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Mitigation, Prevention, and Preparedness

What You Will Learn

- The definitions of mitigation, preparedness, and prevention
- Overview of mitigation and preparedness programs
- Where terrorism fits in the classical life cycle of emergency management
- Preparedness for chemical, biological, and radiological incidents
- Community issues in preparedness
- Private-sector involvement in mitigation and preparedness

Introduction

Mitigation and preparedness constitute one-half of the classic emergency management cycle, with response and recovery completing the sequence (Figure 10–1). Mitigation and preparedness generally occur before a disaster ever occurs, although postdisaster mitigation and preparedness, conducted in recognition that similar events are likely in the future, make these two activities somewhat general to the entire emergency management cycle. This is in contrast to response and recovery, which by definition are only possible in the aftermath of a disastrous event.

In its classical meaning, *mitigation* refers to a sustained action taken to reduce or eliminate risk to people and property from hazards and their effects. Mitigation activities address either or both of the two components of risk, which are probability (likelihood) and consequence. By mitigating either of these components, the risk becomes much less of a threat to the affected population. In the case of natural disasters, the ability of humans to limit the probability of a hazard is highly dependent on the hazard type, with some hazards such as hurricanes or tornadoes impossible to prevent, while avalanches, floods, and wildfires are examples of hazards for which limiting the rate of occurrence is possible.

In general, however, mitigation efforts for natural hazards tend to focus on improved consequence management. In terms of man-made disasters, however, there is a much greater range of opportunities to minimize both the probability and the consequences of potential incidents, and both are applied with equal intensity. Mitigation in terms of terrorism, which is a much more complicated process, is discussed later in this chapter.

Preparedness can be defined as a state of readiness to respond to a disaster, crisis, or any other type of emergency situation. In general, preparedness activities can be characterized as the human component

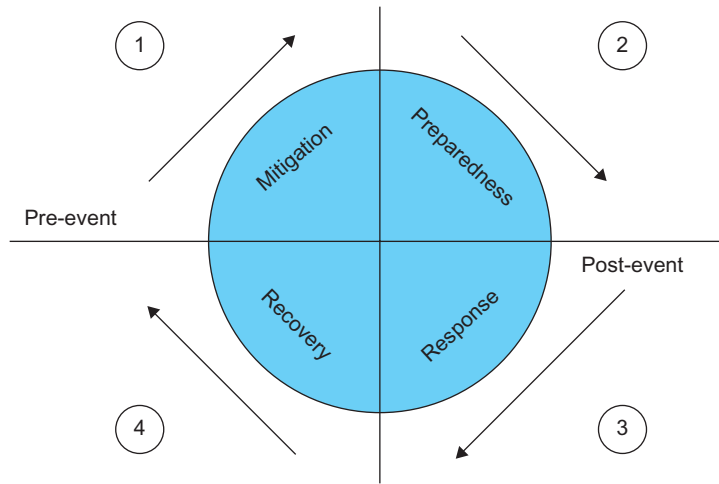


FIGURE 10-1 The four classical phases of disaster management.

of predisaster hazard management. Training and public education are the most common preparedness activities, and, when properly applied, they have great potential to help people survive disasters. Although preparedness activities do little to prevent a disaster from occurring, they are very effective at ensuring that people know what to do once the disaster has happened.

The concepts of mitigation and preparedness have been altered since September 11, 2001, when terrorism became viewed as the primary threat facing America. As such, terms like *terrorism prevention* and *terrorism preparedness* have become more popular. One must question, in light of these new terms, whether there is any real difference between the traditional definitions of *preparedness* and *mitigation* and what is being conducted in light of the new terrorism hazard.

The National Response Plan (NRP), released in December 2004 to replace the Federal Response Plan (FRP) as the operating plan for managing the response to major disasters by all federal government departments and agencies in support of state and local emergency managers, provided insight into this issue. Although this new plan did not directly define the phases of incident management, it introduced to users the sequential terminology of prevention, preparedness, response, recovery, and mitigation. The use of this terminology reflects two major changes with respect to the classical incident management approach in the United States. The first change is that mitigation is placed last in this cycle of incident management, which could indicate to readers that the activity (in the context of the plan) is perceived as a postincident one. This is significant mainly because it is altering a set terminology, which has already been widely understood and accepted within the emergency management discipline, feasibly resulting in unnecessary confusion. The second change, which is surely the more radical of the two, is the introduction of the term *prevention*, not only as a concept but also as a distinct phase in the incident management cycle. The plan defined prevention as “actions taken to avoid an incident or to intervene to stop an incident from occurring, which involve actions taken to protect lives and property.” The NRP, like the FRP, was a comprehensive plan developed according to the all-hazards approach, but the inclusion of prevention as a separate incident phase (especially in light of the preceding definition) gave rise to the question of whether the NRP was focused primarily on terrorism incident management. Prevention does not seem applicable to most natural disasters.

In January 2008, the NRP was replaced by the National Response Framework (NRF), and as such much of the emergency management terminology and functions have changed accordingly. The following section describes several of these changes as they relate to mitigation, prevention, and preparedness.

First, the document's title has been changed appropriately to reflect its true nature — namely, that it provides guidelines, rules of engagement, and an organizational framework for all stakeholders of a disaster response involving the federal government rather than offering specific steps of action as is typical in an EOP.

Second, the NRF does not attempt to redefine the phases of emergency management as occurred in the NRP. In the NRP, prevention was introduced as a distinct phase in the incident management cycle, and in many (but not all) references, as a replacement for mitigation. The NRF makes no direct reference to the emergency management cycle, and refers more sensibly to the terms *prevention* and *mitigation*. *Mitigation* is used comfortably and consistently as part of the all-hazards approach, thereby providing clarity throughout the document. The choice not to push prevention as a distinct emergency management phase is consistent with former Department of Homeland Security (DHS) Secretary Michael Chertoff's vision to establish DHS as managing all hazards rather than having a distinct focus on terrorism. The term *prevention* is most closely associated with terrorism, and therefore finds little applicability in any generalized emergency management approach.

The third major difference relates to the adjustments made to general terms that better accommodate the involvement and partnership of nonfederal stakeholders. These entities are better defined in terms of their role with regard to the emergency support functions (ESFs). The final difference is that the framework commits the federal government to the development of specific emergency response plans based on the 15 incident scenarios identified by the Homeland Security Council. Because incident scenario planning tends to create a rigid response functionality, it is difficult to agree with the approach taken. In such an approach, flexibility is sacrificed and problems may arise when real incidents do not fit the expected parameters. Additionally, this should be seen as a departure from the all-hazards approach as so many of the scores of known hazards are omitted or disregarded, though it is true that these 15 scenarios may be useful as an exercise tool. (For more complete information regarding the NRF and the changes it brings, see [DHS, 2011a](#); [Public Broadcasting System, 2006](#).)

Whether we call it prevention or mitigation, proactive incident management is crucial for minimizing the loss of human life, injuries, financial losses, property damage, and interruption of business activities. Specific methods of prevention and mitigation change from hazard to hazard, and incident to incident, but the goals are the same.

Using the all-hazards approach, whether you are mitigating for earthquakes or floods or preparing for a potential terrorist threat, the classic mitigation planning process is an effective guide for the overall process. The traditional mitigation planning process, still conducted by the Federal Emergency Management Agency (FEMA) today under its DHS umbrella, consists of four stages: (1) identifying and organizing resources; (2) conducting a risk or threat assessment and estimating losses; (3) identifying mitigation measures that will reduce the effects of the hazards and creating a strategy to deal with the mitigation measures in priority order; and (4) implementing the measures, evaluating the results, and keeping the plan up-to-date. This chapter expands on these concepts.

Mitigation and preparedness are vital for sustainable emergency management because strategies geared strictly toward post disaster response tend to be costlier than those accounting for predisaster opportunities. However, it can be difficult to convince decision makers to invest in mitigation and preparedness activities. (See “Another Voice: Why Is Mitigation and Preparedness the Only Sustainable, Cost-Effective Way of Dealing with Emergencies?”)

The next section focuses on mitigation, prevention, and preparedness activities in an effort to identify ongoing programs, as well as new developments as they fit into each subject.

Mitigation Plans, Actions, and Programs

Mitigation activities include many different methods and strategies that have the common goal of reducing the risk associated with potential hazards. To provide a deeper understanding of mitigation, it is important to first understand the nature of natural, man-made, and terrorism risk.

There are many different definitions of *risk*, each of which may be appropriate within specific circumstances. Kaplan 1997, an acclaimed risk management expert, argues that rather than providing a full definition of *risk*, one must ask three major questions in considering a specific hazard: (1) What can happen? (2) How likely is it? (3) What are the consequences? This indirect definition provides a much more flexible starting point with which to begin our discussion of risk and how to mitigate it. It also sheds additional light on the complexity of treating risks, which are clearly dynamic in nature. How we consider those risks — and rank them according to our concern — is a factor of the combined answers of those three questions. For instance, although traffic accidents occur on a daily basis, their consequences tend to be relatively minor. Very large meteor strikes, on the other hand, are very rare, but when they do occur, their consequences are globally catastrophic. Each hazard must be considered for its individual characteristics, and it is up to the individual, community, or society that is making the analysis to determine what level of effort will be made to address each according to these individual risk components.

The uncertainty component of risk, contained within the probability of disastrous event occurrence, places the greatest burden on those who are treating a full portfolio of risks that must be compared in relation to each other. Uncertainty forces us to ask ourselves questions that are often difficult and based more on expert judgment than on concrete evidence, such as, “What is the probability that a 7.0-magnitude earthquake will happen in San Francisco Bay within the next 10 years?” or “What is the probability that terrorists will attack and damage a nuclear power plant in the United States?” The probability component of risk is important because it is an equally weighted parameter that helps us to quantify and prioritize mitigation actions when dealing with multiple risks. The determination of probabilities for events is often a difficult and complicated process. Although several quantitative methods and tools are available that can be used to determine probabilities, these often tend to be too complex for communities to use. Qualitative methods have been developed to ease this problem, which in turn allows for much easier comparison of risk by communities that attempt treating their risks. The sidebar titled, “Qualitative Representation of Likelihood” illustrates but one example of a system of estimation used to establish qualitative risk likelihood rankings.

Qualitative Representation of Likelihood

This particular qualitative representation system uses words to describe the chance of an event occurring. Each word or phrase has a designated range of possibilities attached to it. For instance, events could be described as follows:

- Certain: 99% chance of occurring in a given year (one or more occurrences per year)
- Likely: 50%–99% chance of occurring in a given year (one occurrence every 1 to 2 years)
- Possible: 5%–49% chance of occurring in a given year (one occurrence every 2 to 20 years)
- Unlikely: 2%–5% chance of occurring in a given year (one occurrence every 20 to 50 years)
- Rare: 1%–2% chance of occurring in a given year (one occurrence every 50 to 100 years)
- Extremely rare: 1% chance of occurring in a given year (one occurrence every 100 or more years)

Note that this is just one of a limitless range of qualitative terms and values assigned that can be used to describe the likelihood component of risk. As long as all hazards are compared using the same range of qualitative values, the actual determination of likelihood ranges attached to each term does not necessarily matter.

The second component of risk, hazard consequence, is a detailed examination of the total unwanted impact of the disaster to the community, government, or the interested stakeholders. Consequence is often given an assigned monetary value in order to facilitate comparison with other hazards, but there are many intangible consequences that are very difficult to quantify in such absolute terms but which have to be considered as well if a comprehensive risk analysis is expected (Table 10–1). Interestingly, the consequences of disasters also have a probabilistic nature. In practice, it is quite hard to assign a single monetary value to the expected damage; probability distributions are used to model the most likely damage estimates. For this reason, qualitative applications of consequence estimation have also been developed. An example is presented in the sidebar “Qualitative Representation of Consequence.”

Table 10–1 Tangible and Intangible Consequences of Disasters

| Consequences | Measure | Tangible Losses | Intangible Losses |
|-----------------------|--|--|---|
| Deaths | Number of people | Loss of economically active individuals | Social and psychological effects on remaining community |
| Injuries | Number and injury severity | Medical treatment needs, temporary loss of economic activity by productive individuals | Social and psychological pain and recovery |
| Physical damage | Inventory of damaged elements by number and damage level | Replacement and repair cost | Cultural losses |
| Emergency operations | Volume of manpower, person-days employed, equipment, and resources expended to relief mobilization cost, investment in preparedness capability | Stress and overwork in relief participants | |
| Disruption to economy | Number of working days lost, volume of production lost | Value of lost production opportunities, and in competitiveness and reputation | |
| Social disruption | Number of displaced persons, homeless | Temporary housing, relief, economic production | Psychological, social contacts, cohesion, community morale |
| Environmental impact | Scale and severity | Cleanup costs, repair costs | Consequences of poorer environment, health risks, risk of future disaster |

Source: United Nations Development Programme, *Vulnerability and Risk Assessment*, 2nd ed., Cambridge: Cambridge Architectural Research Limited, 1994.



Qualitative Representation of Consequence

As was true with the qualitative representation of likelihood, words or phrases that have associated meanings can be used to describe the effects of a past disaster or the anticipated effects of a future one. These measurements can be assigned to deaths, injuries, or costs (often, the qualitative measurement of fatalities and injuries is combined). The following is one example of a qualitative measurement system for injuries and deaths:

- Insignificant: No injuries or fatalities
- Minor: Small number of injuries but no fatalities; first-aid treatment required
- Moderate: Medical treatment needed but no fatalities; some hospitalization
- Major: Extensive injuries, significant hospitalization; fatalities
- Catastrophic: Large number of fatalities and severe injuries; extended and large numbers requiring hospitalization



Once both of these factors (probability and consequence) have been determined, it is possible to compare risks against each other, primarily for the purposes of treating the risks through intervention measures. Normally, only limited funds exist for this purpose and, as such, not all risks can be treated. Risk comparison allows for a prioritization of risk, which can help those performing mitigation and preparedness ensure that they are spending their limited funds most wisely. Table 10–2 provides one example of a risk matrix that can be used to compare risks to each other.

Having provided a basic description of the components of risk, it is appropriate to move on to the mitigation of risk. In applying mitigation, risk managers try to minimize probability or consequence or both. In practice, however, it is not always easy, or even possible, to address both. And because each risk is unique, there are different strategies that must be identified, assessed, and applied for successful risk intervention. For example, assume one seeks to minimize the risk of an earthquake. How can one minimize the probability of its happening? In terms of modern science, unfortunately, there is no known way

Table 10–2 Example of a Qualitative Risk-Level Analysis Matrix

| Likelihood | Consequences | | | | |
|----------------|---------------|----------|----------|---------|--------------|
| | Insignificant | Minor | Moderate | Major | Catastrophic |
| Almost certain | High | High | Extreme | Extreme | Extreme |
| Likely | Moderate | High | High | Extreme | Extreme |
| Possible | Low | Moderate | High | Extreme | Extreme |
| Unlikely | Low | Low | Moderate | High | Extreme |
| Rare | Low | Low | Moderate | High | High |

Source: Emergency Management Australia, “Emergency Risk Management: Application’s Guide,” Australian Emergency Manual Series, 2000.

of doing so, and this is true for many natural hazards despite humankind's best efforts. However, one can still mitigate the risk of an earthquake by minimizing its consequences. For the earthquake risk, several known and proven strategies are available to minimize such consequences, such as adopting and enforcing earthquake-resistant building codes, educating the public about earthquakes, and developing robust earthquake response plans.

In dealing with the newly expanded terrorism risk, the mitigation strategy would likely take on a much different approach. In this case, the opportunity to minimize the likelihood of the event's occurrence is very possible, and has been done countless times with great success. Through actionable intelligence collection on terrorist activity, and by infiltration of its social and communication networks, it is possible to stop terrorists before they proceed with their plots. Therefore, theoretically, the probability component of terrorism risk can be reduced through mitigation (or "prevention"). Of course, minimizing this likelihood component is a very complex task, requiring governments to allocate significant resources to build and manage necessary systems, establish international partnerships, and build networks to identify and detain terrorists.

The consequence component of terrorism risk can also be mitigated. However, unlike most natural disasters that have a limited range of possible consequences, the options available to terrorists are limited only by their imagination. Terrorists have limitless targets, including facilities, infrastructures, and organizations, so many different strategies must be employed to minimize the impacts of terrorist attacks to each of these potential targets. DHS has developed a manual titled *Reference Manual to Mitigate Potential Terrorist Attacks against Buildings* (the sidebar "FEMA 426"). This manual discusses the importance of minimizing the impacts of potential terrorist attacks against buildings. Buildings, however, are but one target. Presumably, it may be impossible to mitigate all possible consequences only because to do so would surely exhaust even the richest nation's financial resources. It would seem, then, that the best measures would seek multiple-use solutions, such as building a robust mass-casualty public health system that would not only serve to mitigate the impact of terrorism on humans but also mitigate the consequences of other natural and technological hazards that also may affect the population.

FEMA 426: Reference Manual to Mitigate Potential Terrorist Attacks against Buildings

The Federal Emergency Management Agency (FEMA) developed the Reference Manual to Mitigate Potential Terrorist Attacks against Buildings to provide information on how to mitigate the effects of potential terrorist attacks. The intended audience includes the building sciences community of architects and engineers working for private institutions. The manual supports FEMA's mission (to lead America to prepare for, prevent, respond to, and recover from disasters) and the Strategic Plan's Goal 3 (to prepare the nation to address the consequences of terrorism), all of which will be done within the all-hazards framework and the needs of homeland security.

The building science community, as a result of FEMA's efforts, has incorporated extensive building science into designing and constructing buildings against natural hazards (earthquake, fire, flood, and wind). To date, the same level of understanding has not been applied to man-made hazards (terrorism/intentional acts) and technological hazards (accidental events). Since September 11, 2001, terrorism has become a dominant domestic concern. Security can no longer be viewed as a stand-alone capability that can be purchased as an afterthought and put in place. Life, safety, and security issues must become a design goal from the beginning.

The objective of this manual is to reduce physical damage to structural and nonstructural components of buildings and related infrastructure and also to reduce resultant casualties during conventional bomb attacks, as well as attacks using chemical, biological, and radiological agents. Although the process is general in nature and applies to most building uses, this manual is most applicable for six specific types of facilities:

- Commercial office facilities
- Retail commercial facilities
- Light industrial and manufacturing facilities
- Health care facilities
- Local schools (K-12)
- Higher education (university) facilities

Chapter 1 presents selected methodologies to integrate threat/hazard, asset criticality, and vulnerability assessment information. This information becomes the input for determining relative levels of risk. Higher risk hazards require mitigation measures to reduce risk. The chapter also provides an assessment checklist that compiles many best practices to consider during the design of a new building or renovation of an existing building.

Chapter 2 discusses architectural and engineering design considerations (mitigation measures), starting at the perimeter of the property line, and includes the orientation of the building on the site. Therefore, this chapter covers issues outside the building envelope.

Chapter 3 provides the same considerations for the building — its envelope, systems, and interior layout.

Chapter 4 provides a discussion of blast theory to understand the dynamics of the blast pressure wave, the response of building components, and a consistent approach to define levels of protection.

Chapter 5 presents chemical, biological, and radiological measures that can be taken to mitigate vulnerabilities and reduce associated risks for these terrorist tactics or technological hazards.

Appendices A, B, and C contain acronyms, general definitions, and CBR definitions, respectively.

Appendix D describes electronic security systems and design considerations.

Appendices E and F present a comprehensive bibliography of publications and the associations and organizations capturing the building security guidance needed by the building sciences community, respectively.

Source: FEMA 426, June 2003, <http://www.fema.gov/pdf/plan/prevent/rms/426/fema426.pdf>.



The threat of terrorism is not new. Throughout history there have been terrorist organizations and terrorist attacks in all parts of the world, including North America, Europe, and Australia; however, the September 11 attacks resulted in such severe consequences that, not unexpectedly, terrorism became the primary issue on the U.S. government's agenda.

Mitigating the terrorism risk is important in order to minimize potential damage that may result from what is known to be a very real threat, but it is vital to remember that combating terrorism is a

complex and long-term task, one that requires both patience and sacrifice. Therefore, all stakeholders — including the government, the public, the private sector, the media, and academia — need to appreciate the benefit of applying mitigation on an all-hazards approach such that all known risks are treated, not only terrorism. Clearly, as has been shown in the years following the September 11 attacks, there are much more likely hazards — hurricanes and floods being the greatest — that have much greater potential to cause harm in terms of both likelihood and consequence. Hurricanes Katrina and Rita and the 2011 tornadoes that struck Joplin, MO, and Tuscaloosa, AL, are just some of many recent examples.

DHS continues to provide funding for predisaster and postdisaster mitigation projects through FEMA and its other relevant directorates. Details of those initiatives are provided in the next sections.

Federal Insurance and Mitigation Administration (FIMA)

The Federal Insurance and Mitigation Administration (FIMA) is responsible for a vast majority of the U.S. government’s hazard mitigation activities, including the National Flood Insurance Program (NFIP). FIMA performs several organizational activities that serve to promote protection, prevention, and partnerships at the federal, state, local, and individual levels. The overall mission of FIMA is to protect lives and prevent the loss of property from natural and other hazards. FIMA employs the all-hazards approach through a comprehensive risk-based emergency management program. (See sidebar “What FIMA does and Mitigation Value to Society.”)



What FIMA Does and Mitigation Value to Society

What FIMA Does

FIMA manages the National Flood Insurance Program (NFIP) and a range of programs designed to reduce future losses to homes, businesses, schools, public buildings, and critical facilities from floods, earthquakes, tornadoes, and other natural disasters.

Mitigation focuses on breaking the cycle of disaster damage, reconstruction, and repeated damage. Mitigation efforts provide value to the American people by creating safer communities and reducing loss of life and property. Mitigation includes such activities as:

- Complying with or exceeding NFIP floodplain management regulations.
- Enforcing stringent building codes, flood-proofing requirements, seismic design standards, and wind-bracing requirements for new construction or repairing existing buildings.
- Adopting zoning ordinances that steer development away from areas subject to flooding, storm surge, or coastal erosion.
- Retrofitting public buildings to withstand hurricane-strength winds or ground shaking.
- Acquiring damaged homes or businesses in flood-prone areas, relocating the structures, and returning the property to open space, wetlands, or recreational uses.
- Building community shelters and tornado-safe rooms to help protect people in their homes, public buildings, and schools in hurricane- and tornado-prone areas.

Mitigation's Value to Society

1. Mitigation creates safer communities by reducing losses of life and property.
2. Mitigation enables individuals and communities to recover more rapidly from disasters.
3. Mitigation lessens the financial impact of disasters on individuals, the Treasury, and state, local, and tribal communities.

Source: FEMA, 2011, Federal Insurance and Mitigation Administration (FIMA), <http://www.fema.gov/about/divisions/mitigation.shtm>.

FIMA administers the nationwide risk-reduction programs authorized by the U.S. Congress and is composed of the following divisions:

The Risk Analysis Division applies engineering and planning practices in conjunction with advanced technology tools to identify hazards, assess vulnerabilities, and develop strategies to manage the risks associated with natural hazards. The division runs the following FEMA mitigation programs:

- Flood Map Modernization
- National Dam Safety Program
- Mitigation Planning

The Risk Reduction Division works to reduce risk to life and property through the use of land use controls, building practices, and other tools. These activities address risk in both the existing built environment and future development, and they occur in both pre- and postdisaster environments. The division is in charge of the following programs:

- National Earthquake Hazards Reduction Program (NEHRP)
- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance Program (FMA)
- Pre-Disaster Mitigation Program (PDM)
- Severe Repetitive Loss Program (SRL)
- Repetitive Flood Claims Program (RFC)
- Building Science
- Community Rating System (CRS)

The *Risk Insurance Division* helps reduce flood losses by providing affordable flood insurance for property owners and by encouraging communities to adopt and enforce floodplain management regulations that mitigate the effects of flooding on new and improved structures. The Division's prime responsibility is to run the NFIP, through which affordable flood insurance is provided to communities vulnerable to flood hazards, and impacts of floods are minimized through enforcement of floodplain management for new and altered buildings and structures (FEMA, 2011a). FEMA mitigation programs and their funding levels are described in subsequent sections.

Flood Map Modernization

Flood Map Modernization is a multiyear program to improve existing flood maps in the United States and to create new maps based on new technology and standards for those localities that require flood maps for which no previous maps exist. The need for flood map modernization arises because of the dynamic nature of flood hazards that change with geography. Changing information management standards, improvements in information delivery methods such as the Internet, and advances in technologies such as GIS (geographical information systems) are other drivers behind flood map modernization. Conventional flood maps involve paper-based cartographic maps that may be many years old, providing limited accuracy in a quickly changing physical environment. To make the updating, sharing, collaboration, and delivery of those maps more efficient, Flood Map Modernization is creating electronic maps based on GIS that adhere to newest data management standards (i.e., GIS data models and meta-data).

The resulting maps and data better serve the needs of all parties that use those maps. FEMA Risk Analysis Division takes the lead in this program and acts as the main integrator of data, creator of geographic maps, and the clearinghouse for the dissemination of all flood map products. Community planners, public policymakers, local officials, developers, builders, insurance companies, and individual property owners can all benefit from those map products made available by the program. The improved flood maps provide more reliable information on flood risks and therefore help stakeholders make better informed decisions related to their vulnerability to floods. In the long run, the use of those maps is expected to reduce total costs of flood disasters, as communities and service providers make it a habit to check flooding risks before making land use decisions.

Flood Map Modernization is a multiyear program that started in 2004 and sustained its funding levels throughout the years that followed. In FY 2006 and 2007, the program enjoyed a funding level of \$198 million, and was funded at \$220 million for FY 2008, 2009, 2010, and 2011, respectively. The president's FY 2012 budget includes approximately \$102 million to fund the activities of the program (FEMA, 2011e).

National Dam Safety Program

National Dam Safety Program is an initiative of the FEMA Risk Analysis Directorate. The program was created by the Water Resources and Development Act of 1996 and has since been reauthorized twice with new legislation introduced in 2002 and 2006.

The primary goal of the program is to provide funding for states to be used in dam safety-related activities. In that scope, states use program funds to provide dam safety training, increase the frequency of dam safety inspections, create and test emergency response plans, and promote dam safety awareness through videos and other educative material. Between FY 1998 and FY 2004, the program provided approximately \$22 million to states. Other components of the program include dam safety research and dam safety training.

As confirmed by the National Dam Safety Act of 2006 (Public Law 109–460), the program will continue to provide \$38.7 million to states as dam safety grants, \$9 million for dam safety research, and \$3.25 million for dam safety training for FY 2007 to 2011 (Association of State Dam Safety Officials, 2005; FEMA, 2011b; American Society of Civil Engineers, 2007; Congressional Research Service, 2007a).

Mitigation Planning Program

The Mitigation Planning Program administered by FEMA's Risk Analysis Division creates multihazard mitigation planning manuals, how-to guidelines, and best-practice documents. Since the program has an all-hazards mitigation scope, it works closely with several partners in different areas of interest and

expertise. Some of the program partners include the American Planning Association, Association of State Floodplain Managers, Institute for Business and Home Safety, and National Institute for Building Sciences.

The program also works closely with the (postdisaster) HMGP and the PDM administered by FEMA's Risk Reduction Division (FEMA, 2011d).

National Earthquake Hazards Reduction Program

The NEHRP was established by the Earthquake Hazards Reduction Act of 1977 to “reduce the risks of life and property from future earthquakes in the United States.” In 1980, the act was amended to include the National Institutes of Standards and Technology (NIST, then the National Bureau of Standards) and to designate the newly created FEMA as the lead agency. FEMA coordinated NEHRP until 2003, when legislation transferred FEMA's management role in the program to NIST. In this capacity, FEMA planned and managed the federal response to earthquakes, funded state and local preparedness exercises, and supported seismic design and construction techniques for new buildings and retrofit guidelines for existing buildings.

As part of this program, the U.S. Geological Survey (USGS) conducts and supports earth science investigations into the origins of earthquakes, predicts earthquake effects, characterizes earthquake hazards, and disseminates earth science information. Additionally, the National Science Foundation (NSF) provides funding to earthquake engineering research, basic earth science research, and earthquake-related social science.

In addition to its lead management role for the program, NIST conducts and supports engineering studies to improve seismic provisions of building codes, standards, and practices for buildings and lifelines (FEMA, “NEHRP,” 2007).

Total combined NEHRP funding to the four lead agencies from FY 2005 to FY 2008 rose \$127.1 million, to \$118.5 million, to \$118 million, and finally to \$119 million. The FY 2009 budget was \$129 million, the FY 2010 budget was \$131 million, and the president's FY 2011 budget request included \$129 million for NEHRP (NEHRP, 2011).

The roles of the four NEHRP agencies were further clarified in the 1990 NEHRP Reauthorization Act, which cast their primary responsibilities as follows:

Federal Emergency Management Agency

- Translates research results into technical publications
- Supports state and local governments by providing multiple-hazard loss estimation capability for use in planning and response
- Prepares technical documents aimed at improving the seismic safety of new and existing buildings
- Works with national standards organizations to develop seismic standards for new and existing lifelines
- Prepares and disseminates information about building codes and practices

National Institutes of Standards and Technologies

- Promotes better building practices among architects and engineers
- Works with national standards organizations to develop improved seismic standards for new and existing lifelines
- Chairs and provides the secretariat for the Interagency Committee on Seismic Safety in Construction (ICSSC), which recommends practices and policies to reduce earthquake hazards in federally owned, leased, assisted, and regulated facilities

National Science Foundation

- Supports research on plate tectonics
- Funds engineering research on geotechnical, structural, architectural, and lifeline systems
- Supports research on the social and economic aspects of earthquake hazard mitigation
- Supports the education of new scientists and engineers in the field

United States Geological Survey

- Provides national and regional seismic hazard and risk maps
- Conducts engineering seismology studies of the ground-shaking phenomenon
- Develops methods and standardized procedures for forecasting earthquakes
- Supports an external cooperative grants research program
- Operates national seismograph networks

NEHRP is an essential program because of the susceptibility of the entire geography of the United States to earthquake disasters. Relative earthquake risks of U.S. states can be viewed at the following website: <http://www.fema.gov/hazard/earthquake/risk.shtm>. There are multiple active faults throughout the United States. The San Andreas fault in California and New Madrid fault crossing parts of Illinois, Missouri, Arkansas, Kentucky, and Tennessee are but two examples. These faults are known to have the potential to generate very strong earthquakes. Had the 1906 San Francisco earthquake occurred today, it has been estimated that it would have affected nearly 10 million residents within a 19-county area, and would have caused economic losses ranging from \$90 to \$120 billion. The earthquake could damage as many as 90,000 buildings and depending on the time of the day, 800 to 3,400 people may lose their lives in collapsed buildings. Many of those consequences are preventable through effective earthquake hazard mitigation, thus the importance of the NEHRP (FEMA, 2007b).

FEMA's Mitigation Grant Programs

FEMA currently has five mitigation grant programs: the Hazards Mitigation Grant Program, Pre-Disaster Mitigation Grant Program, Flood Mitigation Assistance Grant Program, Severe Repetitive Loss Grant Program (SRL), and Repetitive Flood Claims Grant Program (RFC), all of which are administered by the Risk Reduction Division of the Mitigation Directorate. (A table of Historic HMS Funding is available online — see p. 5 of “JUNE 1, 2010 HMA GUIDANCE”: <http://www.fema.gov/library/viewRecord.do?id=4225>.)

Hazards Mitigation Grant Program

Authorized under Section 404 of the Stafford Act, the Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard-mitigation measures after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster declaration. HMGP funding is only available in states following a presidential disaster declaration. Eligible applicants follow:

- State and local governments
- Indian tribes or other tribal organizations
- Certain private nonprofit organizations

Individual homeowners and businesses may not apply directly to the program; however, a community may apply on their behalf. HMGP funds may be used to fund projects that will reduce or eliminate the losses from future disasters. Projects must provide a long-term solution to a problem — for example, elevation of a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage.

The HMGP is directly funded by FEMA's Disaster Relief Fund. The amount of HMGP funds that will be made available depends on the combined funding made available from the Disaster Relief Fund for the Public Assistance Program and the Individual Assistance Program. The Public Assistance Program makes funds available to communities in repairing or replacing roads, bridges, and other public infrastructure after a disaster occurs. The Individual Assistance Program provides grants for individuals and families in the aftermath of disasters.

According to FEMA's "Hazard Mitigation Assistance Unified Guidance: June 1, 2010," "HMGP funding is allocated using a "sliding scale" formula based on a percentage of the estimated total federal assistance under the Stafford Act, excluding administrative costs for each presidential major disaster declaration. Applicants with a FEMA-approved State or Tribal Standard Mitigation Plan may receive

- Up to 15% of the first \$2 billion of the estimated aggregate amount of disaster assistance;
- Up to 10% for the next portion of the estimated aggregate amount more than \$2 billion and up to \$10 billion; and
- 7.5% for the next portion of the estimated aggregate amount more than \$10 billion and up to \$35.333 billion.

Applicants with a FEMA-approved State or Tribal Enhanced Mitigation Plan are eligible for HMGP funding not to exceed 20% of the estimated total federal assistance under the Stafford Act, up to \$35.333 billion of such assistance, excluding administrative costs authorized for the disaster" (FEMA, 2010).

In the aftermath of the severe 2004 hurricane season, which included Hurricanes Frances, Jeanne, Ivan, and Charley, FEMA provided a record \$359 million in mitigation funding to the State of Florida through the HMGP. As of November 26, 2007, Hurricane Katrina- and Rita-related HMGP grants exceeded \$1.47 billion (FEMA, 2011c, 2011j, 2011k).

Pre-Disaster Mitigation Program

The Pre-Disaster Mitigation (PDM) Program was authorized by Section 203 of the Robert T. Stafford Disaster Assistance and Emergency Relief Act (as amended by Section 102 of the Disaster Mitigation Act of 2000). Funding for the program is provided through the National Pre-Disaster Mitigation Fund to assist state and local governments (including Indian tribal governments) in implementing cost-effective hazard mitigation activities that complement a comprehensive mitigation program. Recipients of this grant must be participating in the NFIP if they have been identified as being at special risk from flood hazards (i.e., have a "Special Flood Hazard Area"), and must have a mitigation plan in effect. The PDM was funded in FY 2006, FY 2007, and FY 2008 at \$49.5 million, \$100 million, \$114 million, respectively. FY 2009 funding was \$90 million, FY 2010 was \$100 million, and FY 2011 was \$100 million, respectively. The president's FY 2012 budget request included \$84.9 million for the program (DHS, 2011a; DHS, 2012; FEMA, 2011f).

Flood Mitigation Assistance Program

The Flood Mitigation Assistance (FMA) Program provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. Three types of grants are available under FMA: planning, project, and technical assistance grants. FMA planning grants are available to states and communities to prepare flood mitigation plans. NFIP-participating communities with approved flood mitigation plans can apply for FMA project grants. FMA project grants are available to states and NFIP-participating communities to implement measures to reduce flood losses. Ten percent of the project grant is made available to states as a technical assistance grant. These funds may be used by the state to help administer the program. Communities receiving FMA planning and project grants must be participating in the NFIP. An example of eligible FMA projects includes the elevation, acquisition, and relocation of NFIP-insured structures. FMA program priority for FY 2007 and 2008 is the funding of mitigation projects that minimize or eliminate the long-term risk of flood damage to properties insured by NFIP. In FY 2007, the program was funded at \$31 million inclusive of all types of grants, and in FY 2008 funding included \$34 million. However, the president's FY 2009 budget did not request any funding for the FMA program (see [FEMA, 2008c](#)).

Severe Repetitive Loss Program

The Severe Repetitive Loss Program (SLP) is a proactive mitigation initiative of the NFIP to reduce or eliminate flood-related damages and insurance claims for the approximately 83,000 residential properties that qualify as structures with severe repetitive flood damage potential. Structures with severe repetitive flood loss potential are defined as structures that meet the following criteria:

- Have four or more NFIP claim payments over \$5,000 each, given that at least two such claims have occurred within 10 years of each other, and the total amount paid to the policy holder exceeds \$20,000; or
- Have two or more separate claims payments where the total amount paid for the building portion of such claims exceeded the value of the property, given that two such claims have occurred within 10 years of each other.

The SLP has been in effect since the Flood Insurance Reform Act of 2004. This program reduces the cost of NFIP claims made by owners of highly vulnerable structures by funding mitigation projects that strengthen those structures against flood damage. Among qualifying projects are flood proofing (historical properties only), relocation, elevation, acquisition, mitigation reconstruction (demolition rebuild), and minor physical localized flood control projects. The program is funded at \$40 million per fiscal year from 2005 to 2009 ([FEMA, 2011h](#)).

Repetitive Flood Claims Program

Another program introduced by the Flood Insurance Reform Act of 2004 is the RFC. The program is conceptually similar to the SLP, but the criterion to qualify for the program is more relaxed. Any state or community that had at least one claim to the NFIP can apply for RFC funding to finance projects to reduce the vulnerability of properties against floods. RFC funds can only be spent to improve structures that are located within a state or community that is ineligible for the FMA due to cost share or capacity to manage the activities.

In FY 2007, 11 states applied for RFC funding for a total of 24 projects covering 118 properties. A total of \$33.7 million in funding was requested. FEMA selected 15 of these projects, covering 41 properties, which were funded by the program's \$10 million annual budget ([FEMA, 2008b, 2008e, 2008f](#)).

Other FEMA Mitigation Directorate Programs

National Flood Insurance Program

Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968. The NFIP is a federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. Flood insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Flood damage is reduced by nearly \$1 billion a year through communities implementing sound floodplain management requirements and property owners' purchasing of flood insurance. Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80% less damage annually than those not built in compliance. And, every \$3 paid in flood insurance claims reduces \$1 in disaster assistance payments (FEMA, 2005).

The importance of flood insurance was again proven following Hurricanes Katrina, Rita, and Wilma in 2005, when the NFIP paid more than \$16 billion in claims (Figure 10–2). As more communities

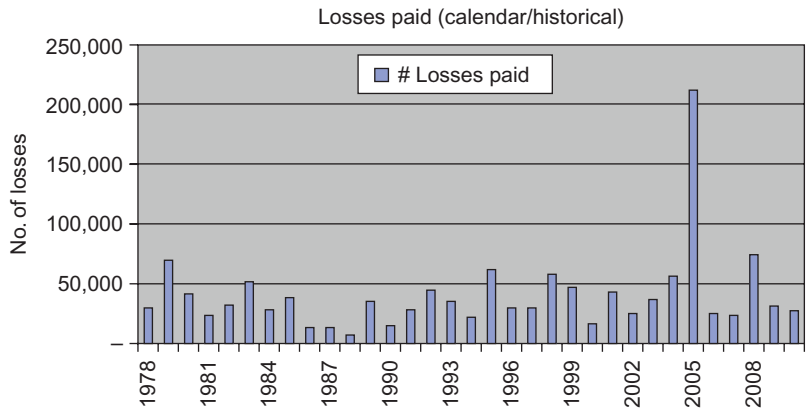


FIGURE 10–2 Losses paid by National Flood Insurance by year. (Source: FEMA, 2011, “Number of Losses Paid by Calendar Year,” http://www.fema.gov/business/nfip/statistics/cy2010_lossespaid.shtm)

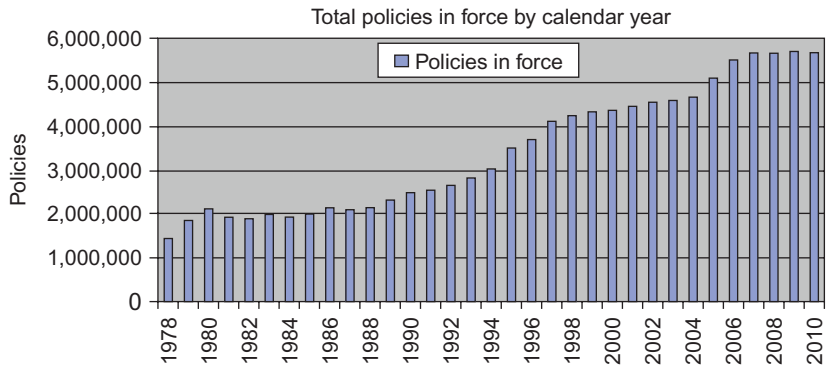


FIGURE 10–3 Growth in national flood insurance policies since 1978. (Source: FEMA, 2011, “Total Policies in Force by Calendar Year” from this site — http://www.fema.gov/business/nfip/statistics/cy2010_totpif.shtm)

meet floodplain management eligibility requirements and participate in the program, they will continue to minimize flood risk, while enjoying greater financial protection from inevitable flood damages. As these benefits become more and more apparent to homeowners with each disaster that occurs, participation in the NFIP should continue to increase over time. Figure 10–3 provides an overview of the growth in the number of flood insurance policies issued by the NFIP. NFIP funding increased from \$2.5 billion to \$2.8 billion from FY 2006 to FY 2008. The president's FY 2009 budget request included \$3.16 billion in mandatory and discretionary funding for the program (NFIP, 2008; Insurance Information Institute, 2008; FEMA, 2011g; DHS, 2008).

Prevention Actions and Programs

Prevention refers to actions taken to avoid an incident or to intervene in an effort to stop an incident from occurring in order to protect lives and property. The draft National Incident Management System of August 2007 defines prevention as follows:

Actions to avoid an incident or to intervene to stop an incident from occurring. Prevention involves actions to protect lives and property. It involves applying intelligence and other information to a range of activities that may include such countermeasures as deterrence operations; heightened inspections; improved surveillance and security operations; investigations to determine the full nature and source of the threat; public health and agricultural surveillance and testing processes; immunizations, isolation, or quarantine; and, as appropriate, specific law enforcement operations aimed at deterring, preempting, interdicting, or disrupting illegal activity and apprehending potential perpetrators and bringing them to justice. (FEMA, 2007a, p. 156)

According to DHS, the NRP (now called the National Response Framework) may be implemented for threats or potential incidents of national significance to prevent or intervene in order to lessen the impact of an incident. Prevention activities may include heightened inspections; improved surveillance and security operations; public health and agricultural surveillance and testing; immunizations, isolation, or quarantine; and, as appropriate, specific law enforcement operations aimed at deterring, preempting, interdicting, or disrupting illegal activity and apprehending potential perpetrators and bringing them to justice (FEMA, 2005).

As the prevention activities described by DHS imply, most of these activities are related to the prevention of terrorist incidents. Prevention actions related to terrorism threats and incidents include law enforcement activities and protective activities. All federal law enforcement activities are coordinated by the attorney general, generally acting through the FBI. During an incident, initial prevention efforts include, but are not limited to, the following actions:

- Collecting, analyze, and apply intelligence and other information.
- Conducting investigations to determine the full nature and source of the threat.
- Implementing countermeasures such as surveillance and counterintelligence.
- Conducting security operations, including vulnerability assessments, site security, and infrastructure protection.
- Conducting tactical operations to prevent, interdict, preempt, or disrupt illegal activity.
- Conducting attribution investigations, including an assessment of the potential for future-related incidents.

- Conducting activities to prevent terrorists, terrorist weapons, and associated materials from entering or moving within the United States.

As defined within the NRP, any activity that attempts to prevent terrorist attacks can be considered a prevention measure. Several specific DHS prevention programs are discussed in greater detail in Chapter 5.

Several of the recommendations made by the 9/11 Commission, discussed in Chapter 2, also include prevention components. The following examples are provided:

Prevention of proliferation of weapons of mass destruction and their acquisition by terrorist groups:

The 9/11 Commission underlines that about two dozen terrorist groups including al-Qaeda have attempted to acquire or develop chemical, biological, radiological, and nuclear weapons. Most of those weapons can be developed relatively inexpensively if the necessary knowledge is available to terrorists. The possible consequences of an attack involving those weapons are very likely to be devastating. Therefore, preventing the proliferation of such weapons or materials that are necessary in their development is a critical task that needs to be performed. The commission recommends that the United States has to work with the international community to get this done. The commission recommends that the United States should sustain its support for the Cooperative Threat Reduction Program, which aims to secure the weapons and highly dangerous materials still scattered in Russia and other countries of the Soviet Union.

Prevention of financial strength and flexibility of terrorist organizations: The United States and its allies made an effort to paralyze the financial networks of terrorists in the recent aftermath of 9/11. This effort aimed to reduce or eliminate the ability of terrorist groups to support their operations and maintain their existence. The experience showed that tracking and blocking of money that is potentially connected to terrorist groups is a very difficult job that demands not only international cooperation but also the convenience of national laws of international partners. Therefore, other innovative ways of reducing the financial strength and flexibility of terrorist organizations are necessary.

Prevention of terrorist travel: With the advancements in and increased frequency of international travel, terrorist groups were able to gain the mobility to conduct attacks in different parts of the world. This gives an opportunity to governments to identify the terrorist as they enter the transportation system or the country through its border checkpoints. This is a critical task that may prevent some terrorist attacks or at least the penetration of terrorists from one country to another one. But the fact that terrorists also use local resources and people in their activities makes the challenge even tougher.

Prevention of terrorist access to critical infrastructures and key assets: The 9/11 Commission recommends that the improvements being made to protect U.S. borders such as use of terrorist lists, biometric screening, biometric passports, and other threat-related information be shared with and implemented at access points to critical infrastructures and key assets. Such assets may include nuclear power plants, dams, and other infrastructures of national significance and consequences (9/11 Commission, 2004).

Preparedness Actions and Programs

Preparedness within the field of emergency management can best be defined as a state of readiness to respond to a disaster, crisis, or any other type of emergency situation. It includes those activities, programs, and systems that exist before an emergency that are used to support and enhance response to an emergency or disaster.



FIGURE 10-4 Mays Landing, NJ, April 17, 2010 — Community Relations Specialists Paul Williams and Joseph Bonaccorse (right) team up with Community Emergency Response Team Nancy E. Neglia (left) and Dwight L. Neglia to inform residents of the flood-affected area of the FEMA registration process. FEMA Community Relations specialists are going door to door to inform residents about the assistance available. (Source: Photo by Michael Medina-Latorre/FEMA)

Preparedness is important to the overall emergency management cycle because it provides for the readiness and testing of all actions and plans before actual application occurs in response to a real incident or disaster. There is a close connection between mitigation and preparedness. Often, emergency managers argue over whether a specific action should be considered mitigation or preparedness. Oftentimes the lines of distinction become fuzzy, and exact determination impossible. In its most simple terms, preparedness is more about planning for the best response, whereas mitigation includes all the actions that are attempts to prevent the need for a disaster response or to minimize the scope of the needed response.

Examples of preparedness for natural hazards are organizing evacuation drills from buildings in case of fires or other threats, providing first-response training to employees so that they can assist each other and their neighbors in small emergencies (Figure 10-4), and preparing a family disaster plan that covers topics such as the designation of a location where family members will meet if they get separated during an event and what personal papers (e.g., prescriptions and insurance records) they might need in the aftermath of an event. More specific examples include the logistical planning for tugboats operating around oil refineries such that they become responsible for responding to fire emergencies in the refinery, or providing training and relocating necessary hazardous materials (HAZMAT) teams to areas where the risk of radiological emergencies is higher, such as nuclear power plants.

In the aftermath of September 11, terrorism preparedness has become a more pressing issue. The risk of terrorists gaining access to and using weapons of mass destruction (WMDs), such as biological, chemical, and radiological agents, forced the U.S. government to establish an adequate response capability, capacity, and expertise to protect American citizens against a potential attack and respond to it in case these weapons are used. Citizens, who are the most likely targets of these attacks, must be adequately prepared if any response effort is to be successful. DHS has been given the responsibility for this task, although several other federal government agencies, including the Centers for Disease Control and

Prevention (CDC) and the Department of Education, for example, provide guidance on a full range of terrorism preparedness activities.

FEMA is responsible for preparing for and responding to natural and technological disasters and terrorism. As such, FEMA produces and publishes several documents that help citizens and businesses to take preparative action against each of these threats, including the new terrorism risk. Unfortunately, the arsenal of weapons available to the growing cadre of international terrorists is expanding — and as new weapons are identified and understood, the public must be educated accordingly. The sidebars “CDC Guidance for Evacuation Preparedness for Chemical Weapons,” “FEMA ‘Are You Ready’ Protective Measures for a Nuclear Blast,” and “DHS Ready.Gov Guidance on Explosions” presented in this chapter provide examples of the guidance provided by DHS, CDC, and FEMA for citizen preparedness against such weapons.



CDC Guidance for Evacuation Preparedness for Chemical Weapons

Some kinds of chemical accidents or attacks may make staying put dangerous. In such cases, it may be safer for you to evacuate or leave the immediate area. You may need to go to an emergency shelter after you leave the immediate area.

How to Know If You Need to Evacuate

You will hear from the local police, emergency coordinators, or government on the radio or television if you need to evacuate. If there is a “code red” or “severe” terror alert, you should pay attention to radio and television broadcasts so that you will know right away if an evacuation order is made for your area.

What to Do

Act quickly and follow the instructions of local emergency coordinators. Every situation can be different, so local coordinators may give you special instructions to follow for a particular situation. Local emergency coordinators may direct people to evacuate homes or offices and go to an emergency shelter. If so, emergency coordinators will tell you how to get to the shelter. If you have children in school, they may be sheltered at the school. You should not try to get to the school if the children are being sheltered there.

The emergency shelter will have most supplies that people need. The emergency coordinators will tell you which supplies to bring with you. Be sure to bring any medications you are taking. If you have time, call a friend or relative in another state to tell him or her where you are going and that you are safe. Local telephone lines may be jammed in an emergency, so you should plan ahead to have an out-of-state contact with whom to leave messages. If you do not have private transportation, make plans in advance of an emergency to identify people who can give you a ride.

Evacuating and sheltering in this way should keep you safer than if you stayed at home or at your workplace. You will most likely not be in the shelter for more than a few hours. Emergency coordinators will let you know when it is safe to leave the shelter.

Source: Centers for Disease Control and Prevention, 2005, www.cdc.gov.



FEMA “Are You Ready” Protective Measures for a Nuclear Blast

Before a Nuclear Blast

To prepare for a nuclear blast, you should do the following:

- Find out from officials if any public buildings in your community have been designated as fallout shelters. If none have been designated, make your own list of potential shelters near your home, workplace, and school. These places would include basements or the windowless center area of middle floors in high-rise buildings, as well as subways and tunnels.
- If you live in an apartment building or high-rise, talk to the manager about the safest place in the building for sheltering and about providing for building occupants until it is safe to go out.
- During periods of increased threat increase your disaster supplies to be adequate for up to two weeks.
- Taking shelter during a nuclear blast is absolutely necessary. There are two kinds of shelters: blast and fallout:
 - Blast shelters are specifically constructed to offer some protection against blast pressure, initial radiation, heat, and fire. But even a blast shelter cannot withstand a direct hit from a nuclear explosion.
 - Fallout shelters do not need to be specially constructed for protecting against fallout. They can be any protected space, provided that the walls and roof are thick and dense enough to absorb the radiation given off by fallout particles.

During a Nuclear Blast

The following are guidelines for what to do in the event of a nuclear explosion.

If an attack warning is issued:

- Take cover as quickly as you can, below ground if possible, and stay there until instructed to do otherwise.
- Listen for official information and follow instructions.

If you are caught outside and unable to get inside immediately:

- Do not look at the flash or fireball — it can blind you.
- Take cover behind anything that might offer protection.
- Lie flat on the ground and cover your head. If the explosion is some distance away, it could take 30 seconds or more for the blast wave to hit.
- Take shelter as soon as you can, even if you are many miles from ground zero where the attack occurred — radioactive fallout can be carried by the winds for hundreds of miles. Remember the three protective factors: distance, shielding, and time.

After a Nuclear Blast

Decay rates of the radioactive fallout are the same for any size of nuclear device. However, the amount of fallout will vary based on the size of the device and its proximity to the ground. Therefore, it might be necessary for those in the areas with highest radiation levels to shelter for up to a month. The heaviest fallout would be limited to the area at or downwind from the explo-

sion, and 80% of the fallout would occur during the first 24 hours. People in most of the areas that would be affected could be allowed to come out of shelter within a few days and, if necessary, evacuate to unaffected areas.

Returning to Your Home

Remember the following:

- Keep listening to the radio and television for news about what to do, where to go, and places to avoid.
- Stay away from damaged areas. Stay away from areas marked “radiation hazard” or “HAZMAT.” Remember that radiation cannot be seen, smelled, or otherwise detected by human senses.

Source: Federal Emergency Management Agency, 2005, www.fema.gov.



DHS Ready.Gov Guidance on Explosions

If There Is an Explosion

- Take shelter against your desk or a sturdy table.
- Exit the building ASAP.
- Do not use elevators.
- Check for fire and other hazards.
- Take your emergency supply kit if time allows.



If There Is a Fire

- Exit the building ASAP.
- Crawl low if there is smoke.
- Use a wet cloth, if possible, to cover your nose and mouth.
- Use the back of your hand to feel the upper, lower, and middle parts of closed doors.
- If the door is not hot, brace yourself against it and open slowly.
- If the door is hot, do not open it. Look for another way out.
- Do not use elevators.
- If you catch fire, do not run. Stop-drop-and-roll to put out the fire.
- If you are at home, go to a previously designated meeting place.
- Account for your family members and carefully supervise small children.
- Never go back into a burning building.

If You Are Trapped in Debris

- If possible, use a flashlight to signal your location to rescuers.
- Avoid unnecessary movement so that you don't kick up dust.
- Cover your nose and mouth with anything you have on hand. (Dense-weave cotton material can act as a good filter. Try to breathe through the material.)
- Tap on a pipe or wall so that rescuers can hear where you are.
- If possible, use a whistle to signal rescuers.
- Shout only as a last resort. Shouting can cause a person to inhale dangerous amounts of dust.

Source: Department of Homeland Security, 2005, www.dhs.gov.

Preparedness Against Biological and Chemical Attacks and Accidents

Preparedness against biological and chemical attacks and accidents poses a distinct challenge due to the unique consequences that they inflict and the relatively limited experience of emergency management professionals in dealing with them. This unique challenge is being addressed by many local, state, federal, private, and nonprofit agencies throughout the United States. In fact, the majority of preparedness funding under the Department of Homeland Security targets these WMD hazards.

Specific Challenges for Biological/Chemical Terrorism Incident Management

Deliberate biological or chemical incidents will present critical challenges to both the intended targets and those in charge of managing the incident that results. These agents, as with all WMDs, present public health threats that are not typically seen in either day-to-day or even major incidents of natural or accidental man-made nature. As such, the methods by which citizens and response officials can prepare for these attacks have only just begun to emerge in the past few years. Chemical incidents do occur with regularity, but it is very rare for them to deliberately target a human population.

Both chemical and biological agents, when used as weapons, have a significant potential to overwhelm the capabilities of the public health infrastructure. There have been several attempts to design a comprehensive framework to prepare for and manage mass-casualty medical incidents. The specific response challenges that those defining new preparedness methods must take into account are listed here:

- The existence of a chemical or biological attack may be hard to verify, due to delayed consequences or symptoms.
- The incident may involve multiple jurisdictions, which may make it much more difficult to organize a coordinated response.
- It may be time consuming to identify and isolate the type and source of the chemical or biological agent present on site.

- The incident may have a pinpoint target where a specific crowd is targeted, or may be designed to impact a larger geographic area and even larger crowds, both of which will likely create large crowds of morbidities if not mortalities.
- If large numbers of the public are impacted by the incident, the demand for health care may quickly exceed local, or even regional, medical resources.
- The identification of the involved chemical(s) or biological agent(s) may consume the capacity of local medical laboratories making it mandatory to integrate use of neighboring laboratories.
- Resources of the medical system may be consumed by not only the victims but also by those who perceive themselves as possible victims who may not be real victims.
- The emergency management officials may have to make extremely difficult public policy decisions very quickly, where lives may have to be sacrificed to save other lives.
- It may be necessary to quarantine the impacted region to insulate the nonimpacted geographies from potential contamination.
- The medical units may have to triage arriving victims if the incoming demand dramatically exceeds the capacity of available resources.
- To decontaminate the impacted geographies and those who were contaminated by the release, necessary decontamination systems, equipment, and human resources may be necessary at multiple locations.
- The medical system may not only have to deal with the physical disease caused by the chemical or biological release but also with the mental impacts of the “mass paranoia” the incident may have triggered.

These are but a small subset of the potential challenges that must be met. Individual events will present individual response factors that may or may not be known beforehand. To address these issues, physical (equipment, tools, technology), financial, knowledge, and human resources are all necessary. More importantly, a comprehensive system to address these challenges is necessary, and the adequate utilization of such a system demands the provision of training and exercises to those who will be dependent on such a system in a time of crisis. See the sidebar titled “CDC’s Strategic Plan for Preparedness and Response to Biological and Chemical Terrorism.”

CDC’s Strategic Plan for Preparedness and Response to Biological and Chemical Terrorism

The CDC has developed a plan, titled the “Strategic Plan for Preparedness and Response to Biological and Chemical Terrorism,” that identifies preparedness and prevention, detection and surveillance, diagnosis and characterization of biological and chemical agents, response, and communication as the five focus areas for comprehensive mass casualty health incident management. Descriptions of each follow.

Preparedness and Prevention

Detection, diagnosis, and mitigation of illness and injury caused by biological and chemical terrorism are complex processes that involve numerous partners and activities. Meeting this challenge requires special emergency preparedness in all cities and states. CDC provides public health guidelines, support, and

technical assistance to local and state public health agencies as they develop coordinated preparedness plans and response protocols. CDC also provides self-assessment tools for terrorism preparedness, including performance standards, attack simulations, and other exercises.

Detection and Surveillance

Early detection is essential for ensuring a prompt response to a biological or chemical attack, including the provision of prophylactic medicines, chemical antidotes, or vaccines. CDC is integrating surveillance for illness and injury resulting from biological and chemical terrorism into the U.S. disease surveillance systems, while developing new mechanisms for detecting, evaluating, and reporting suspicious events that might represent covert terrorist acts. As part of this effort, CDC and state and local health agencies form partnerships with frontline medical personnel in hospital emergency departments, hospital care facilities, poison control centers, and other offices to enhance detection and reporting of unexplained injuries and illnesses as part of routine surveillance mechanisms for biological and chemical terrorism.

Diagnosis and Characterization of Biological and Chemical Agents

The CDC and its partners created a multilevel laboratory response network (LRN). The LRN and its partners will maintain an integrated national and international network of laboratories that are fully equipped to respond quickly to acts of chemical or biological terrorism, emerging infectious diseases, and other public health threats and emergencies.

Response

A comprehensive public health response to a biological or chemical terrorist event involves epidemiologic investigation, medical treatment and prophylaxis for affected persons, and the initiation of disease prevention or environmental decontamination measures. CDC assists state and local health agencies in developing resources and expertise for investigating unusual events and unexplained illnesses. If requested by a state health agency, CDC will deploy response teams to investigate unexplained or suspicious illnesses or unusual etiologic agents and provide on-site consultation regarding medical management and disease control. To ensure the availability, procurement, and delivery of medical supplies, devices, and equipment that might be needed to respond to terrorist-caused illness or injury, CDC maintains a national pharmaceutical stockpile.

Communication Systems

U.S. preparedness to mitigate the public health consequences of biological and chemical terrorism depends on the coordinated activities of well-trained health care and public health personnel throughout the United States who have access to up-to-the minute emergency information. Effective communication with the public through the news media will also be essential to limit terrorists' ability to induce public panic and disrupt daily life.

Source: Centers for Disease Control and Prevention, "Biological and Chemical Terrorism: Strategic Plan for Preparedness and Response," 2005.



Comprehensive Medical and Health Incident Management System

The Medical and Health Incident Management System (MaHIM) designed by Joseph A. Barbera and Anthony G. Macintyre is one of the most recent and most comprehensive analytical tools designed to help communities develop their own medical mass-casualty incident management capacity. The system not only focuses on developing local capacities, but also proposes a framework that can be used to integrate interjurisdictional capacities, should the incident spread beyond local jurisdictional borders.

The goal of the framework is to define as a single system encompassing the medical and public health functions and processes required for adequate management of a mass-casualty incident. The system has been designed with an all-hazards approach where special consideration is given to bioterrorism.

The MaHIM system defines the goal of medical consequence management in a mass-casualty incident as follows: to maximally limit morbidity (injury or illness) and mortality (deaths) in the population exposed to a major hazard and to return the community to normalcy as soon as possible. The three primary medical objectives to attain this goal are as follows:

- *Reduce hazard exposure:* Avoid or minimize the hazard exposure to patients and the population after hazard “release.”
- *Increase hazard resistance:* Maximize patient and population resistance to the hazard impact after exposure.
- *Promote/achieve healing from hazard effects:* Maximize the rate and degree of patient and population healing from the hazard impact.

To achieve these goals, the system utilizes principles of effective local and regional organization to provide a detailed description of necessary medical and health emergency operations, and the associated

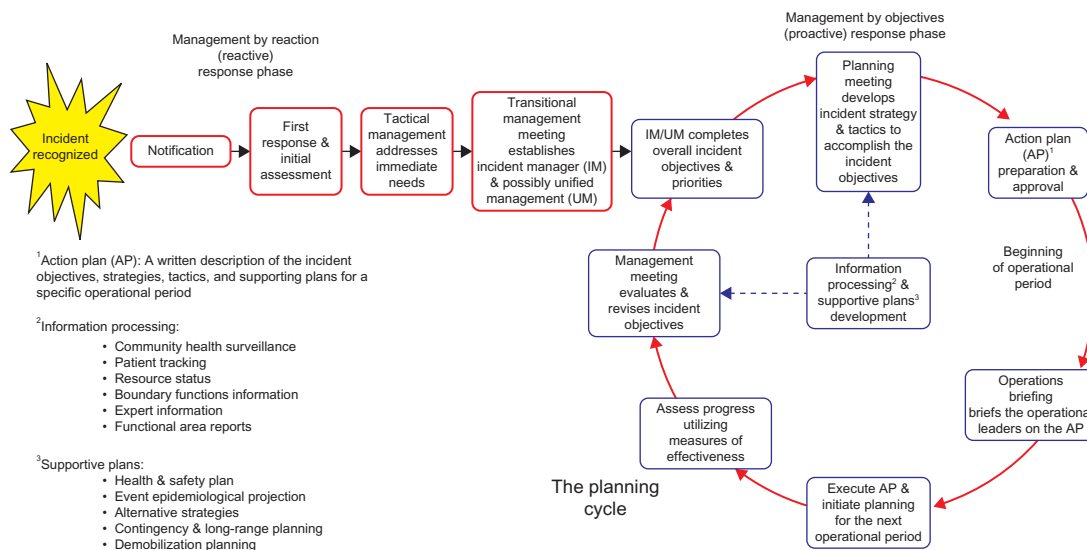


FIGURE 10-5 MaHIM management process. (Source: “Planning Cycle,” U.S. Coast Guard Incident Management Handbook, U.S. Coast Guard COMDTPUB P3120, April 17, 2001)

subfunctions and processes. The system underlines the importance of responsibility and authority. It defines the operational requirements for surge capacity, and provides detailed explanations about support functions critical to system's operation. Figure 10–5 details the MaHIM management process.

MaHIM provides a new vision for the health and emergency medical service communities, and gives them an actionable tool with which they can now structure their preparedness and management efforts in a more systematic fashion. The system describes in detail all functional areas that should be included in a comprehensive, mass-casualty health incident management system. The system is currently being implemented in Arlington County, Virginia, as part of a pilot project. The project includes restructuring the county's entire emergency medical system. A more detailed functional description of the system can be downloaded from the following website: <http://www.gwu.edu/~icdrm/publications/MaHIM%20Model%20Web%20Version%20FEB%202003.pdf> (Barbera and Macintyre, 2002, 2003).

ANOTHER VOICE: WHY IS MITIGATION AND PREPAREDNESS THE ONLY SUSTAINABLE, COST-EFFECTIVE WAY OF DEALING WITH EMERGENCIES?

Pay Now or Later

Catastrophic disasters are associated with large losses of property and lives, where resources to cope with the disaster overwhelm local governments. Following such disasters, large amounts of capital in the form of disaster aid are necessary in order to put the physical infrastructure back to its original state. Even larger amounts — doubled, tripled, or sometimes quadrupled — are necessary to put the economic and social infrastructure back into a sustainable state. Therefore, local planners and policy-makers should be extra careful when allowing settlements and the associated infrastructure systems in precarious zones such as active faults, coastal regions, flood zones, and nuclear power plants. These decisions should not only be based on scientific assessment of potential risks of failure (these are ideally embedded in building codes) but also “life cycle costs” of owning and operating infrastructure systems (LCCs are ideally factored into the “benefit-cost ratio” for capital allocation). LCCs should include allowances for scheduled and emergency maintenance for critical parts of the system, as well as economic allowances for failures.

Case in Point

In the immediate aftermath of Hurricane Katrina, the levees surrounding the city of New Orleans failed, causing the flooding of the entire city and incapacitating local response forces. The failure of the response is attributable, among other things, to the historic ill decision of settling in a very dangerous flood zone and continued expansion despite prior major flooding events, as well as the lack of funding that caused the poor maintenance and near-neglect of critical components of the levee structure which led to their compromise under extreme forces.

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Nuclear and Radiological Preparedness

The Nuclear Regulatory Commission (NRC) is the primary federal government agency in charge of regulating the commercial radiological operations within the United States. The NRC's mission is to regulate the nation's civilian use of by-product, source, and special nuclear materials to ensure adequate protection of public health and safety, to promote the common defense and security, and to protect the environment. The NRC's regulatory mission covers three main areas:

- **Reactors:** Commercial reactors for generating electric power and research and test reactors used for research, testing, and training
- **Materials:** Uses of nuclear materials in medical, industrial, and academic settings and facilities that produce nuclear fuel
- **Waste:** Transportation, storage, and disposal of nuclear materials and waste, and decommissioning of nuclear facilities from service

A key component of the mission of the NRC is to ensure adequate preparedness measures are in place to protect the health and safety of the public. These actions are taken to avoid or reduce radiation dose exposure and are sometimes referred to as *protective measures*.

The overall objective of NRC's Emergency Preparedness (EP) program is to ensure that nuclear power plant operators are capable of implementing adequate measures to protect public health and safety in the event of a radiological emergency. As a condition of their license, operators of these nuclear power plants must develop and maintain EP plans that meet comprehensive NRC EP requirements. Increased confidence in public protection is obtained through the combined inspection of the requirements of emergency preparedness and the evaluation of their implementation.

The NRC maintains oversight of the capability of nuclear power plant operators to protect the public by conducting thorough inspections. The NRC maintains four regional offices (Region I in King of Prussia, Pennsylvania; Region II in Atlanta, Georgia; Region III in Lisle, Illinois; and Region IV in Arlington, Texas) that implement the NRC's inspection program. In addition to these regionally based inspectors, the NRC places "resident inspectors" at each of the nation's operating nuclear plants to carry out the inspection program on a day-to-day basis.

The NRC assesses the capabilities of nuclear power plant operators to protect the public by requiring the performance of a full-scale exercise at least once every 2 years that includes the participation of government agencies. These exercises are performed in order to maintain the skills of the emergency responders and to identify and correct weaknesses. They are evaluated by NRC regional inspectors and FEMA regional evaluators. Between the times when these 2-year exercises are conducted, additional drills are conducted by the nuclear power plant operators that are evaluated by the resident inspectors (Nuclear Regulatory Commission, 2005).

Terrorism Preparedness and Mitigation: Community Issues

The terrorism threat knows no geographic, social, or economic boundaries. Every citizen and every community is potentially at risk. Although the DHS focuses on federal and state efforts to prepare for and combat terrorism, local communities are struggling to address the terrorism risk. The following sections explain several initiatives that have been launched to deal with community issues concerning the terrorist threat.

Corporation for National and Community Service

The mission of the Corporation for National and Community Service (CNCS), an independent federal agency under the White House, is to provide opportunities for Americans of all ages and backgrounds to engage in service that addresses the nation's educational, public safety, environmental, and other human needs to achieve direct and demonstrable results. In doing so, the corporation fosters civic responsibility, strengthens the ties that bind citizens together, and provides educational opportunities for those who make a substantial commitment to service.

CNCS provides opportunities for Americans to serve through three programs: Senior Corps, AmeriCorps, and Learn and Serve America. Members and volunteers serve with national and community nonprofit organizations, faith-based groups, schools, and local agencies to help meet community needs in education, the environment, public safety, homeland security, and other critical areas. The corporation is part of USA Freedom Corps, a White House initiative to foster a culture of citizenship, service, and responsibility and help all Americans answer the president's call to service.

Senior Corps taps the skills, talents, and experience of more than 500,000 Americans aged 55 years and older to meet a wide range of community challenges through three programs: RSVP, Foster Grandparents, and Senior Companions. RSVP volunteers conduct safety patrols for local police departments, participate in environmental projects, provide intensive educational services to children and adults, and respond to natural disasters, among other activities. Foster Grandparents serve one-on-one as tutors and mentors to young people with special needs. Senior Companions help homebound seniors and other adults maintain independence in their own homes.

Fifty thousand Americans are serving their communities 20 to 40 hours a week through AmeriCorps. Most of AmeriCorps' members are selected by and serve with local and national nonprofit organizations such as Habitat for Humanity, the American Red Cross, City Year, Teach for America, and Boys and Girls Clubs of America, as well as with a host of smaller community organizations, both secular and faith based. AmeriCorps operates in a decentralized manner that gives a significant amount of responsibility to states and local nonprofit groups. Roughly three-quarters of all AmeriCorps grant funding goes to governor-appointed state service commissions, which award grants to nonprofit groups in responding to local needs. Most of the remainder of the grant funding is distributed by the corporation directly to multistate and national organizations through a competitive grants process. AmeriCorps NCCC (National Civilian Community Corps) is a residential program for more than 1,200 members ages 18 to 24. Based on a military model, it sends members in teams of 10 to 14 to help nonprofit groups provide disaster relief, preserve the environment, build homes for low-income families, tutor children, and meet other challenges. Because members are trained in CPR, first aid, and mass care, and can be assigned to new duties on short notice, they are particularly well suited to meet the emerging homeland security needs of the nation.

Learn and Serve America provides grants to schools, colleges, and nonprofit groups to support efforts to engage students in community service linked to academic achievement and the development of civic skills. This type of learning, referred to as *service learning*, improves communities while preparing young people for a lifetime of responsible citizenship. In addition to providing grants, Learn and Serve America serves as a resource on service and service learning to teachers, faculty members, schools, and community groups.

CNCS is an important initiative for homeland security efforts at the local community level because it provides a significant portion of the total federal funding that goes to volunteer organizations and local communities that are trying to improve their homeland security capabilities.

On July 18, 2002, CNCS announced that it had acquired more than \$10.3 million in grants. These grants supported 37,000 volunteers for homeland security in public safety, public health, and disaster mitigation and preparedness. The corporation announced on September 10, 2003, the renewal of 17 of the grants from the previous year totaling nearly \$4.5 million for homeland security volunteer projects that were developed in the aftermath of the September 11 terrorist attacks.

In January 2004, CNCS announced the availability of \$3.2 million in funding for organizations addressing homeland security concerns by engaging students in service learning activities in their schools and communities. The funding was made available through the Corporation's Learn and Serve America program, which provides grants to schools, colleges, and nonprofits to support programs that connect classroom learning with community service. The Homeland Security initiative aimed to engage young people aged 5 to 17 in planning for and responding to health, safety, and security concerns in their schools or communities, including natural disasters, school violence, medical emergencies, or terrorist acts. Examples of activities supported included engaging students in service learning projects to develop school crisis plans, distributing preparedness kits, conducting school safety audits and drills, providing health education, inventory and maintain emergency supplies, or providing language assistance to non-English-speaking populations.

In February 2004, CNCS announced the renewal of 13 AmeriCorps homeland security grants to support 362 AmeriCorps members serving in public safety, public health, and disaster relief and preparedness projects across the country. The grants totaled \$3.5 million and supported AmeriCorps projects in 20 states. The grantees included 12 state or local groups and 1 national organization, the American Red Cross. The grants supported AmeriCorps members' efforts to recruit volunteers, develop disaster response plans, teach disaster preparedness to students, assist firefighting and police operations, train people in first aid and CPR, respond to national and local disasters, and develop partnerships with organizations involved in homeland security such as Citizen Corps councils and Neighborhood Watch Programs. (See sidebar titled "DHS Secretary Ridge Cites Neighborhood Security as Instrumental to Homeland Security.") Results from the 2003 activities sponsored by the grants included the following:

- AmeriCorps members serving in a program sponsored by the Florida Department of Elder Affairs have recruited over 600 disaster services volunteers who contributed more than 12,000 hours of service, distributed over 200,000 disaster services publications, and reached nearly 2,500 residents with presentations on safety.
- Serving with the Green River Area Development District in rural Kentucky, AmeriCorps members have utilized data from a Global Positioning System to map out information about fire stations, emergency shelters, HAZMAT storage facilities, medical facilities, and nursing homes.
- Just blocks from the World Trade Center site, Pace University AmeriCorps members have trained 250 people in English, Chinese, and Spanish in emergency preparedness techniques, created a resource list that consolidates all important emergency numbers, and built a "Downtown Needs" website that serves as a volunteer clearinghouse for 2,000 organizations in the downtown area.
- AmeriCorps members in the California Safe Corps have taught disaster preparedness classes to more than 1,000 community members, recruited more than 100 new volunteers who have provided over 250 hours of service, and assisted more than 200 victims of disasters.
- In Iowa, AmeriCorps members have made presentations on disaster preparedness at 400 schools across the state.

- In the summer of 2004, the devastation wrought by Hurricanes Charley and Frances in Florida prompted the CNCS to muster as much assistance as possible to the state. More than 600 national service volunteers have been deployed to provide both direct services and leverage the support of thousands of additional volunteers. The CNCS worked with state and federal disaster officials to deploy even more volunteers as needed.

AmeriCorps members and Senior Corps volunteers specially trained in disaster relief have responded to disasters in more than 30 states. The corporation has a long track record of working with FEMA and other relief agencies in helping run emergency shelters, assisting law enforcement, providing food and shelter, managing donations, and helping families and communities rebuild. Hundreds of national service volunteers have directly assisted victims of the September 11 terrorist attacks by providing family services, organizing blood drives, raising funds, and counseling victims' families (from <http://www.nationalservice.org/news/factsheets/homeland.html> and <http://www.nationalservice.org/news/homeland.html>).

CNCS volunteers proved to be especially useful and valuable in the aftermath of Hurricane Katrina. CNCS quickly activated its local volunteer base to join the response to the disaster, and also deployed many of its volunteers from other states to take part in the response and recovery operations. Response to Hurricane Katrina constituted the single largest nonmilitary volunteer disaster response in the history of the United States. Close to 600,000 volunteers took part in the response and recovery to Hurricane Katrina of which approximately 35,000 were participants of various CNCS programs. Volunteers with diverse skills and training supported many important activities such as management of evacuee shelter operations, food services, basic health-care services, informing disaster victims on available governmental and nongovernmental benefits, and general postincident counseling services. CNCS volunteers staffed the American Red Cross emergency call center in Fairfax, Virginia.

CNCS did not suspend its efforts in the hurricane-hit region after the response transformed into a long-term recovery operation. The organization worked with established partners including but not limited to FEMA, and the American Red Cross. Volunteers got involved with donation collection, and warehouse management activities. Alabama Emergency Management Agency's emergency phone answering system has been staffed by CNCS volunteers. The corporation funded volunteer-pilot-operated airlifts to transport patients out of the area, reunite families, and bring in medical supplies to the region. Trained and equipped members of American Radio Relay League, a CNCS partner, have supported emergency radio communications. In the later phases of the recovery effort volunteers collaborating with federal, state, and local response units; military units deployed to help with the recovery; and other nonprofit organizations and CNCS volunteers participated in debris removal, helped the elderly and the disabled, repaired damaged roofs, and staffed coordination offices. American Red Cross response vehicles such as mobile kitchens were also staffed by volunteers in many instances. CNCS encouraged the volunteering of college students during their winter and spring breaks, and created opportunities for their direct involvement in the hardest hit areas as volunteers. Those students participated in repair and reconstruction projects and enjoyed supporting local communities as they helped them recover from the devastation caused by Hurricane Katrina (CNCS, 2006, 2007a, 2007b).

The CNCS Homeland Security Grant Program was discontinued in 2006 after being funded at \$10.3 million in FY 2003, at \$9.88 million in FY 2004, and at \$4.96 million in FY 2005, respectively. During that time frame, 17 grants were funded for a 3-year period and 12 grants were funded for a 2-year period (CNCS, 2005).



DHS Secretary Ridge Cites Neighborhood Security as Instrumental to Homeland Security


In Falcon Heights, Minnesota, a program that trains residents to respond to potential terrorist attacks is becoming a model for other cities and states. Falcon Heights Mayor Sue Gehrz, St. Paul Mayor Randy Kelly, and other officials were joined by Homeland Security Secretary Tom Ridge at a symposium in St. Paul exploring how Americans can protect their food supply, workplaces, and homes. “The potential destruction to life and property from man-made disasters is so large that communities can no longer assume” that agencies in neighboring communities will be available to help, Gehrz said. “That means more individuals need to be trained to assist their families and neighbors until help arrives,” she said.

“The only way you can secure the homeland is to make sure the hometowns are secure,” Ridge told about 350 people at the symposium. The nation has strengthened security in many ways since the terror attacks of 2001, yet it still needs a greater degree of readiness, he said. “We need to consolidate most of our computer systems and databases in one seamless operation, make it easier for police to communicate with each other, with the rest of federal government, right down to the state and locals,” he said.

Since the September 11 attacks, the residents of Falcon Heights have worked together to plan a response to terror attacks, Gehrz said. They have created a community manual on their “intergenerational organizing model” and provided it to more than 70 Minnesota cities and counties. It has been used in Florida, South Carolina, and Washington, DC.

In Falcon Heights, which has a population of 5,600, a total of 65 “neighborhood liaisons” have collected the names, addresses, and phone numbers of people on their blocks, identifying who has medical training or other specialized skills or equipment that might be useful in a disaster, Gehrz said. A neighborhood commission worked with the Red Cross to provide free first-aid training for 62 residents. Police have trained 11 residents how to direct traffic during emergencies. Others will receive 21 hours of training in how to respond to emergencies. “Involving all ages helps reduce fear and protect civil rights,” said Gehrz, who is trained as a psychologist. “One of the primary goals of terrorism is to make people feel isolated and vulnerable.”

Source: “Falcon Heights Security Efforts Are Becoming a National Model,” *Star Tribune*, June 20, 2003, p. 19A.



Citizen Corps

Following the tragic events that occurred on September 11, 2001, state and local government officials have increased opportunities for citizens to become an integral part of protecting the homeland and supporting local first responders. Officials agree that the formula for ensuring a more secure and safer homeland consists of preparedness, training, and citizen involvement in supporting first responders. In January 2002, President George W. Bush launched the USA Freedom Corps to “capture the spirit of service that has emerged throughout our communities following the terrorist attacks.”

Citizen Corps, a vital component of USA Freedom Corps, was created to help coordinate volunteer activities that can make communities safer, stronger, and better prepared to respond to emergencies. It provides opportunities for people to participate in a range of measures to make their families, their homes, and their communities safer from the threats of crime, terrorism, and disasters of all kinds.

Citizen Corps is coordinated nationally by FEMA. In this capacity, FEMA works closely with other federal entities, state and local governments, first responders and emergency managers, the volunteer community, and the White House Office of the USA Freedom Corps. One of the initiatives supported by Citizen Corps is the Community Emergency Response Teams (CERT). The program trains citizens to be better prepared to respond to emergency situations in their communities. When emergencies happen, CERT members can give critical support to first responders, provide immediate assistance to victims, and organize spontaneous volunteers at a disaster site. CERT members can also help with nonemergency projects that help improve the safety of the community.

The CERT course is taught in the community by a trained team of first responders who have completed a CERT Train-the-Trainer course conducted by their state training office for emergency management, or FEMA's Emergency Management Institute (EMI), located in Emmitsburg, Maryland. CERT training includes disaster preparedness, disaster fire suppression, basic disaster medical operations, and light search and rescue operations. As of 2008, there were more than 2,800 CERT programs active in many states, counties, and communities nationwide. For more information on CERT, see the CERT web-site at www.citizencorps.gov/programs/cert.shtm.

Another important Citizen Corps initiative is the Medical Reserve Corps (MRC) program, which coordinates the skills of practicing and retired physicians, nurses, and other health care professionals, as well as other citizens interested in health issues who are eager to volunteer to address their community's ongoing public health needs and to help their community during large-scale emergency situations.

Local community leaders develop their own MRC units and identify the duties of the MRC volunteers according to specific community needs. For example, MRC volunteers may deliver necessary public health services during a crisis, assist emergency response teams with patients, and provide care directly to those with less serious injuries and other health-related issues. More information on the MRC program can be found at <http://www.medicalreservecorps.gov>.

The Neighborhood Watch Program (NWP) and Volunteers in Police Service (VIPS) programs are other Citizen Corps homeland security-related programs.

A relatively new partner program of the Citizen Corps initiative is the Fire Corps program. Launched in 2004, Fire Corps is a partnership between the International Association of Fire Chiefs' Volunteer and Combination Officers Section (IAFC/VCOS), the International Association of Fire Fighters (IAFF), the National Volunteer Fire Council (NVFC), and the U.S. Fire Administration (USFA). Its mission is to help career, volunteer, and combination fire departments supplement existing personnel resources by recruiting citizen advocates. In June 2005, the program signed up its first 250 fire departments in its "citizen advocates" program. The purpose of the program is to help fire departments expand existing programs — or assist in developing new ones — that recruit citizens who donate their time and talents to support the fire service in nonoperational roles. Within the first 4 years of its existence, Fire Corps has expanded its organization to many states. Currently, the organization has a division advocate for all 7 divisions across the United States, and 52 state advocates that represent 28 states. More information about Fire Corps can be found at <http://firecorps.org> (Fire Corps, 2008). The president's FY 2012 budget requested \$9.8 million for the program (DHS, 2011b).



The SAFE Conference

The first annual conference on “The Community and Homeland Security,” in cooperation with the SAFE project, took place in San Francisco on March 27 and 28, 2003. The aim of the conference was to bring together local leaders from several states, leaders responsible for shaping homeland security programs and activities in their communities, with representatives from federal, state, local, nonprofit, private, and international organizations working on homeland security-related issues. The conference allowed all these practitioners, participants, and representatives to voice their concerns and to share their experiences and gave them their first opportunity not only to work together to identify existing problems with homeland security at the local level but also to propose possible solutions to these problems.

Four principal areas of concern on the community level emerged from the discussions in the conference:

- Resources: Greater access to resources to fund homeland security programs and projects at the community level
- Information: Greater access to practical information about application, eligibility, recruitment, retention, and other concerns
- Programming: The need for innovative and effective programming ideas
- Customizing: The need to focus on diverse and “special needs” populations

To create more resources and to use available resources more effectively, the following ideas were developed in the conference:

- Block grants to communities are an efficient means for providing federal funding for community homeland security efforts.
- Communities should partner with the National Governor’s Association, the United States Conference of Mayors, the League of Cities, and other professional associations seeking federal funding for community homeland security efforts.
- Creative funding ideas practiced in communities around the country need to be identified and widely disseminated among community homeland security officials.
- New partnerships need to be established with the country’s business and philanthropic communities to leverage their resources for community homeland security efforts.

Suggestions for improving access to accurate and timely information regarding homeland security issues included the following:

- Establishing an information clearinghouse to catalog homeland security information sources
- Establishing a Web-based “chat room” for community officials to exchange ideas and best practices and to discuss current issues
- Establishing a “funding exchange” to share ideas on funding sources and creative funding ideas

- Partnering with the Department of Homeland Security and state homeland security operations to facilitate the flow of information on federal and state programs and funding opportunities to community officials.

In addition to the homeland security programming currently in place (e.g., CERT training, Medical RSVP), conference participants identified a need to design and implement programs that fully leveraged the capabilities of volunteers in the community. Several ideas were considered, including the following:

- The SAFE Project, designed to develop volunteer programs in support of community emergency management and homeland security operations
- The development of Community Emergency Networks (CENs), designed to facilitate communications between community residents and local homeland security officials before, during, and after a disaster or terrorism incident

Some of the ideas developed in the conference regarding the “special needs” populations were as follows:

- Reprogramming Community Development Block Grant (CDBG) funding targeted for “special needs” populations to include homeland security efforts
- Establishing “language and culture banks” in communities to facilitate communications and information flow between public safety and emergency officials and “special needs” populations
- Partnering with national associations and groups that represent the interests of special needs populations such as the elderly, veterans, minority populations, children, and the disabled
- Partnering with foundations and other philanthropic organizations, such as the Annie E. Casey Foundation, which focuses its efforts and funding in disadvantaged communities
- Partnering with local emergency management/homeland security and public health operations to help these groups identify and serve special needs populations in the community

The existence of voluntary activities for homeland security, such as the SAFE conference, is important because such activities bring together different stakeholders, provide an opportunity to share expertise and best practices, and create an environment in which public-private partnerships can be initiated and brainstorming can occur.

The primary concern of those in attendance was well stated by Carol Lopes (Berkeley, California), who said, “Though there has been a lot of progress, we are willfully unprepared. Community and neighborhood preparedness is the centerpiece of today’s work. Our responsibility is to prepare a community before a disaster and assist after a disaster strikes. We must train a cadre of emergency prepared individuals who will interface well with first responders.”

Said Chuck Supple (GO SERV): “We must engage citizens to address problems in their own communities to have the greatest possible impact in Community Homeland Security.”

Said Valli Wasp (Austin, Texas): “Preparedness must be addressed locally. We need to take this to ‘homes’ — get rid of the ‘land,’ get rid of the ‘security’ — this is about people protecting their homes. If you want people to listen to you, you have to go to where they live.”

Said Eileen Garry (U.S. Department of Justice): “Every good idea I have ever heard came from the local level.”

One participant expressed concern that “making us fundraisers, in addition to our programmatic [tasks], really stretches municipalities’ resources thin. The raw numbers of people required for fundraising exhausts programs.” However, such fundraising actions are recognized as vital to any program’s success, echoed by Doris Milldyke (Kansas) who said, “Money is the first goal, volunteers are the second.” Ann Patton (Tulsa, Oklahoma) stated, “An information clearinghouse would be invaluable,” while Doris Milldyke (Kansas) noted that information on VIPS, MRS, and other programs is “notoriously difficult to find,” adding, “we need a golden key for information on getting grants.”

Chuck Supple (California GO SERV) stated this position well in saying, “We’ve probably only thought of a ‘minutia’ of the areas where volunteers would be useful.”

Ana-Marie Jones (Oakland, California) warned that “special needs communities are often isolated from services,” adding that “[programs] must have a trusted leader who either speaks or has access to the languages of all representative groups — you need more than a ‘Spanish press release.’” She suggested that participants “involve special needs communities before the disaster” to be effective.

Source: D. Coppola, G.D. Haddow, and J.A. Bullock, A Report on the First Annual Conference on “The Community and Homeland Security,” March 2003, www.nccd-crc.org/new/chs_conference_1.pdf.

The American Red Cross

The American Red Cross (ARC) has always been one of the most important partners of the federal, state, and local governments in disaster preparedness and relief operations. Some of the daily community operations of the Red Cross chapters include senior services, caregivers’ support, provision of hospital and nursing home volunteers, lifeline (an electronic personal emergency response service), transportation to medical/doctor’s appointments and other essential trips, food pantry and hot lunch programs, homeless shelters and transitional housing services, school clubs and community service learning programs and projects, youth programs (violence and substance abuse prevention, peer education and mentoring, leadership development camps), food and rental assistance, language banks, and community information and referral.

From the first \$10.3 million in federal grants provided to involve citizen volunteers in homeland security efforts in 2002, the ARC received \$1,778,978, which was distributed by the national headquarters to many individual chapters. The recipient of the greatest portion of these funds was the Greater New York chapter, which received \$500,000 of the funds for the recruitment, training, and mobilization of 5,000 new disaster volunteers equipped to respond to another terrorist attack on a local level. These volunteers work with Red Cross service delivery units in New York to train additional volunteers, exponentially increasing the city’s force of disaster relief workers.

In 2002, another \$371,978 was given to the ARC National Headquarters for a nationwide program aimed at increasing volunteers in communities most vulnerable to terrorist attacks. The grant supported a

yearlong program with 30 Community Preparedness Corps (CPC) members working in 19 chapters. Corps members worked in chapters to ensure that all community members — totaling some 27 million — have a “family disaster response plan.” They tailored plans for those with language barriers and disabilities and for children and the elderly. At the same time, CPC volunteers focused on minimizing intolerance across the country by teaching international humanitarian law and the principles of the International Red Cross Movement (humanity, independence, neutrality, impartiality, voluntary service, unity, and universality).

Corps members also recruited and trained an estimated 400 new volunteers and instructors who made the educational programs available to additional vulnerable communities. Ultimately, corps members working through Red Cross chapters will create a network of hundreds of skilled volunteers across the country.

Additional grants have since been awarded to Red Cross chapters nationwide. In California, funds have been dedicated to the implementation of homeland security measures in Los Angeles, San Francisco, and Sacramento. The Oregon Trail Chapter that was awarded a grant funding 400 new volunteers will perform 1,500 hours of service to disaster preparedness. On the East Coast, the Red Cross developed “Disaster Resistant Neighborhood” programs across eight wards of Washington, DC. Through the program these communities created disaster response plans. The southeast Pennsylvania chapter received a grant to create an alliance of more than 100 nonprofits in the Philadelphia area to form the Southeast Pennsylvania Voluntary Organization Active in Disaster (VOAD) to help citizens prevent, prepare for, and respond to disasters.

In 2003, the ARC participated in the TOPOFF 2 national training exercise. The Red Cross used this exercise to practice the screening of emergency shelter residents and supplies for radiation exposure, the logistical support when national stockpiles of medications were mobilized, and keeping the public informed as the national threat level reached the highest “red” alert. In the same year the Red Cross was actively involved with the development of the new NRP. The ARC was the only nongovernmental organization that was invited to the discussions.

Throughout 2004, the Red Cross taught 11 million Americans critical life-saving skills such as first aid, water safety, caregiving, CPR, and the use of automated external defibrillators (AEDs). In addition, the number of people attending presentations or demonstrations for Together We Prepare, community disaster education awareness, and the Masters of Disasters program climbed 6% to 3.9 million. Those programs aim to create safer families and communities.

Another 2004 initiative from the Red Cross involved expanding to diverse audiences with important preparedness and other information. To achieve this goal, the Red Cross expanded and detailed its Spanish-language website and first-aid and preparedness print materials. In cooperation with the CDC, the Red Cross initiated a multiyear project to develop and disseminate terrorism preparedness materials to the public.

In 2005, the year of several major hurricanes, some criticism emerged regarding the way the ARC handled its duties during those disasters. In the days leading to the landfall of Hurricane Katrina at the shores of Florida, the ARC was initially praised for its proactive approach in prestaging volunteers and mass care resources, but as the disaster unfolded and showed its destructive face in larger geographies, issues concerning the ARC response to the disaster became more apparent. At the center of the problem were issues between FEMA and the ARC regarding rules of engagement as partners under the new NRP. A Government Accountability Office (GAO) study that looked at the relationship of the two agencies during and after Katrina sheds light on some of the specific issues.

One major issue was the different interpretation of emergency support function 6 (ESF #6) responsibilities and process flow by FEMA and the ARC. The ARC and FEMA are the designated primary agencies for ESF #6 in charge of mass care, housing, and human services. The ARC is directly responsible for mass care. The NRP tasks an ESF #6 coordinator, a FEMA official with the oversight and coordination

of all ESF #6 activities including mass care, which according to the ARC is not a perfect model since it designates the oversight of a core ARC competency to a non-ARC official. Therefore, during its response to Katrina, ARC in some instances bypassed the ESF #6 coordinator and tried to work with the FEMA Operations Section Chief. This resulted in tensions between the ARC and FEMA, and in many instances undermined a very much needed partnership between the two agencies.

Another issue that the ARC was criticized for was the frequently changing personnel at facilities that required ongoing working relationships with the staff of other agencies, primarily FEMA. Those short shifts also reduced the exposure of ARC representatives to the operational environment of the ESF #6. The primary explanation for this problem was the ARC's predisposition for involvement in disasters with much shorter life spans, and requiring shorter periods of continuous staffing — neither of which describe the needs of the Hurricane Katrina response where ESF #6 was active for more than 3 months. Also, since a significant portion of ARC personnel are volunteers, it is more difficult to engage those individuals in longer-term deployments than shorter ones.

In its response to GAO findings, the ARC underlined that it followed the guidance provided in the NRP as it worked with FEMA during Hurricane Katrina. Nevertheless, it is also mentioned that ARC and FEMA are in the process of developing policies and procedures to formalize their agreement on seemingly gray areas of responsibility and ESF #6 operations. Regarding the issues of frequent ARC personnel changes in ESF #6, ARC reports that it has improved the content of its ESF #6 training and hired 14 permanent employees to be trained in ESF #6 procedures and deployed at strategic locations in multiple states to coordinate with state emergency management agencies and officials (GAO, 2006; PBS, 2005; DHS, 2004).

Two other issues the ARC faced during its response to Hurricane Katrina were the fraudulent money transfers by some ARC subcontractors, and unacceptably long wait times on phone-based services. ARC provides cash payments to disaster victims to help them get through the first few days of a disaster until other means of relief become available. During Hurricane Katrina, ARC established call centers manned by subcontractors to register and provide cash payments to hurricane victims using the money wiring services of a private contractor. The procedure did not have adequate checks and protection against fraudulent money transfers; therefore a group of employees working for the subcontractor staffing the call center found loopholes to transfer money to themselves and their relatives who were not victims of the hurricane. None of those workers were actual ARC employees or volunteers. ARC has also been criticized by people trying to reach the call centers in that wait times were extremely long, and in many instances, hours. Some experts explain those management problems are the result of the unique financial structure of the ARC, which heavily relies on donations; donors generally want their money spent strictly on direct assistance of hurricane victims rather than fixing administrative or managerial problems. This may minimize budgets to fix problems related to functions such as operations, finance, and accounting (Washington Post, 2005).

DIGGING DEEPER: INFLUENZA PANDEMIC MITIGATION AND PREPAREDNESS.

An influenza pandemic is regarded as potentially the next large disaster that may threaten the entire globe and require the involvement of many nations and the international community for effective mitigation, prevention, preparedness, and response. Pandemic is the global outbreak of an infectious disease. The influenza pandemic is different from the seasonal flu in many ways. Among the differences are:

- Large or global geographic impact as opposed to local impacts of the seasonal flu
- Potential to quickly exhaust available resources of national health systems

- Potential to require medical supply and vaccine availability that is drastically different than what is required to deal with the seasonal flu to deal with a possible mandatory need to vaccinate masses of people within a very short time frame
- Long-lasting impact on the operations of the government, the general public, and the business sectors caused by drastic intervention measures, difficult to predict human response to those measures (such as risk perception and panic), suspended or delayed economic activity, and diminished confidence

Three influenza pandemics occurred during the 20th century:

- 1918: killed 675,000 in United States and around 50 million worldwide
- 1957: killed at least 70,000 in United States and 1 to 2 million worldwide
- 1968: killed about 34,000 in United States and 700,000 worldwide

The urgency for influenza pandemic mitigation and preparedness has increased in the past few years primarily due to two important medical incidents that at least partially shared the characteristics of an influenza pandemic or carried the potential to evolve into a serious global pandemic. These two incidents are SARS (severe acute respiratory syndrome) and avian influenza (bird flu). While some characteristics of the two diseases seem to be similar, essentially the root causes and the contagious behavior of those diseases are different. While both are potentially fatal respiratory infections that initiated in animals and then made the jump to humans with similar flu-like symptoms such as fever and difficulty breathing, there are two major differences. First, avian influenza is caused by a flu virus, whereas SARS has roots similar to the common cold. The second and more important difference is that SARS can be transmitted between humans, whereas in most cases of the avian flu, the transmission has occurred from a bird to a human.

SARS originated in southern China in late 2002. In February 2003, cases were reported in Hong Kong (China). In just a few days, cases were observed in Vietnam, Singapore, Canada, and Germany. Between November 2002 and July 2003, more than 8,000 cases of SARS were reported globally. Those cases caused 774 deaths in 26 countries — most of which were in the Western Pacific.

Avian influenza is bird disease caused by type “A” strains of the influenza virus. While most birds are vulnerable to the virus, many wild bird species carry the viruses with no apparent symptoms. Of all strains of avian influenza “A” viruses, only four are known to have caused human infections: H5N1, H7N3, H7N7, and H9N2. H5N1 causes the most dangerous and fatal infections for humans. From 2003 to 2008, 349 human cases of the avian flu from 14 countries were reported to the World Health Organization, of which 216 were fatal. Indonesia and Vietnam had the highest numbers of human avian influenza deaths, with 94 and 47 lives lost, respectively. While H5N1 is still primarily a virus that can transmit from an infected bird to a human, cases of human-to-human transmission have been confirmed in at least three incidents in Thailand, Indonesia, and Pakistan. In all of those instances, the transmission occurred through extended close contact (caretaker and infected person). Scientists are not too concerned about this type of transmission, since it is highly preventable, but the possibility of a mutation in the virus genetic code that makes the transmission among humans much easier and faster is of real concern to public health officials (see figure).

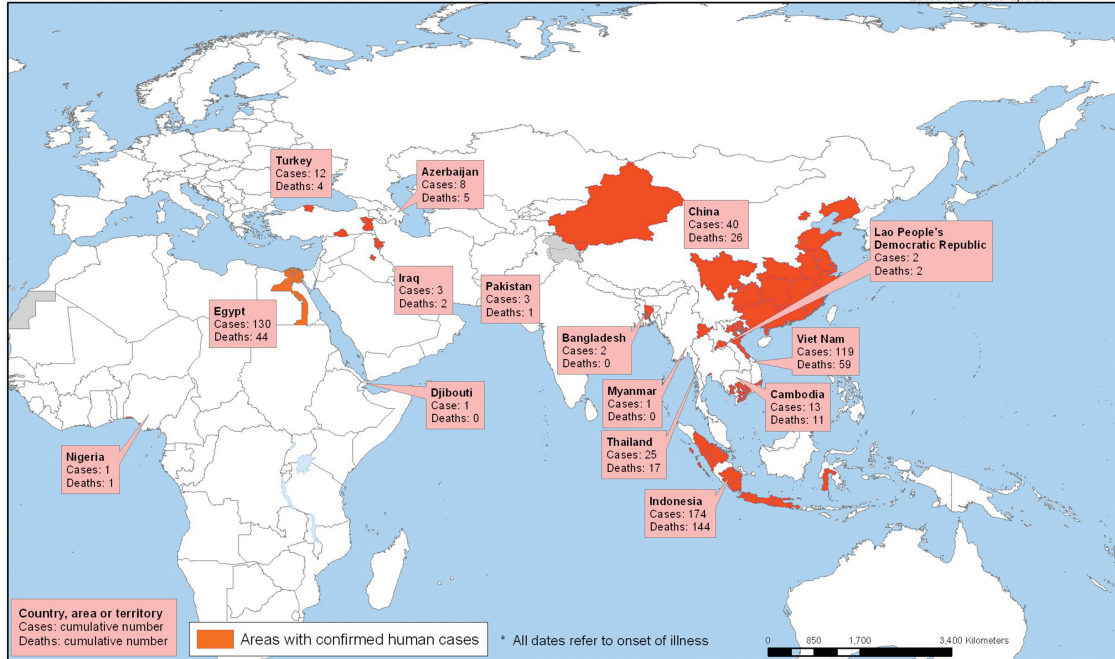
Because the entire world is at risk of influenza pandemic, every country is expected to enable resources for preparedness and response in case of a potential outbreak. The World Health Organization supports those efforts by making information, data, knowledge, expertise, research, and

(Continued)

DIGGING DEEPER: INFLUENZA PANDEMIC MITIGATION AND PREPAREDNESS. (CONTINUED)

Areas with confirmed human cases of H5N1 avian influenza since 2003 *

Status as of 16 March 2011
Latest available update



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement. © WHO 2011. All rights reserved.

Data Source: WHO
Map Production: Public Health Information and Geographic Information System (GIS)
World Health Organization

Areas with confirmed cases of H5N1 Avian Influenza since 2003 (as of March 2011). Source: World Health Organization, 2011.

guidelines available to the international community. In 2005, the World Health Organization released the “Checklist for Influenza Pandemic Preparedness Planning.” The goal of the checklist is to provide national planning authorities a list of required and desired tasks to be completed to achieve a minimum level of preparedness that would increase the chance of success in an actual influenza pandemic response. The checklist is intentionally kept generic to ensure applicability in many nations with varying levels of resources and technical expertise. The checklist includes the following seven items:

1. *Preparing for an emergency:* This step involves the completion of preplanning activities such as the creation of political and public awareness regarding an influenza pandemic, the establishment of an overall preparedness strategy, and the appropriation of a budget adequate to sustain preparedness activities and to pay for resources deemed essential in the preparedness strategy.
2. *Surveillance:* Surveillance is one of the most critical steps of pandemic preparedness, as early detection of an outbreak is key to minimize further spread of the disease and initiation of a timely response. Unique and complex predictive procedures may be necessary to detect an outbreak in a timely fashion, which should effectively monitor and analyze multiple parameters that may be early signals of an upcoming influenza pandemic. For example, constant monitoring

of daily cases that report to hospitals with flu-like symptoms may help in the creation of confidence intervals that designate normal conditions and abnormal conditions that may be associated with an uncommon demand for medical care related to a new flu outbreak.

3. *Case investigation and treatment:* This step ensures the creation of capability and resources to complete a first assessment of a virus when it shows signs of a known influenza strain. Adequate laboratory capability is mandatory. Established communication mechanisms with the World Trade Organization and other relevant organizations should occur to disseminate valuable new information in a timely fashion. Guidelines on clinical treatment of the new case should be established along with adequate training for first-response personnel.
4. *Preventing spread of the disease in the community:* Identification and initiation of postincident mitigation and prevention activities are crucial to stop dispersion of the disease to the general public, thus preventing an influenza pandemic outbreak. Some of the activities involved in this step are restrictions to mobility, setup of checkpoints, creation of rules for hospital admissions, creation of a communication system with the general public, and identification of priority rules in case vaccination becomes necessary with a limited supply of vaccine or other preventive medical supplies.
5. *Maintaining essential services:* Government organizations and other vital services should have internal organizational continuity plans to make sure that they can still provide the services the public expects from them even under the extreme operational conditions of an influenza pandemic outbreak. Government agencies in most nations have laws that require them to develop continuity plans, but those plans should be revised and improved based on the unique sets of challenges that may be posed as a direct consequence of the pandemic outbreak.
6. *Research and evaluation:* While countries dealing with an actual influenza pandemic outbreak are very likely to become stretched for resources, an actual outbreak is an important opportunity for research and data collection to improve existing strategies and to test control measures applied for their level of effectiveness. Therefore, nations should make research and evaluation part of their response strategy and establish relationships and partnerships with other nations to ensure that scientific exchange among research communities is not impaired by the circumstances of the ongoing incident.
7. *Implementation, testing, and revision of national plan:* Revision of the national plan for applicability and testing it to improve its use during an actual outbreak are necessary. Make sure to set clear goals and measures of effectiveness that make progress evaluation of the plan easier during actual plan activation.

In the United States, the Department of Health and Human Services (HHS) holds primary responsibility for the coordination of influenza pandemic preparedness, as determined by the Homeland Security Council document, “National Strategy for Pandemic Influenza.” The strategy identifies the following three pillars for effective management of a potential influenza pandemic:

- *Preparedness and communications:* Understand roles and responsibilities of different government agencies for the purposes of a potential influenza pandemic outbreak. Establish communications mechanisms and chain of command for effective incident management and decision making.
- *Surveillance and detection:* Ensure continuous “situational awareness” for timely identification outbreaks to limit the spread and to protect the public.

(Continued)

**DIGGING DEEPER: INFLUENZA PANDEMIC MITIGATION AND PREPAREDNESS.
(CONTINUED)**

- *Response and containment:* Develop the capacity to effectively respond to an outbreak and establish mechanisms to minimize the spread of an overall economic and societal impact of an outbreak in progress.

Sources: World Health Organization, “SARS,” 2003; World Health Organization, “WHO Checklist for Influenza Pandemic Preparedness Planning,” 2005; U.S. Department of Health and Human Services, “General Information on Pandemic and Avian Flu,” 2008; WikiBirdFlu, “Relationship between Bird Flu and SARS,” 2007; World Health Organization, “Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO,” 2008; Reuters, “WHO Confirms Human-to-Human Bird-Flu Case,” December 27, 2007; White House, “National Strategy for Pandemic Influenza,” 2005.

The Role of the Private Sector in Mitigation and Preparedness Activities

The events of September 11 brought to light the importance of private-sector involvement in crisis, emergency, and disaster management. Since that time, an ever-expanding list of private entities has begun focusing on their needs in this area. This section discusses the essentials of private-sector business continuity planning and disaster management. Most of the components discussed next have been learned as a result of experience with natural disasters or man-made accidents; however, the September 11 attacks have proved that those important components of classical crisis management are also important for terrorism risk management:

Business impact analysis (BIA): The management-level analysis by which an organization assesses the quantitative (financial) and qualitative (nonfinancial) impacts, effects, and loss that might result if the organization were to suffer a business-interrupting event. Performing BIA as a preparedness measure is important because findings from BIA are used to make decisions concerning business continuity management strategy.

Crisis communications planning: Decision making about how crisis communications will be performed during an emergency is important because communication is a critical success factor for effective crisis management. Preventing rumors about your corporation as well as telling your story before someone else does it for you is only possible via a predefined communication policy.

Information technology (IT) and systems infrastructure redundancy planning: There are different techniques and approaches regarding the enforcement of systems redundancy. Each company is unique, with its own IT and system needs and processes; therefore, customized approaches have to be employed to build more reliable systems infrastructure (e.g., backup databases, software, hardware, and network redundancy).

Geographic location and backup sites: The selection of the geographic location of headquarters and offices and the distribution of key executives in those buildings are strategically important decisions with regard to minimizing potential losses (both human and physical) during a disaster. The availability of backup sites that allow employees to continue operations in case of physical loss of or damage to a primary facility is a key success factor, but, unfortunately, is usually difficult to justify in terms of cost and benefit.

Transportation planning: The transportation infrastructure is one of the most sensitive infrastructures to emergency and disaster situations. Overloaded transportation infrastructure during crisis is usually a reason for microdisasters in the midst of bigger ones. Therefore, realistic transportation planning is important for a successful response.

Crisis leadership: Research and experience have shown that during crisis situations, people (e.g., employees, staff, and customers) need someone to tell them what is going on and explain what is being done about it, even if the information this person communicates is obsolete or redundant. Strong leadership also helps people to regain self-esteem and motivates them to commit to the efforts to overcome the crisis.

Insurance: It is important for companies to have a feasible but protective insurance policy. Realistic risk assessments and modeling are necessary to establish this economic feasibility.

There surely are other components of private-sector risk mitigation and preparedness that are not mentioned in this text; however, these are the most important across the broad range of business types and sizes (Kayyem and Chang, 2002; Smith, 2002). See the sidebar titled “Private-Sector Homeland Security Checklist” for assistance provided by the DHS.

Private-Sector Homeland Security Checklist

The Department of Homeland Security released the following antiterror checklist for the private sector in its May 2003 Homeland Security Information Bulletin:

- Maintain situational awareness of world events and ongoing threats.
- Ensure all levels of personnel are notified via briefings, e-mail, voice mail, and signage of any changes in threat conditions and protective measures.
- Encourage personnel to be alert and immediately report any situation that may constitute a threat or suspicious activity.
- Encourage personnel to avoid routines, vary times and routes, preplan, and keep a low profile, especially during periods of high threat.
- Encourage personnel to take notice and report suspicious packages, devices, unattended briefcases, or other unusual materials immediately; inform them not to handle or attempt to move any such object.
- Encourage personnel to keep their family members and supervisors apprised of their whereabouts.
- Encourage personnel to know emergency exits and stairwells.
- Increase the number of visible security personnel wherever possible.
- Rearrange exterior vehicle barriers, traffic cones, and roadblocks to alter traffic patterns near facilities and cover by alert security forces.
- Institute/increase vehicle, foot, and roving security patrols varying in size, timing, and routes.
- Implement random security guard shift changes.
- Arrange for law enforcement vehicles to be parked randomly near entrances and exits.
- Review current contingency plans and, if not already in place, develop and implement procedures for receiving and acting on threat information; alert notification procedures; terrorist incident response procedures; evacuation procedures; bomb threat procedures; hostage and barricade procedures; chemical, biological, radiological, and nuclear (CBRN) procedures; consequence and crisis management procedures; accountability procedures; and media procedures.

- When the aforementioned plans and procedures have been implemented, conduct internal training exercises and invite local emergency responders (fire, rescue, medical, and bomb squads) to participate in joint exercises.
- Coordinate and establish partnerships with local authorities to develop intelligence and information-sharing relationships.
- Place personnel on standby for contingency planning.
- Limit the number of access points, and strictly enforce access control procedures.
- Approach all illegally parked vehicles in and around facilities, question drivers, and direct them to move immediately; if the owner cannot be identified, have vehicle towed by law enforcement.
- Consider installing telephone caller ID; record phone calls, if necessary.
- Increase perimeter lighting.
- Deploy visible security cameras and motion sensors.
- Remove vegetation in and around perimeters; maintain regularly.
- Institute a robust vehicle inspection program to include checking the undercarriage of vehicles, under the hood, and in the trunk. Provide vehicle inspection training to security personnel.
- Deploy explosive detection devices and explosive detection canine teams.
- Conduct vulnerability studies focusing on physical security, structural engineering, infrastructure engineering, and power, water, and air infiltration, if feasible.
- Initiate a system to enhance mail and package screening procedures (both announced and unannounced).
- Install special locking devices on manhole covers in and around facilities.
- Implement a countersurveillance detection program.

Source: Continuity Central, May 21, 2003.

Corporate Preparedness and Risk Management in the Sarbanes–Oxley Era

The Sarbanes–Oxley Act of 2002, written by Senator Paul Sarbanes (D-MD) and Representative Paul Oxley (R-OH), was created to protect investors by improving the accuracy and reliability of corporate disclosures. The act is in direct response to financial fraud discovered in the cases of both Enron and WorldCom. However, it was created to cover issues beyond fraud (establishing a public company accounting oversight board, auditor independence, corporate responsibility, and enhanced financial disclosure), and is now a driving force behind corporate business continuity planning. Although the phrase *business continuity planning* is not once mentioned in the language of the act, continuity professionals claim that Section 404 of the act implies that such measures must be taken for compliance. Section 404 of the act reads as follows:

SEC. 404. MANAGEMENT ASSESSMENT OF INTERNAL CONTROLS.

- (a) **RULES REQUIRED** — The Commission shall prescribe rules requiring each annual report required by Section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m or 78o(d)) to contain an internal control report, which shall

- (1) state the responsibility of management for establishing and maintaining an adequate internal control structure and procedures for financial reporting; and
 - (2) contain an assessment, as of the end of the most recent fiscal year of the issuer, of the effectiveness of the internal control structure and procedures of the issuer for financial reporting.
- (b) **INTERNAL CONTROL EVALUATION AND REPORTING** — With respect to the internal control assessment required by subsection (a), each registered public accounting firm that prepares or issues the audit report for the issuer shall attest to, and report on, the assessment made by the management of the issuer. An attestation made under this subsection shall be made in accordance with standards for attestation engagements issued or adopted by the Board. Any such attestation shall not be the subject of a separate engagement (Sarbanes–Oxley Act of 2002, <http://thomas.loc.gov/cgi-bin/query/F?c107:6:/temp/~c107×5GHak:e143423>).

Section 404 of the Sarbanes–Oxley Act requires companies to include an internal control report that states the responsibility of management for establishing and maintaining an adequate internal controls structure and procedures for financial reporting in their annual report. In addition, it requires management to ensure that the effectiveness of the internal control structure is assessed on an annual basis. The section also requires the external auditing entity to report on management’s assessment of the effectiveness of the company’s internal controls and procedures with respect to standards defined by the Public Company Accounting Oversight Board. Compliance with the act became effective in April 2005 for most companies.

Even though the section still focuses on financial record management and process control, in order to really ensure those things, it is almost a prerequisite for the company to ensure adequate protection and continuity of its entire core processes. This is where the “business continuity” aspect of the act becomes evident.

To protect the financial processes and records from misconduct or fraud, and to ensure data integrity and resilience, the first step is to identify the risks, threats, and vulnerabilities that may endanger those expectations defined by the act. This is possible through a comprehensive risk and vulnerability assessment followed by a BIA to identify the business consequences of possible adverse incidents. The BIA is usually considered as one of the main building blocks of business continuity planning, because its findings usually help the corporations identify and prioritize the risks it has to mitigate, and provide an understanding of recovery goals.

At present, it is too early to comment on whether there is full consensus between what the Sarbanes–Oxley Act demands from corporations and how the corporations interpret those expectations and what they are going to do about it. But it is true that business continuity concepts will adequately address some of the expectations of the act. Business continuity service providers seem to capitalize on this connection and enlarge the market for their services and products. The fact that the Sarbanes–Oxley Act places responsibility for compliance on top management makes it inevitable that these corporations will increase investments aimed at compliance. Business continuity is one of the answers.

Based on recent reports (2007), corporate spending on the Sarbanes–Oxley Act increased until 2005 and stabilized at about \$6 billion a year. This includes all the money that corporations spend to comply with the requirements of the 2002 Act (Reuters, 2007b).

A recent business continuity planning-focused journal article has indicated that compliance may require more than basic business continuity planning. The article explained that the act will make senior management involvement in the planning process inevitable, and thus will require them to think about and find solutions beyond their organizations, while paying more attention to service-level agreements, continuity of vendors, and suppliers (Benvenuto, 2004; Berman, 2004; Williams, 2005).

DIGGING DEEPER: U.S. GOVERNMENT GUIDANCE ON PANDEMIC PREPAREDNESS PLANNING FOR BUSINESSES WITH OVERSEAS OPERATIONS.

Due to the global nature of a potential pandemic influenza outbreak, a panel of representative U.S. agencies (i.e., Department of State, Department of Health and Human Services, Department of Commerce, and Centers for Disease Control and Prevention) have established pandemic planning guidelines for U.S. businesses with overseas operations. A summary of the guidelines follows. The full document can be found at <http://www.pandemicflu.gov/plan/workplaceplanning/businessesoverseas.pdf>.

- Plan for Maintaining Business Continuity during and after a Pandemic
- Plan for the Impact of a Pandemic on the Lives and Welfare of Your Employees
- Establish Policies and Guidelines to Be Implemented during a Pandemic to Avoid Creating Policies “On Demand” in the Midst of a Pandemic
- Determine Resources Required to Fulfill Actions in Your Pandemic Plan
- Create an Emergency Communications System
- Work to Coordinate with External Organizations and Your Community
- Prepare for Postpandemic Scenarios

Source: U.S. Department of Health and Human Services, “Pandemic Preparedness Planning for US Businesses with Overseas Operations,” 2007. See the companion website for the full text of this document.

Best Practices

The nature of crisis, emergency, and risk management is very complicated: No matter how much one may discuss the process in the theoretical sense, the complexity of the actual environment in which they must try to implement practical applications cannot be fully appreciated. The three case studies that follow document private-sector experience with disaster, individual mitigation and preparedness, and a governmental approach to mitigation and preparedness.

CASE STUDY 1: CANTOR FITZGERALD

For Joseph Noviello, September 11 began at 6:30 AM with a phone call confirming that an annual fishing trip with colleagues at the Cantor Fitzgerald bond trading firm was still on, despite some foul weather offshore. Minutes later, the most intense two days of his life would begin as the first plane hijacked by terrorists crashed into Cantor’s building.

Watching on TV from his Manhattan apartment, Noviello had no way of knowing what lay in store. Clearly, this was a disaster of a proportion that neither he nor likely anyone in his position had dealt with before. Fortunately, he had a plan to follow.

That plan may have saved the company. No firm suffered a worse fate, in terms of lives lost on September 11, than Cantor Fitzgerald and its electronic marketplace unit, eSpeed. More than 700 employees of the two companies died in the destruction of the World Trade Center’s north tower, where Cantor and eSpeed shared their headquarters and a vital computer center. Yet eSpeed was up and running when the bond market reopened at 8 AM on September 13, little more than 47 hours after the disaster.

“The difference for us was the planning we had in place,” says Noviello, 36, who was promoted to eSpeed’s chief information officer after the disaster. eSpeed’s systems were built on a dual architecture that replicated all machines, connections, and functionality at the World Trade Center and at a Rochelle Park site, with a third facility in London.

eSpeed, which operates as a freestanding business and also serves as the trading engine for its parent company, lost 180 employees, including about half of its U.S.-based technology staff. But eSpeed had several important assets left. Most of the top technology executives had been out of the office, including Matt Claus, eSpeed’s current CTO, and Noviello’s right-hand man, who had been scheduled to go on the fishing trip.

The response atmosphere was tense, with people unsure as to what had happened to their friends or colleagues. “For days, every time a new face came in the door it was an emotional release,” says Noviello. “There was a disaster-recovery contact list, but people were seeking to find each other not for work but to find out who was okay.”

Beyond the technical questions were operational details such as advising staff on public transportation options to the suburban site, reestablishing shifts, and making sure there were counselors on duty. Conference calls every two hours kept track of milestones and objectives. “We were talking at 2 AM, at 4 AM,” says Noviello. “Who is sleeping during something like this? Work is great therapy.”

None of this effort would have succeeded without the duplicate architecture in Rochelle Park. Yet Cantor started moving into the facility only in February. From day one, Rochelle Park was seen as a concurrent system, not a disaster-recovery site.

All that redundancy would be stretched to the limit as eSpeed worked to overcome the technical hurdles before the opening of the bond market Thursday morning. Two of those hurdles were huge: the loss of eSpeed’s private network connections and the destruction of the company’s ability to handle fulfillment of trades.

The first problem was solved by allowing customers who had overseas offices connected to Cantor’s London data center to reroute across their own networks to London. eSpeed worked with customers to reconfigure their servers to point to London and moved or expanded the permissions on customer accounts to connect to that site. For customers without overseas private networks, eSpeed worked to get them access over the Internet until the customers could get their high-speed connections hooked into the Rochelle Park facility.

To solve the second issue, help arrived in the form of one of eSpeed’s competitors. ICI/ADP, another electronic trading company, offered to take care of eSpeed’s clearing and settling of transactions through its own connection to banks. By Wednesday night, the eSpeed team had mapped its financial back-office system to ADP’s system and had successfully sent test transactions to J.P. Morgan Chase & Co. and other banks. The cooperation of other companies, including vendors and fellow financial firms, turned out to be essential to Cantor/eSpeed’s quick recovery.

The firm was weakened by the loss of so many people and the related shutdown of its voice-broker business. But it survived as a viable business. Thanks to planning, the company can keep operating, even if something should happen to Rochelle Park. Its data center in London will serve as the mirror site going forward.

And going forward, the company’s systems should be even more resilient. “We are learning a lot of lessons as we are restoring the system,” says Noviello, including how to automate more aspects of bringing systems back up. “And we are not restoring our bad habits” (Summarized from the original work of Cone and Gallagher, 2001).

CASE STUDY 2: HOME ALONE ... EMERGENCY PLAN SAVES SISTERS

When the strongest tornado to hit Mississippi in more than 50 years tore through the small town of Smithville on April 27, 2011, 16-year old Audrey Herren and her younger sister Cassidy, 11, knew what to do, and it probably saved their lives. They went into emergency mode — covered themselves with blankets and huddled on the floor of an inside hallway — and emerged virtually unscathed from a home that had disintegrated around them.

April 27 started off on an ominous note as the town's siren was sounded several times during the morning to warn residents of the approaching severe weather system. As the potential threat to Smithville became more certain, the 600 students in the town's K-12 school complex were released early, at approximately 2 PM. Parents Jim and Carol Herren were at work at the time, but they had learned via broadcast warnings and access to radar images of the storm that Smithville was in the path of a possible tornado. They called their daughters and told them to exercise their emergency plan, which they had put to use during earlier severe thunderstorms as recently as the previous week.

The tornado reached Smithville at 3:44 PM., roaring through the middle of town with peak winds estimated at 205 miles per hour. Most buildings were flattened, including more than 150 homes, 14 businesses, and 2 churches. Seventeen people lost their lives, either during the tornado or later as a result of injuries.

When the Herrens reached Smithville about an hour after the tornado struck, their daughters were not at their home (or what was left of it) as they had been told to move away from the area because of possible gas leaks. They connected with the girls later. The Herren family was able to save a bit of clothing from their home, but none of their furnishings could be salvaged. Most importantly their daughters had survived the storm.

"Everybody in town has a tornado story," said Carol Herren, "but unfortunately, many didn't turn out as positive as ours." And although her family didn't have a safe room at the time of the tornado, she is glad they had an emergency plan and that the plan likely saved her daughters.

The Herren family had occupied their home along Mississippi Highway 25, the main road through Smithville, for about 13 years. They are now living in a rented home that is just outside the tornado's path of destruction. They plan to begin construction of safe room in a new home within the next few weeks that will specifically comply with the design criteria in FEMA 361, Design and Construction Guidance for Community Safe Rooms. They know several other neighbors who plan to do the same, and Jim Herren says he hopes that many others will decide to stay and rebuild in Smithville.

For additional information, contact the FEMA Safe Room Help Line at 866-222-3580 or at saferoom@dhs.gov. The help line provides information on where to go for assistance regarding hazard mitigation grants and other grant funding, project eligibility, and guidelines for safe room construction. FEMA's safe room website (<http://www.fema.gov/plan/prevent/saferoom>) is another source of information.

Source: FEMA, 2011, "FEMA Mitigation Best Practices Portfolio," <http://www.fema.gov/mitigationbp/brief.do?mitssId=8410>

CASE STUDY 3: SAFE ROOM WITHSTANDS EF-4 TORNADO**Tuscaloosa County, Alabama**

William Blakeney grew up in Tuscaloosa County and is well aware of the effects of disasters in the area. In an effort to prepare for disasters like the tornadoes in mid- and late April 2011, he built a safe room in his grandparents' home. Although they weren't home when the storms devastated the area, the only portion of their home left standing was the multipurpose safe room (see [Figure 10–6](#)).

Blakeney and his construction company had built a few safe rooms in the past, mainly in their family members' homes. While not built according to the design criteria of Federal Emergency Management Agency's publication FEMA 320, *Taking Shelter from the Storm: Building a Safe Room For Your Home or Small Business*, this safe room was able to withstand the strong winds of the EF-4 tornado that ravaged the area.

FEMA 320 includes construction plans and cost estimates for building individual safe rooms. A safe room, built according to the standards outlined in FEMA 320, in a home or small business provides “near-absolute protection” for its occupants.

“We were not familiar with FEMA specifications, but we had built a few safe rooms,” said Blakeney. “I was actually at the office and used the safe room we had built there when the tornado came through.”



FIGURE 10–6 Tuscaloosa, AL, June 12, 2011 — A FEMA mitigation specialist conducts an interview with local media prior to the Safer Alabama Summit at the Bryant Auditorium on the University of Alabama Campus. The summit provided information on how communities can best prepare for another catastrophic series of storms, and safe rooms will be on display to illustrate the building techniques required to withstand an F5 tornado. (Source: Photo by FEMA/Tim Burkitt)

(Continued)

CASE STUDY 3: SAFE ROOM WITHSTANDS EF-4 TORNADO (CONTINUED)

April's storms claimed over 40 lives in Tuscaloosa and left more than 2,000 residents homeless. The area experiences tornadoes early spring and late fall each year, but never as severe as those on April 2011.

"Tornadoes usually hit the southern or northern parts of the town," said Blakeney about the recent events. His family had lived in Tuscaloosa County for more than 71 years. "In my time, we've never seen one come through the area like that!" The home was recently renovated so his grandparents could move from the outskirts of the city and live closer to other relatives. In the additional wing, the master bedroom closet was the perfect location to reinforce as the safe room.

"They had a basement in their old home and that made them feel secure," said Blakeney. "Here, they had nothing." The major home renovation was completed just 2 weeks before the storm hit the city and destroyed the home. His grandparents had not completely moved into the house and Blakeney was still adding finishing touches to the home. Fortunately, no one was home when the tornado struck because the entire neighborhood was destroyed.

Safe rooms provide homeowners, like Blakeney's grandparents, relief during times where they have to quickly seek shelter. Should homeowners decide to build a safe room in their new or existing home, FEMA 320 provides examples of proper installation techniques and designs. Safe rooms built to FEMA 320 standards have saved the lives of people affected by events like the one that destroyed many areas of Alabama.

"We just think it is a great investment for the sense of security," Blakeney added. "We will be building more in the future using FEMA 320." Building safe rooms according to FEMA specifications helps ensure that they will be able to withstand high winds and provide the ultimate protection. Not building according to FEMA specifications is risky and increases the likelihood of the safe room not providing the needed protection.

For additional information, contact the FEMA Safe Room Help Line at 866-222-3580 or at saferoom@dhs.gov. The help line provides information on where to go for assistance regarding hazard mitigation grants and other grant funding, project eligibility, and guidelines for safe room construction. FEMA's safe room website (<http://www.fema.gov/plan/prevent/saferoom>) is another source of information.

Source: FEMA, 2011, "FEMA Mitigation Best Practices Portfolio," <http://www.fema.gov/mitigationbp/bestPracticeDetail.do?mitssId=8390>

Exercises to Foster Preparedness

The Homeland Security Council (HSC), in partnership with DHS, and state and local homeland security agencies, has developed 15 all-hazards planning scenarios for use in national, federal, state, and local homeland security preparedness activities. These scenarios are designed to be the foundational structure for the development of national preparedness standards from which homeland security capabilities can be measured (Figure 10–7). For the earthquake scenario, see the sidebar titled "HSC Scenario 9."



FIGURE 10-7 Anniston, AL, January 21, 2011 — Health-care workers rush to decontaminate a simulated victim during an exercise at the Center for Domestic Preparedness, located in Anniston, Alabama. These students were attending the Hospital Emergency Response Training (HERT) for mass-casualty incidents course that places emergency response providers in a realistic mass-casualty training scenario. For more information on the CDP's more than 50 specialized programs and courses, please visit their website at: <http://cdp.dhs.gov>.

HSC Scenario 9: Major Earthquake

Executive Summary

- Casualties: 1,400 fatalities; 100,000 hospitalizations
- Infrastructure Damage: 150,000 buildings destroyed, 1 million buildings damaged
- Evacuations/Displaced Persons: 300,000 households
- Contamination: From hazardous materials, in some areas
- Economic Impact: Hundreds of billions
- Potential for Multiple Events: Yes, aftershocks
- Recovery Timeline: Months to years

Scenario Overview

General description: Earthquakes occur when the plates that form under the Earth's surface suddenly shift, and most earthquakes occur at the boundaries where the plates meet. A fault is a fracture in the Earth's crust along which two blocks of the crust have slipped with respect to each other. The magnitude of an earthquake, usually expressed by the Richter Scale, is a measure of the amplitude of the seismic waves. The intensity, as expressed by the Modified Mercalli Scale, is a subjective measure that describes how strong a shock was felt at a particular location.

The Richter Scale is logarithmic so that a recording of 7, for example, indicates a disturbance with ground motion 10 times as great as a recording of 6. A quake of magnitude 2 is the smallest

quake normally felt by people. Earthquakes with a Richter value of 6 or more are commonly considered major; great earthquakes have magnitude of 8 or more. The Modified Mercalli (MM) Scale expresses the intensity of an earthquake's effects in a given locality in values ranging from I to XII. The most commonly used adaptation covers the range of intensity from the condition of "I — Not felt except by a very few under especially favorable conditions," to "XII — Damage total. Lines of sight and level are distorted. Objects thrown upward into the air."

In this scenario, a 7.2-magnitude earthquake occurs along a fault zone in a major metropolitan area (MMA) of a city. MM Scale VIII or greater intensity ground shaking extends throughout large sections of the metropolitan area, greatly impacting a six-county region with a population of approximately 10 million people. Subsurface faulting occurs along 45 miles of the fault zone, extending along a large portion of highly populated local jurisdictions, creating a large swath of destruction. Soil liquefaction occurs in some areas, creating quicksand-like conditions.

Timeline/event dynamics: While scientists have been predicting a moderate to catastrophic earthquake in the region sometime in the future, there were no specific indications that an earthquake was imminent in the days and weeks prior to this event.

Damage includes a large multistate area of several hundred square miles. Rapid horizontal movements associated with the earthquake shift homes off their foundations and cause some tall buildings to collapse or "pancake" as floors collapse down onto one another. Shaking is exaggerated in areas where the underlying sediment is weak or saturated with water. (Note: In the central and eastern United States, earthquake waves travel more efficiently than in the western United States. An earthquake of a given size in the central and eastern United States may cause damage over a much broader area than the same size earthquake in California.)

Several hours later, an aftershock of magnitude 8.0 occurs. Based on past events, additional aftershocks are possible. Sizable aftershocks (7.0 to 8.0 in magnitude) may occur for months after the original jolt.

Secondary hazards/events: As a result of the earthquake, hazardous contamination impacts of concern include natural gas compression stations and processing plants, oil refineries and major tank farms, and natural gas/crude oil pipelines. In addition, more than 2,000 spot fires occur and widespread debris results. Flooding may occur due to levee failures and breaks in water mains and sewage systems.

Transportation lines and nodes, power generation and distribution, communications lines, fuel storage and distribution, and various structures (ranging from dams to hospitals) may be damaged and will require damage assessment in order to continue operating. Reduced availability of services will be disruptive and costly.

Ground shaking from the earthquake has generated massive amounts of debris (more than 120 million tons) from collapsed structures. In addition, fuel pumps in several gas stations have sustained damage, leaking thousands of gallons of gasoline into the streets. There are numerous reports of toxic chemical fires, plumes with noxious fumes, and spills. Several other local waste treatment facilities have reported wastewater and sewage discharges. A large refining spill has contaminated the port facility and is spilling into the harbor. Significant concern for spilled hazardous materials from storage, overturned railcars, and chemical stockpiles make progress very slowly as triage is conducted.

Key implications: Approximately 1,400 fatalities occur as a direct result of the earthquake. More than 100,000 people are injured and continue to overwhelm area hospitals and medical facilities, most of which have sustained considerable damage. Approximately 18,000 of the injured require hospitalization. As many as 20,000 people are missing and may be trapped under collapsed buildings and underground commuter tunnels.

More than 1 million buildings were at least moderately damaged (40% of the buildings) and more than 150,000 buildings have been completely destroyed.

Service disruptions are numerous to households, businesses, and military facilities. Medical services are overwhelmed and functioning hospitals are limited. Fire and emergency medical services (EMS) stations and trucks were also damaged. Bridges and major highways are down or blocked and damaged runways have caused flight cancellations. There are widespread power outages and ruptures to underground fuel, oil, and natural gas lines. Water mains are broken. Wastewater primary receptors have broken, closing down systems and leaking raw sewage into the streets. As a result, public health is threatened.

More than 300,000 households have been displaced, and many businesses have lost employees and customers. The port has been adversely affected in its capacity to provide export/import and loading/unloading capabilities, and damage to vital parts of the communications infrastructure has resulted in limited communications capabilities.

The disruption to the nation's economy could be severe because the earthquake impacts major supply and transportation centers. Reconstruction, repairs, disposal, and replacement of lost infrastructure will cost billions of dollars. Replacement of lost private property and goods could also cost billions. An overall national economic downturn is probable in the wake of this event.

Mission Areas Activated

Prevention/deterrence/protection: After the earthquake occurs, actions should be taken to protect critical facilities from terrorist attacks and to maintain civil order.

Emergency assessment/diagnosis: Disaster assessments and aerial reconnaissance are necessary. Using real-time seismic data, FEMA runs an earthquake model to provide a preliminary “best guess” at the level of expected damage, subject to confirmation or modification through remote sensing and field assessments. Assessment teams must be deployed and remote sensing initiated.

Emergency management/response: Hazardous material spills must be managed. Emergency medical treatment, shelters, and food must be provided. A joint information center (JIC) is established, and search and rescue teams must be placed on alert, some of which should be activated and deployed. Public utilities and other basic-needs services must be repaired as quickly as possible, and damage assessments should be conducted.

Incident/hazard mitigation: Federal support will be required to coordinate the development of plans to execute mitigation efforts to lessen the effects of future disasters. Mitigation to minimize or avoid future impacts would largely be an issue for recovery and restoration.

Public protection: Structural engineers are inspecting critical building, bridge, freeway, waste facilities, etc., and inspection teams are deployed to inspect hundreds of homes for safe habitability.

Victim care: The massive number of injured and displaced persons requires a warning order for the activation of task forces for the delivery of mass care and health and medical services. Temporary housing strategies must be considered.

Investigation/apprehension: Not applicable.

Recovery/remediation: Hazardous materials will contaminate many areas, and decontamination and site restoration will be a major challenge.

Source: DHS and the Homeland Security Council.



Conclusion

Mitigation, prevention, and preparedness programs are vital to the safety and security of the nation. Since the onset of civilization, people have worked to limit their vulnerability to hazards once they recognized that those hazards existed. Since the attacks of September 11, the focus of mitigation has shifted primarily to mitigation, prevention, and preparedness for terrorist attacks, but the real threat has proven to be the traditional natural and man-made hazards that existed both before and after the attacks began. It is the responsibility of government, which rests most clearly on the Department of Homeland Security, to protect the nation from the consequences of disastrous events. For that reason, it is vital that the all-hazards approach to mitigation, prevention, and preparedness be maintained.

Key Terms

All-Hazards Planning: The disaster planning and preparedness philosophy that advocates for holistic preparedness and flexible disaster planning to ensure the response can be improvised to deal with the many unknowns of any disaster situation. In one sense, it is the opposite of “Scenario Planning.”

Avian Influenza: An infection typically seen in birds, although in rare cases human transmission has been observed. Among four strains of the virus known to be infectious for humans, H5N1 is the most dangerous one. Avian influenza is also called “bird flu” in daily use.

Bird Flu: Please refer to Avian Influenza.

Business Continuity Planning (BCP): The process of identification and remediation of commercial and organizational impacts of disasters through planning and strategy. Business continuity planning typically involves strategizing for the continuity and protection of the human resource, critical business processes, information systems, infrastructure, and organizational reputation.

Business Impact Analysis (BIA): The management-level analysis by which an organization assesses the quantitative (financial) and qualitative (nonfinancial) impacts, effects, and loss that might result if the organization were to suffer a business-interrupting event. Performing BIA as a preparedness measure is important because findings from BIA are used to make decisions concerning business continuity management strategy.

Community Emergency Response Team (CERT): A community initiative of Citizen Corps to create disaster-resistant communities by training and disaster awareness. CERTs are composed of volunteers trained in basic disaster and medical response. As of 2008, there are more than 2,800 CERT programs all over the United States.

Crisis Management: A proactive management effort to avoid crisis, and the creation of strategy that minimizes adverse impacts of crisis to the organization when it could not be prevented. Effective crisis management requires a solid understanding of the organization, its strategy, liabilities, stakeholders, and legal framework combined with advanced communication, leadership, and decision-making skills to lead the organization through the crisis with minimizing potential loss.

Crisis: A critical turning point with impact to the future state of a given system. Although mostly signaling a deteriorating status of the system, if managed correctly, a crisis can be potentially beneficial. Example: Increased customer confidence to a company that has managed to survive a major crisis in the industry provides competitive advantage.

Disaster Recovery Planning (DRP): The planning effort that primarily deals with the continuity and timely recovery of physical and logical components of information systems infrastructure

and applications. The first goal in DRP is to ensure a redundant infrastructure that provides for continuity of information technology (IT) systems that support critical business processes. The second goal is to develop a prioritized recovery strategy for systems and applications based on their criticalities for the organization in case of an inevitable system failure or a catastrophic incident.

Epidemic: An infection that affects the public in a larger proportion than day-to-day diseases and infections to the degree that resources of national medical care systems are exhausted or significantly constrained. Epidemics also typically have impacts on the social and economic infrastructures.

Emergency Support Function (ESF): A specific area of expertise deemed critical for a successful disaster operation as identified by the federal disaster response framework. The Federal Response Plan (12 ESFs), the National Response Plan (15 ESFs), and the new National Response Framework (15 ESFs) each identify the various ESFs as appendices. The ESFs in the National Response Framework follow: ESF #1 — Transportation, ESF #2 — Communications, ESF #3 — Public Works and Engineering, ESF #4 — Firefighting, ESF #5 — Emergency Management, ESF #6 — Mass Care, Housing, and Human Services, ESF #7 — Resource Support, ESF #8 — Public Health and Medical Services, ESF #9 — Search and Rescue, ESF #10 — Oil and Hazardous Materials Response, ESF #11 — Agriculture and Natural Resources, ESF #12 — Energy, ESF #13 — Public Safety and Security, ESF #14 — Long-Term Community Recovery, and ESF #15 — External Affairs.

Federal Response Plan (FRP): A signed agreement among 27 federal departments and agencies, including the American Red Cross, that provided a mechanism for coordinating the delivery of federal assistance and resources to augment efforts of state and local governments overwhelmed by a major disaster or emergency; replaced by the National Response Plan.

Hazard: A potential source of danger or unsafe environment.

Influenza: A contagious infection of the respiratory tract. Common symptoms include fever, muscular pain, general tiredness, and chills. Symptoms are typically felt stronger than those caused by the common cold.

Man-Made Disaster: Sometimes also called *technological disaster*. Man-made disasters have two common elements: (1) They are not primarily induced by a naturally occurring process. (2) In most instances, the cause of the disaster is human error or failure of systems designed by humans. Examples of man-made disasters include oil spills, radiological incidents, chemical releases, and transportation disasters.

Mitigation: A sustained effort taken to reduce or eliminate risk to people and property from hazards and their effects.

Natural Disaster: A disaster that is primarily induced by the destructive power of nature. Examples of natural disasters include hurricane, earthquake, tsunami, and snowstorm.

National Planning Scenarios (NPS): Fifteen disaster scenarios, each corresponding to one particular natural, technological, or terrorist hazard threats, which together or individually allow for a standard against which plans, capabilities, and policies may be exercised and otherwise tested or measured.

National Response Framework (NRF): Presents the guiding principles that enable all response partners to prepare for and provide a unified national response to disasters and emergencies—from the smallest incident to the largest emergency catastrophe; defines key principles, roles, and structures that organizes the way the nation responds; replaced the National Response Plan.

National Response Plan (NRP): A national-level plan which replaced the Federal Response Plan and which was created in keeping with the national Incident Management System model to align

federal coordination structures, capabilities, and resources into a unified, all-discipline, and all-hazards approach to domestic incident management.

Pandemic: An epidemic that impacts a large region or has global impacts.

Postdisaster Mitigation: Mitigation activities typically performed in the aftermath of a disaster either to provide a safer environment for the ongoing response or recovery effort or to mitigate potential impacts of the next disaster based on immediate lessons learned from a current one.

Predisaster Mitigation: Mitigation activities engaged prior to the occurrence of the disaster to minimize its impact when it occurs.

Preparedness: A state of readiness to respond to a disaster, crisis, or any other type of emergency situation.

Prevention: Actions taken to avoid an incident or to intervene in an effort to stop an incident from occurring for the purpose of protecting lives and property.

Risk: According to Stan Kaplan, risk is comprised of three components: scenario, probability of scenario, and consequence of scenario.

Tabletop Exercise: A mock disaster game in which participants playing different roles such as decision maker, incident commander, or first responder typically gather around a table and discuss/decide their responses to the incident scenario presented by a moderator. The goal of a tabletop exercise is to simulate a disaster situation for the purposes of exposing the participant to the stressful decision-making conditions of a disaster. Tabletop exercises typically conclude with a debrief session where various parties discuss their respective roles, goals established, priorities, and challenges faced regarding the scenario played.

Terrorism: There are more than 100 definitions of terrorism in the literature. The United Nations defines terrorism as “an anxiety-inspiring method of repeated violent action, employed by (semi-) clandestine individual, group or state actors, for idiosyncratic, criminal or political reasons, whereby — in contrast to assassination — the direct targets of violence are not the main targets.”

TOPOFF (abbreviation for “top officials”): TOPOFF is a congressionally mandated annual disaster preparedness and response exercise designed to improve the incident management/decision-making capability of the nation’s top officials at every level of the government during an incident of national significance.

Review Questions

1. What are the initiatives that help local communities to mitigate/prepare against potential terrorist attacks? Why is community preparedness an important component of homeland security?
2. What mitigation/preparedness role does the private sector have in terms of homeland security? Do you believe that the private sector learned lessons from the 9/11 terrorist attacks?
3. Try to define terrorism mitigation using the common definition of mitigation in terms of the all-hazards approach. (Hint: Define risk as a combination of probability and consequence, and list all potential activities that can reduce both components of the potential terrorist event.)
4. What is the importance of international consensus and cooperation for terrorism mitigation/preparedness?
5. Take a quick look at the FEMA document, FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks against Buildings (available at www.fema.gov). What are the two most important factors to minimize damage caused by car bombs to buildings?

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