resources and Services Administration or through local resources.

Private Health-Care Providers and Other Partners

In nearly all communities, government agencies play a central role in preparing for and responding to public health emergencies. Often overlooked, however, is the critical contribution made by private-sector health-care providers, pharmaceutical manufacturers, agricultural producers, the food industry, and other private sector interests. An important example is the role played by alert health professionals who are trained to recognize potential emergency situations and report these suspicions to public health officials. Clinicians in Florida played a major role in first identifying and then linking anthrax cases with bioterrorism in 2001. Hospital emergency rooms and physicians' offices are where most individuals who have contracted an infectious disease or are exposed to dangerous chemicals encounter their community's emergency response system. That encounter should trigger an appropriate response if the condition is one that represents a threat to others. Every state has incorporated requirements in state statute that call for physicians, laboratories, and other health providers to notify public health officials when specific notifiable diseases or conditions are encountered. (See Exhibit 6–10, Chapter 6.) Some states include a general provision that physicians should report "unusual" infectious diseases. Despite these laws and regulations, compliance with disease reporting is well-documented to be low among physicians due to a variety of reasons. The requirements and the reporting procedures may not be understood by some physicians. Others believe reporting is not worth the time and effort. Reporting from laboratories is more complete, but concerns exist as to whether laboratories serving multiple jurisdictions are fully aware of differences in requirements among the jurisdictions served.

In addition to playing an important role in identifying potential public health emergencies, health care providers play a critical role in responding to the medical consequences of those emergencies, especially in mass casualty situations. For the relatively rare disease threats associated with bioterrorism, health care providers often have only limited experience dealing with these conditions and look to public health authorities for clinical guidance. Through the development of community-wide emergency response plans, public health agencies, private sector delivery systems, hospitals, physicians, pharmacies, nursing homes, and others are mobilized in the event of an emergency to provide needed treatment to those affected by disease and to provide prophylactic care to those at risk for exposure to disease. State and federal laws that confer tax-exempt status on hospitals typically require those institutions to provide significant community benefit, including the provision of emergency medical services and participation in regional emergency medical

service planning. Funds for hospital preparedness, including staff training and preparedness planning, are provided by HRSA and channeled through state health departments.

Other private sector interests also contribute to public health emergency preparedness. Although NIH makes significant investments in the development of new vaccines and antimicrobial agents, pharmaceutical manufacturers represent the primary source of funding for research and development. Efforts to encourage industry interest in the development of vaccines and other countermeasures include incentives such as liability protections, antitrust waivers, patent extensions, and long-term contracts. Similarly, activities to improve the safety and security of the food supply will rely on the agricultural and food production industries to make necessary upgrades to their processes and to seek innovative ways to minimize disease threats.

Public Perceptions

The flurry of activity to improve public health emergency preparedness and response capabilities is understandable. The public is highly concerned over the possibility of terrorist attacks of all types.⁹ Fears of possible anthrax or smallpox attacks are nearly as high as concerns of conventional explosives, airline hijacking or bombings, and attacks using radioactive, toxic, or hazardous materials as weapons. Among these potential terrorist weapons, concern is growing that smallpox will be used, related in part to the attention placed on smallpox at the national level with the initiation of smallpox preparedness programs that include vaccinations for key medical and first responder personnel. Although the public believes that the country is better prepared for a biological or chemical attack than it was prior to 2002, the public perceives that the current level of preparedness is not high enough and more needs to be done. The public is also concerned that the emphasis on bioterrorism will reduce efforts on other public health problems and issues that are important to the public. The public rates bioterrorism preparedness and response high, but no higher than health alerts, immunizations, testing and monitoring for diseases, education, natural epidemics, and chronic diseases.⁹

STATE AND LOCAL BIOTERRORISM PREPAREDNESS GRANTS

With the public health infrastructure increasingly viewed as a front line defense against terrorism and homeland security priority, federal funding for public health purposes increased dramatically beginning in 2002. To put this increase into perspective, total governmental spending in 2000 for population-based public health services was \$17.4 billion, with the federal government accounting for 29 percent of that total, or about \$5 billion.¹⁰ The federal share of total governmental public health spending has been under 30 percent since the mid-1980s after having been as high as 72 percent in 1970.

Beginning in 2002, federal funding increased by more than \$2 billion, with about half that amount directed to state and local governments for public health infrastructure improvements. Similar levels were funded in 2003

and are expected for at least the next few years. The infusion of this magnitude of resources creates the opportunity to address serious and longstanding gaps in public health protection and foster greater consistency and enhanced quality throughout the national network of governmental public health agencies at the federal, state, and local levels.

Public health infrastructure funding, approximately \$1 billion annually, is channeled to the states and several large cities (including New York, Chicago, Los Angeles, and Washington, DC) through CDC. Each state receives a minimum award of \$5 million plus an additional amount based on a population formula.

State Proposals and Workplans

Activities supported by these funds must be consistent with federal guidance. For funding from CDC for public health preparedness, grantees must undertake activities that increase capacity in seven focus areas, identified as Focus Areas A through G. HRSA funding for hospital preparedness can be considered an additional focus area and is included below with those supported by CDC funding.

- A. Preparedness planning and readiness assessment—These activities establish strategic leadership, direction, assessment, and coordination of activities (including Strategic National Stockpile response) to ensure statewide readiness, interagency collaboration, local and regional preparedness (both intrastate and interstate) for bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies.
- B. Surveillance and epidemiology capacity—Surveillance and epidemiologic capacities enable state and local health departments to enhance, design, and develop systems for rapid detection of unusual outbreaks of illness that may be the result of bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies. These activities assist state and local health departments in establishing expanded epidemiologic capacity to investigate and mitigate such outbreaks of illness as part of a National Electronic Disease Surveillance System (NEDSS). NEDSS is an initiative that promotes the use of data and information system standards to advance the development of efficient, integrated, and interoperable surveillance systems at federal, state, and local levels. NEDSS-based systems can be used by states for the surveillance and analysis of notifiable diseases providing a platform upon which modules can be built to meet state and program area data needs, as well as providing a secure, accurate, and efficient way for collecting and processing data.
- C. Laboratory capacity for biologic agents—These activities ensure that core diagnostic capabilities for bioterrorist agents are available at all state and major city/county public health laboratories in order to conduct rapid and accurate diagnostic and reference testing for select biologic agents likely to be used in a terrorist attack. Given the myriad

forms that terrorism might take, emergency preparedness requires not only a variety of different types of analytical laboratories, but also well defined operational relationships among them, especially with respect to routing of samples and sharing of test results. The national Laboratory Referral Network (LRN) provides this connectivity.

- D. Laboratory capacity for chemical agents—These activities ensure that all state public health laboratories have the capacity to measure chemical threat agents in human specimens (e.g., blood, urine) or to appropriately collect and ship specimens to qualified LRN partner laboratories for analysis and further the establishment of a network of public laboratories for analysis of chemical threat agents.
- E. Health alert network/communications and information technology—Activities for this focus area enable state and local public health agencies to establish and maintain a network that will support exchange of key information and training over the Internet by linking public health and private partners on a 24/7 basis, provide for rapid dissemination of public health advisories to the news media and the public at large, ensure secure electronic data exchange between public health partners' computer systems, and ensure protection of data, information, and systems, with adequate backup, organization, and surge capacity to respond to bioterrorism and other public health threats and emergencies.
- F. Health risk communication and health information dissemination—Activities for this focus area ensure that state and local public health organizations develop an effective risk communications capacity that provides for timely information dissemination to citizens during a bioterrorist attack, bioterrorism, outbreak of infectious disease, or other public health threat and emergency. This includes training for key individuals in communications skills, the identification of key spokespersons (particularly those who can deal with infectious diseases), printed materials, timely reporting of critical information, and effective interaction with the media.
- G. Education and training—Activities for this focus area ensure that state and local health agencies have the capacity to assess the training needs of key public health professionals, infectious disease specialists, emergency department personnel, and other healthcare (including mental health) providers in preparedness for and response to bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies, and ensure effective provision of needed education and training to key target audiences through multiple channels, including schools of public health, schools of medicine, other academic institutions, healthcare professionals, CDC, HRSA, and other sources. Emergency preparedness competencies (Exhibit 8–6) for all public health workers serve as the focal point for these assessment, enhancement, and recognition efforts. A more extensive panel of bioterrorism and emergency readiness competencies for various categories of public health workers is also in wide use.¹¹

Exhibit 8-6 Emergency Preparedness Core Competencies for All Public Health Workers

All Public Health Workers must be competent to:

- Describe the public health role in emergency response in a range of emergencies that might arise (e.g., “The department provides surveillance, investigation and public information in disease outbreaks and collaborates with other agencies in geological, environmental, and weather emergencies.”).
- Describe the chain of command in emergency response.
- Identify and locate the agency emergency response plan (or the pertinent portion of the plan).
- Describe his/her functional role(s) in emergency response and demonstrate his/her role(s) in regular drills.
- Demonstrate correct use of all communication equipment used for emergency communication (phone, fax, radio, etc.).
- Describe communication role(s) in emergency response: within the agency using established communication systems; with the media; with the general public; and personal (with family, neighbors).
- Identify limits to own knowledge/skill/authority and identify key system resources for referring matters that exceed these limits.
- Recognize unusual events that might indicate an emergency and describe appropriate action (e.g., communicate clearly within chain of command).
- Apply creative problem solving and flexible thinking to unusual challenges within his/her functional responsibilities and evaluate effectiveness of all actions taken.

Public Health Leaders/Administrators must also be competent to:

- Describe the chain of command and management system (“incident command system” or similar protocol for emergency response in the jurisdiction).
- Communicate the public health information, roles, capacities, and legal authority to all emergency response partners—such as other public health agencies, other health agencies, other governmental agencies—during planning, drills, and actual emergencies. (This includes contributing to effective community-wide response through leadership, team building, negotiation, and conflict resolution.)
- Maintain regular communication with emergency response partners. (This includes maintaining a current directory of partners and identifying appropriate methods for contacting them in emergencies.)
- Assure that the agency (or the agency unit) has a written, regularly updated plan for major categories of emergencies that respects the culture of the community and provides for continuity of agency operations.
- Assure that the agency (or agency unit) regularly practices all parts of emergency response.
- Evaluate every emergency response drill (or actual response) to identify needed internal and external improvements.
- Assure that knowledge and skill gaps identified through emergency response planning, drills, and evaluation are addressed.

Public Health Professionals must also be competent to:

- Demonstrate readiness to apply professional skills to a range of emergency situations during regular drills. (For example: access, use, and interpret surveillance data; access and use lab resources; access and use science-based investigation and risk assessment protocols; identity and use appropriate personal protective equipment.)

continues

Exhibit 8-6 continued

- Maintain regular communication with partner professionals in other agencies involved in emergency response. (This includes contributing to effective community-wide response through leadership, team building, negotiation, and conflict resolution.)
- Participate in continuing education to maintain up to date knowledge in areas relevant to emergency response. (For example: emerging infectious diseases, hazardous materials, and diagnostic tests.)

Public Health Technical and Support Staff must also be competent to:

- Demonstrate the use of equipment (including personal protective equipment) and skills associated with his/her functional role in emergency response during regular drills.
- Describe at least one resource for backup support in key areas of responsibility.

Source: Bioterrorism & Emergency Readiness Competencies for All Public Health Workers, Centers for Disease Control and Prevention, 2003.

H. Hospital Preparedness—Not a focus area funded by CDC, hospital preparedness is the primary category of activity supported by HRSA funding to states and large cities. Activities that are supported include: development of regional hospital preparedness and response plans; identification of hospital capacity for isolation, quarantine, and decontamination; procedures for receipt and distribution of materials from the Strategic National Stockpile; personal protective equipment; communications capabilities; biological disaster drills; and training.

Critical benchmarks identify those grantee activities that should be prioritized and fully achieved during the current budget period. For the 2002/2003 funding cycle, federal guidance identified 17 critical benchmarks (14 for the CDC funded state bioterrorism preparedness and 3 for the HRSA funded hospital preparedness program) to be accomplished by September 2003. Each focus area has one or more critical capacities associated with it. Critical capacities are the core expertise and infrastructure to enable a public health system to prepare for and respond to bioterrorism, other infectious disease outbreaks, and other public health threats and emergencies. These must be fully addressed by state and local grantees. Enhanced capacities represent additional expertise and infrastructure over and beyond the critical capacities. These should be addressed only after critical capacities have been achieved or are well along in development. As conveyed by the critical and enhanced capacities, federal expectations were broad and general. Exhibit 8-7 identifies the critical and enhanced capacities for each focus area for funding awarded in 2003.

As conveyed by the critical and enhanced capacities, expectations were unclear. In effect, responsibility for defining and operationalizing the capacities was left to the states, posing the risk of little consistency and standardization of approaches from state-to-state. CDC plans to transition critical capacities to readiness goals and readiness indicators in the future in order to establish an operational definition of preparedness, something that has been lacking in the early years of funding.

Exhibit 8-7 Critical and Enhanced Capacities for State Bioterrorism Project Grants, 2003**Critical Capacities***Focus Area A: Preparedness Planning and Readiness Assessment*

- Establishment of a process for strategic leadership, direction, coordination, and assessment of activities to ensure state and local readiness, interagency collaboration, and preparedness for bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies
- Conducting integrated assessments of public health system capacities related to bioterrorism, other infectious disease outbreaks, and other public health threats and emergencies to aid and improve planning, coordination, and implementation
- Responding to emergencies caused by bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies through the development, exercise, and evaluation of a comprehensive public health emergency preparedness and response plan
- Effective management of the CDC Strategic National Stockpile (SNS), should it be deployed, translating SNS plans into firm preparations, periodic testing of SNS preparedness, and periodic training for entities and individuals that are part of SNS preparedness

Focus Area B: Surveillance and Epidemiology Capacity

- Rapidly detection of terrorist events through a highly functioning, mandatory reportable disease surveillance system, as evidenced by ongoing timely and complete reporting by providers and laboratories in the jurisdiction, especially of illnesses and conditions possibly resulting from bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies
- Rapid and effective investigation and response to potential terrorist events as evidenced by a comprehensive and exercised epidemiologic response plan

Enhanced Capacities

- Ensuring public health emergency preparedness and response through the development of necessary public health infrastructure
- Recruiting, retaining, and fully developing public health leaders and managers with current knowledge and expertise in advanced management and leadership principles who will play critical roles in responding to bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies
- Ensuring that public health systems have optimal capacities to respond to bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies

continues

Exhibit 8-7 continued

that addresses surge capacity, delivery of mass prophylaxis and immunizations, and pre-event development of specific epidemiologic investigation and response needs

- Rapid and effective investigation and response to potential terrorist events, as evidenced by ongoing effective state and local response to naturally occurring individual cases of urgent public health importance, outbreaks of disease, and emergency public health interventions such as emergency chemoprophylaxis or immunization activities.

Focus Area C: Laboratory Capacity, Biologic Agents

- Development and implementation of a jurisdiction-wide program to provide rapid and effective laboratory services in support of the response to bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies
- Ensuring, as a member of the Laboratory Response Network (LRN), adequate and secure laboratory facilities, reagents, and equipment to rapidly detect and correctly identify biological agents likely to be used in a bioterrorist incident

Focus Area D: Laboratory Capacity, Chemical Agents

- Development and implementation of a jurisdiction-wide program for Level One Laboratories that provides rapid and effective laboratory response for chemical terrorism by establishing competency in collection and transport of clinical specimens to laboratories capable of measuring chemical threat agents
- Establish adequate and secure Level Two laboratory facilities, reagents, and equipment (e.g., ICP-MS, CG-MSD) to rapidly detect and measure in clinical specimens for chemical agents (such as cyanide-based compounds, heavy metals, and lewisites). Currently, CDC methods for Level Two chemical agents use analytical techniques of inductively coupled plasma mass spectrometry and gas chromatography mass spectrometry. The list of Level Two chemical agents may expand as better methods are developed. Tandem mass spectrometry methods are not required for Level Two chemical agents.

ease, and other public health threats and emergencies by accessing potentially relevant pre-existing datasets outside the health department, or through the development of new active or sentinel surveillance activities

- Creation or strengthening of pre-event, ongoing working links between health department staff and key individuals and organizations engaged in health care, public health, and law enforcement

continues

Exhibit 8–7 continued

- Establish adequate and secure Level Three laboratory facilities, reagents, and equipment (e.g., tandem mass spectrometer) to rapidly detect and measure in clinical specimens Level Three chemical agents (such as nerve agents, mustards, mycotoxins, and selected toxic industrial chemicals). Level Three Laboratories also provide surge capacity to CDC and serve as referral laboratories for Level One and Level Two laboratories.

Focus Area E: Health Alert Network/ Communications and Information Technology

- Effective communication connectivity among public health departments, health care organizations, law enforcement organizations, public officials, and others (e.g., hospitals, physicians, pharmacists, fire departments, 911 centers)
- Methods of emergency communication for participants in public health emergency response that are fully redundant with standard telecommunications (telephone, e-mail, Internet, etc.)
- Ongoing protection of critical data and information and capabilities for continuity of operations
- Electronic exchange of clinical, laboratory, environmental, and other public health information in standard formats between the computer systems of public health partners
- Provision of or participation in an emergency response management system to aid the deployment and support of response teams, the management of response resources, the facilitation of inter-organizational communication and coordination
- Ensuring full information technology and support services

Focus Area F: Communicating Health Risks and Health Information Dissemination

- Provision of needed health/risk information to the public and key partners during a terrorism event by establishing critical baseline information about the current communication needs and barriers within individual communities, and identifying effective channels of communication for reaching the general public and special populations during public health threats and emergencies
- Identifying, developing, and pre-testing communications concepts, messages, and strategies to ensure that state and local public health agencies prepare in advance and produce effective and culturally appropriate public information for terrorism, other infectious disease outbreaks, and other public health threats and emergencies

continues

Exhibit 8-7 continued*Focus Area G: Education and Training*

- Ensure the delivery of appropriate education and training to key public health professionals, infectious disease specialists, emergency department personnel, and other healthcare (including mental health) providers in preparedness for and response to bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies, either directly or through the use (where possible) of existing curricula and other sources, including schools of public health, schools of medicine, academic health centers, CDC training networks, and other providers
- Ensure that public and private health professionals and other members of the community are identified in advance and can be effectively trained to mobilize and respond during a public health emergency
- Ongoing systematic evaluation of the effectiveness of training, and the incorporation of lessons learned from performance during bioterrorism drills, simulations, other exercises, events, and evaluations of those exercises would also enhance this focus area

Source: Centers for Disease Control and Prevention, 2003.

Several new emphases were injected into guidance for the 2003 awards, reflecting actual and perceived issues encountered in the previous year. These include laboratory capacity for chemical agents, integration of mental health services into preparedness planning and response activities, coordination of CDC funding with HRSA-funded hospital preparedness activities, and concurrence of local public health authorities with state spending plans. Finally, the 2003 guidance incorporates specific smallpox preparedness and response capacities and allows for costs associated with smallpox preparedness to be covered by grant funds. These and several other issues arose in many states during early implementation of bioterrorism preparedness activities.

Early Lessons

Comprehensive preparedness programs require hazard and vulnerability analyses, forecasts of the probable health effects, analyses of the availability of needed resources, identification of vulnerable populations, and development of detailed plans for both preparedness and response. Many factors influence a state's ability to complete these tasks. Public health preparedness is particularly challenging because public health and public safety roles differ for federal, state, and local governments. The federal government has primary responsibility for national security, while state and local governments carry the responsibility and financial burden for most other public health responsibilities. Some of the early lessons from the states reflect these themes.

Early experience with the infusion of federal support for public health emergency preparedness and response activities indicates that considerable progress has occurred (although much remains to be done), consistent with apparently conflicting conclusions of an ASTHO assessment of progress through December 2002, on the one hand, and that from the Independent Task Force on Emergency Responders, on the other. The ASTHO report found that states are making significant progress in the enterprise of building the capacity to respond quickly and effectively to bioterrorism, outbreaks of infectious diseases, and other public health threats and emergencies.¹² The Independent Task Force on Emergency Responders summarized its conclusions in its report's title, "Emergency Responders: Drastically Underfunded, Dangerously Unprepared."¹³

An early start does not guarantee success. Many states had a head start on public health preparedness and stood ready to benefit from and effectively deploy the substantial resources received beginning in 2002. Some states had already received as much as three years of funding, often for development of statewide health alert networks. States with a solid pre-existing statewide public health infrastructure were particularly well positioned to move ahead rapidly. Yet despite a head start and other positive influences, a variety of intergovernmental, political, bureaucratic, and economic forces slowed progress. Some of these influences were unique to specific states, while others reflect circumstances existing in many other states. Still others reflect a long-standing pattern of intergovernmental relationships, the operational aspects of federalism and public health.

Political influences included shifts in the political balance of power within state government, such as occurs when a new governor takes office. Discord between the state and its local health jurisdictions over fairness of past state funding of public health infrastructure and current plans for allocating public health preparedness resources represents another political influence. The concept of regional health consortia controlling resources for public health preparedness merits consideration and appears to be successful in several states.

Local jurisdictions deal with public expectations as well as with state and federal directives, while attempting to meet a wide variety of health needs at the local level. West Nile Virus hit many states hard in 2002 and 2003, forcing local health agencies to redeploy staff and resources. Smallpox vaccination activities resulted in similar redeployments in early 2003. One local health officer reported that smallpox preparedness activities required 80 percent of the time for 20 percent of his agency's staff over a four-month period.

Critical in many states was a state budget in heavy deficit mode, making significant reductions in state general revenue funding for the public health department and other state agencies necessary. State budget crises often prompted the enactment of early retirement programs that resulted in the displacement of many middle and senior level staff within the state health agency. Reduced staffing levels, decimated leadership ranks, and greater control over hiring created a management crisis to accompany the financial crisis. Bargaining unit provisions further complicated the hiring process in some states as workers previously laid off by other state agencies bumped workers in similar titles within the state health agency and were given priority for some newly funded positions.

The net effect was an environment conducive to supplanting state and local resources with federal funds. Federal guidance specifically prohibits supplanting state and local resources, meaning that funds under this program may not be used to replace or supplant any current state or local expenditures. Supplanting had become an issue in several states, including Connecticut where public health organizations fought efforts by the state to pull \$2.3 million out of infrastructure grants to local health jurisdictions while the state was developing a new \$2.3 million bioterrorism grant program for locals.¹⁴ Boston and Seattle have also witnessed reduced state and local appropriations for public health services while ramping up bioterrorism preparedness-related activities.¹⁵ The evidence to-date in most states does not indicate that widespread and explicit supplanting has occurred, but a continuing state fiscal crisis could make federal bioterrorism resources look even more attractive a year or two further down the road. In any event, state and local cutbacks in funding for public health infrastructure coupled with increased federal funds ultimately results in lower total funding levels than envisioned. Although this may not violate the letter of the prohibition against supplanting, it certainly challenges its spirit.

The degree to which these factors are operative in the 50 states varies. Changes in governorships and state administrations are a regular occurrence in virtually all states. Nearly all states have shared in the economic plight. Hiring and procurement policies seem to be problems everywhere, even in good economic times. State-local tensions are the rule rather than the exception for public health in states with relatively independent local health jurisdictions. West Nile Virus may not have hit all states yet, but almost certainly will emerge as a community health risk, and the smallpox redeployment affects local health jurisdictions throughout the U.S. In any event, political, bureaucratic, economic, and intergovernmental factors control the speed with which progress toward public health preparedness occurs.

Systems take time and need sustained support. The early experience also demonstrates that systems take time and need sustained support. Even for those states with three years of early work to develop the health alert network and upgrade disease surveillance systems, it will be several more years until these systems are completed, fully functional, and integrated into a national network. The development of a comprehensive public health workforce preparedness system will also take several years, as will true multi-state planning. It is unrealistic to believe that these systems can be up-and-running after only a year or two of funding.

ASTHO and NACCHO have recognized this in arguing for coordinated surveillance systems, development of a fully trained workforce, and sustained support of the public health infrastructure. The Independent Task Force on Emergency Responders (convened by the Council on Foreign Relations, a respected think tank organization) concluded that public health preparedness and response will require \$6.7 billion more than projected funding for 2004–2008.¹³ A Government Accounting Office (GAO) report concluded that it will take \$1 billion per year for five years for there to be a national impact on state/local preparedness.¹⁶

Workforce is a particularly difficult and important systems issue. Funding alone will not ensure that competent staff can be recruited and hired in a timely manner. A myriad of factors related to political and fiscal control, as well

as others related to bureaucratic processes and labor relations, can derail hiring plans. Effective public health workforce development systems that ensure the appropriate quantity, composition, distribution, and competency of public health workers lag far behind the development of other preparedness systems.

Spending on ongoing activities, such as workers, training, surveillance, and communications systems requires sustained levels over many years—not one or two shots. For this to occur, public health preparedness must remain a national priority, and federal leadership must be strong.

Federal leadership is essential. Federal health agencies are at risk of criticism from both sides. At times they provide too much direction and guidance in categorical programs. At other times they are criticized for providing too little. Aspects of both critiques are apparent in CDC's bioterrorism grant relationships with the states. Focus areas are well defined, but expectations within these focus areas are not. Within CDC separate units provide program support and review for each focus area with inadequate prioritization and integration across all focus areas. States tend to mimic federal structures and develop separate staff and budgets for each focus area, again without adequate coordination across all focus areas for priorities and cross cutting needs (training, equipment, hiring, etc.). Separate units within states run the hospital preparedness program, mimicking the less than optimal coordination between CDC and HRSA over their separate bioterrorism preparedness priorities.

Federal guidance for public health preparedness provides a framework of critical and enhanced capacities and critical benchmarks. Needed is a better approach to setting standards that would include both functional and operational performance in preparedness activities. Currently, states are not clear on what is meant by preparedness and how it can be measured and recognized. In this vacuum, states are left to fend for themselves, resulting in uneven, inconsistent, and unstandardized approaches from state-to-state, and from locality-to-locality within states.

Several of these themes derive from the history of federalism and public health in America, which has left the federal government in a precarious situation of weakened leadership capacity at a time when leadership is most badly needed. The federal decline is evident in the federal agencies' shrinking percent of total public health spending, the reduction in the federal public health workforce, and several decades of active devolution of health responsibilities back to the states.¹⁷ Only one percent of total federal spending on health supports population-based public health activities.¹⁰

Needed are explicit national preparedness standards as an operational definition of national, state, and local readiness. One such effort is already underway with 12 local health jurisdictions participating as pilot sites for NACCHO's project, Public Health Ready.¹⁸ In order to be certified as "ready" local health jurisdictions must meet standards for workforce training, establishment of an agency response plan linked to a communitywide response plan, and exercising of that plan.

Another hallmark of federalism and public health in the U.S., the lack of coordination between and among federal agencies, has long been a concern for state and local public health agencies. With HRSA funding relatively small in comparison with CDC funds for the 2002/2003 funding cycle, this may not

have appeared to represent a significant problem. However, HRSA funding for 2003/2004 increased four-fold while CDC funds remained at the same level as the previous year, increasing the scope and possible repercussions of problems due to lack of coordination. Early experience and reactions from the states resulted in strengthened guidance for the 2003/2004 funding cycle related to coordination of CDC and HRSA funding. Rather than each state having two separate advisory committees, one for the CDC funded activities and one for HRSA funded activities, the latest guidance calls for a joint advisory committee for CDC and HRSA cooperative agreements. More than 25 entities/interests must be included on the unified advisory committee and/or its subcommittees.

Preparedness is primarily local. Preparedness, like public health and politics, is primarily local. In that light, careful attention must be paid to identifying and addressing local needs for public health preparedness and response. Local health officials in many states have raised concerns over the distribution of funding in 2002, perceiving that local health jurisdictions should have received more than the share allotted to them. In future years, the proportion of funding shared with local health jurisdictions may need to increase as state level needs are addressed. Some local health jurisdictions would prefer that CDC directly fund local jurisdictions in a manner similar to what is now done for only a handful of the largest U.S. cities. They argue that political whims at the state level too often result in poor priorities, state money grabs, and inefficient reimbursement mechanisms. States, on the other hand, argue that state control and decision making promotes interoperable equipment, complementary resources across jurisdictions, and avoidance of gaps in coverage. It is not possible to draw conclusions as to the wisdom of separate grants to states and localities within that state. Some differences in approach are apparent for surveillance systems, hospital relationships, and training. But none appear, as yet, to be major. Strong leadership within state and local health agencies should minimize the potential for problems. Further, strong federal leadership and assurance of consistency across jurisdictions could also serve to avert problems. However, federal guidance for inter-jurisdictional (city-state), multi-jurisdictional (multi-state) regional preparedness has been minimal to date, at least in comparison to that for statewide and sub-state regional preparedness. The impact on local public health practice should ultimately be positive as better systems and workforce development advance. However, preparedness competes with other local priorities and may have suffered in the past year due to the need for West Nile virus and smallpox focused activities. Ongoing community health priorities may have fared even worse.

Notable in the latest federal guidance for bioterrorism preparedness grants is the requirement for evidence of consensus, approval, or concurrence between state and local public health officials for the proposed use of the funds. States must provide assurance that both state and local capacity development is to be achieved and local public health officials, especially those serving a significant portion of the state's population, concur with the proposed use of funds. The intent of this guidance is to shift the focus of funding to the benefit achieved rather than the level of government spending the dollars. Whether it will serve to constructively engage state and local public health interests remains to be seen. In states with a long history of collaboration

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around public health improvement initiatives, it could serve to upset the delicate balance that has evolved over time.

At the local level, public health preparedness must be well coordinated with hospital preparedness. The experience to date suggests that hospitals feel isolated from much of the communitywide planning that is taking place. Yet hospitals are key players in response to actual events. Lessons from several large scale national exercises substantiate this concern. States have identified a need for exercises and drills similar to the TOPOFF 2 exercise (see Exhibit 8-8) involving Washington State and Illinois in 2003.¹⁹

Ideally, the infusion of resources to shore up the sagging public health infrastructure would foster positive structural changes in public health systems at the state and local level. The impact on core public health practice activities should be measurable and, ultimately, there is a need to assess this impact as preparedness efforts advance. Preparedness should be viewed as an important quality or attribute of an effective public health system rather than as a categorical end in itself. This is the essence of the philosophy that has become to be known as the “dual use,” “multiple use,” or “all hazards” strategy. Although this has been the public position of federal officials since late 2001, federal actions have not always been consistent with federal rhetoric.

Indeed, credibility is one theme that constantly reemerges from the early experience of the states with preparedness funding. CDC’s emphasis on smallpox preparedness has both helped and hurt its credibility with the state and local public health community. It hurt in several ways, including the lack of information related to the hazard and risk assessment process. States and localities were to accept the risk assessment undertaken by the federal government based on undisclosed intelligence information. Many public health officials questioned whether a terrorist-generated smallpox attack represents enough of a real risk to justify the harm associated with smallpox vaccination strategies. Secondly, federal directives on smallpox undermine the credibility of an all hazards approach through the enormous emphasis placed on one specific threat at the expense of all others. This nurtures the fear that the federal preparedness program may be little more than another federal categorical program. Countering these concerns is the perception that the implementation steps for smallpox provide useful practical experience that may assist future responses to other threats and actual events. In any event, all sides recognize the need to take full advantage of federal funding increases to leverage overall infrastructure improvements. How this can be done when states and localities are tempted to cut back on their own support of public health infrastructure will require vision, leadership, and follow-through beyond anything seen to date.

CONCLUSION

Preparing for and responding to emergencies is a well established role for public health agencies and their workers. This role, highlighted in the Public Health in America statement¹ as one of six critical responsibilities, has often been viewed as one of responding to an occasional natural disaster such as an earthquake, hurricane, or flood. Large scale events that threaten public health

Terrorism drill unfolds this week

The Department of Homeland Security will stage a weeklong series of simulated disasters in Chicago and Seattle May 10-16 to test the government's ability to respond to terrorist attacks.

THE SCENARIO

A fictional terrorist group releases pneumonic plague in the Chicago area and explodes a "dirty bomb" in Seattle. Local and state agencies in both cities coordinated their responses with federal agencies in Washington, D.C. and the American Red Cross. In Canada, agencies coordinate with U.S. officials after the plague spreads from Chicago to Vancouver.

SATURDAY

The scenario begins in Chicago when pneumonic plague is supposedly released into the environment at three spots, spreading undetected throughout Cook, DuPage, Kane and Lake Counties.



Sources: Department of Homeland Security, City of Chicago, City of Seattle, Department of the Solicitor General of Canada
Chicago Tribune

MONDAY AND TUESDAY



SEATTLE

MONDAY
• At about noon, a fake radiological dispersion device, or "dirty bomb," is detonated.

TUESDAY
• A public shelter is opened, using high school students as mock victims. Meanwhile, a "safe house" for terrorists is located.

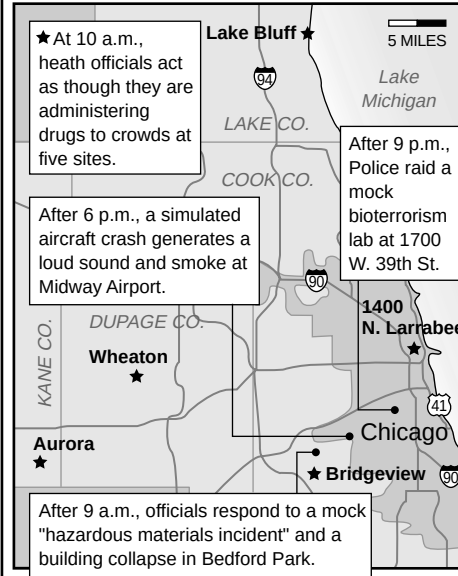
CHICAGO

TUESDAY
• A growing number of mock patients show up at hospitals complaining of flu-like symptoms.

WEDNESDAY

CHICAGO
• More mock patients show up at hospitals.
• Five sites are prepared to distribute mock antibiotics.
• Taylor Street from Clinton to Jefferson Streets is scheduled to be closed from 3-7 p.m. A police motorcade is expected to travel the Kennedy Expressway to the downtown area.

THURSDAY



WHAT YOU MIGHT SEE

- Traffic delays, emergency vehicles and equipment in southwest Chicago.
- Helicopters, flash grenades and simulated gunshots near 1700 W. 39th St.
- Parking will be prohibited in the 1400 block of North Larrabee Street for several hours beginning at 8 a.m. CTA buses and drill volunteers will be lined up along the street.
- Officials will close 55th Street from Laramie to Central Avenues for several hours starting at about 5 p.m. At Midway Airport, mock victims will wear makeup to resemble injuries. Rescue teams will be present.

Source: Chicago Tribune, May 11, 2003.

and safety have seldom been intentionally inflicted, despite recent examples to the contrary such as the bombing of the federal building in Oklahoma City in the 1990s. Events in the international theater raised the specter of increased risk for terrorist acts, including bioterrorism, directed against the American population and prompted interest in preparedness and response capacities within the federal government in the mid-1990s.

The cycle of progress in public health preparedness has been remarkably consistent over several centuries in the U.S. A terrible epidemic or another form of health-related disaster or threat occurs. Public expectations call for such an event to never occur again. Significant new resources are deployed to raise the level of preparedness and protection. The threat seems to dissipate over time. Preparedness, though still important, becomes relatively less important. Eventually, a new threat or event appears, and the cycle repeats itself. This recurring scenario raises the question as to whether current preparedness efforts represent a new and different strategy that could short circuit this chain of events. Past preparedness efforts focused on a specific threat and diminished as that specific threat diminished. Perhaps a more broadly focused preparedness campaign, one that is valued because it battles many different threats, will fare differently. Although still early in the process, some things are clear.

The price for public health preparedness will be high, regardless of how it is calculated. In crude dollar terms, its costs reflect a 20 percent increase in the federal investment in governmental public health services provided through governmental public health agencies. This increase will need to be sustained indefinitely since it primarily supports information, communications, and workforce development systems that are ongoing in nature. And it will require commensurate commitment and investment on the part of state and local governments. Otherwise supplanting will occur in one form or another, and the opportunity for federal preparedness funds to leverage other resources will be lost.

If the price is to be calculated in terms of federalism and intergovernmental relationships, it will also be high. States will need to encourage and accept stronger federal leadership on the one hand and generate a better understanding of local needs and priorities on the other. These will need to be fashioned into effective local, regional, state, and multi-state efforts in ways that will challenge states to live up to their primary responsibility for the health of its citizens. All this must be done while navigating through a treacherous obstacle course laden with political, economic, and bureaucratic impediments to sustained progress.

The federal government must avoid the pitfall of merely throwing money at the problem, without fostering a national vision of public health preparedness and nurturing the state-local public health systems that must carry out that vision. This will require the federal agencies to be accountable for meaningful capacity and performance standards, consistent credibility as to both ends and means, integration both across focus areas and across federal agencies, and leadership rather than either regulatory or advisory approaches to dealing with state-local public health system issues.

Although these are formidable challenges, the opportunities (and the opportunity costs) are unprecedented. The boost in federal funding and potential for federal leadership provide a unique opportunity to fashion a more coordinated national public health system. Certainly, the public now expects this,⁹ and the price of not being prepared will be high. But progress often comes at a high price. The history of public health preparedness reflects this lesson. Ironically, failure to seize this opportunity will increase the likelihood that another cycle will occur. We can either learn the lessons of the past, the lessons of public health threats and responses, and the lessons of public health operated within a federalist form of government, or we can relive this history over and over again.

DISCUSSION QUESTIONS AND EXERCISES

1. What constitutes vulnerability in populations who live in disaster prone areas? Give a concrete example from a disaster that has drawn media attention in recent years (several media web sites are provided in the Course Resources catalog).
2. Choose a public health discipline or occupational group (either your own or one that you are somewhat familiar with) and describe the range of tasks that group of public health practitioners may be asked to perform in disaster preparedness and response. Why is public health participation important?
3. Why should public health organizations take a leadership role in emergency and disaster planning?
4. Why is the process of planning more important than the written plan itself? Describe the “paper plan” syndrome and how it can detract from public health emergency preparedness. Identify factors contributing to disaster and other public health emergency planning apathy.
5. What is meant by the term *surge capacity* and how is this addressed in public health emergency response plans?
6. Describe three or more elements of public health statutes that are important elements of public health emergency response plans.
7. Describe the role of your agency and at least four other agencies that work in conjunction with your agency in public health emergencies.
8. Describe your own specific role for several different public health emergency situations.
9. What are the basic functions that a health department should perform in response to an emergency or disaster? When should a health department identify these functions?
10. What public health resources are available at the federal, state, or local level in an emergency or disaster? How would you go about requesting these resources?

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