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PART I

Introduction

CHAPTER 1

What Is Public Health Emergency Preparedness?

LEARNING OBJECTIVES

Public health emergency preparedness is a highly specialized area of public health practice. In order to effectively appreciate the importance of public health preparedness in keeping populations healthy following a large-scale public health emergency, the basic foundations of public health practice must be placed into context with emergency and disaster situations. By the end of this chapter, readers should be able to:

- Explain the role of public health in emergency preparedness
- Describe the role of state and local governments in preparedness and response
- Describe the Incident Command System (ICS) and the importance of a centralized command structure during response operations
- Articulate the premise of the "whole community" approach to preparedness and response

What Is Public Health?

In its groundbreaking report, *The Future of Public Health*, the Institute of Medicine defines public health in terms of its mission to "fulfill society's interest in assuring conditions in which people can be healthy," and the report further depicts public health's "aim to generate organized community effort to address the public interest in health by applying scientific and technical knowledge to prevent disease and promote health."[1(p7)] Unlike traditional medical care, public health

employs policies and interventions to minimize disease and improve health outcomes for populations, as opposed to narrowly focusing on how to address the health of an individual. Public health is "measured in terms of improved health status, diseases prevented, scarce resources saved and improved quality of life."[2(p2)] Improvements in health due to public health scientific advancements, such as the use of vaccines and sanitation practices to prevent the spread of disease, are distinct scientific interventions. However, the public typically does not link public health's work with its achievements.

The three core functions of public health—assessment, policy development, and assurance—characterize and shape how public health practitioners approach their work. Assessment deals with the collection and analysis of health status information for communities. Policy development deals with the development of policies and the determination of appropriate interventions to address the problems in health. Finally, assurance deals with the responsibility of public health to implement strategies and interventions to promote health. Similarly, emergency preparedness as a discipline utilizes a systematic approach, the preparedness cycle, to preparing for emergencies and disasters. The steps of hazard/vulnerability assessment, planning, and mitigation/response can be likened to the three core functions of public health.

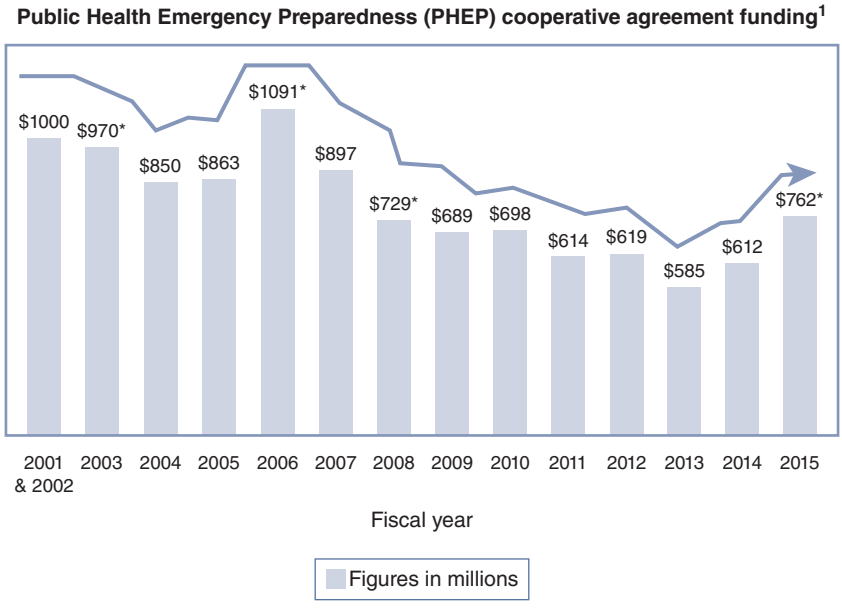
What Is Emergency Preparedness?

What is public health emergency preparedness? Public health emergency preparedness is the ability to prevent, prepare for, protect against, respond to, and recover from health emergencies. Public health emergencies are emergencies whose "scale, timing, or unpredictability threaten to overwhelm routine capabilities" to provide health care.[3(pS9)] These emergencies are characterized by their high severity, inability to be managed with routine resources, and tendency to cause increased illness, injury, or death. Public health emergencies span a broad range of emergency and disaster situations, including natural hazards, acts of terrorism, and large-scale infectious disease outbreaks. We discuss the various types of emergency and disaster events more thoroughly in Chapters 4 and 5.

History of Preparedness Programs/ Preparedness Funding

Public health preparedness programs in the United States started in the late 1990s. In 1999, the U.S. Centers for Disease Control and Prevention established the "Public Health Preparedness and Response for Bioterrorism Program." This program was narrowly focused on preparing for a biological terrorism attack on the United States. At that time, the threat was considered to be remote, and as such, little funding was allocated to public health for this effort. Public health agencies across the United States conducted planning for a response to a bioterrorism attack; however, the sense of urgency in this preparation was limited, as

bioterrorism was thought to be a high-impact, but low-probability threat. The World Trade Center attacks in New York City on September 11, 2001 (9/11), and the subsequent anthrax attacks on the United States in October 2001 changed this thinking. With these two events came the sharp realization that the United States could not properly respond to a large-scale bioterrorism attack on the country. This was due in large part to the severely depleted infrastructure of the U.S. public health system. As a result, Congress appropriated $1 billion to public health to build the public health infrastructure in a manner that would strengthen the country's ability to respond to a bioterrorism attack. **FIGURES 1-1A** and **1-1B** illustrate funding levels since the beginning of the Public Health Emergency Preparedness (PHEP) Cooperative Agreement and the Hospital Preparedness Program Cooperative Agreement funding. Funding was allocated to 62 public health awardees, including the state health departments in all 50 states, 8 territories, and 4 directly funded cities. These directly funded cities—Chicago, New York City, Los Angeles County, and the District of Columbia—were considered to have the highest risk of a terrorist attack and thus the need to be funded separately from their states.



[1]Annual totals include PHEP Base Funding plus one or more of the following: Cities Readiness Initiative, Chemical Laboratory Capacity, Early Warning Infection Disease Surveillance (EWIDS), Real-Time Disease Detection, Risk Funding, Smallpox, Pandemic Influenza Supplement - Phase I, Pandemic Influenza Supplement - Phase II, Pandemic Influenza Supplement - Phase III and Ebola Supplemental Funding.

*Asterisk denotes increase in PHEP awards due to emergency supplemental funding (2003 for smallpox; 2006, 2007, and 2008 for pandemic influenza; and 2015 for Ebola). The FY2008 total includes $24 million for pandemic influenza preparedness projects that were from a different, competitive funding opportunity announcement.

FIGURE 1-1A PHEP Cooperative Agreement funding history

Data from Centers for Disease Control and Prevention. Office of Public Health Preparedness and Response.

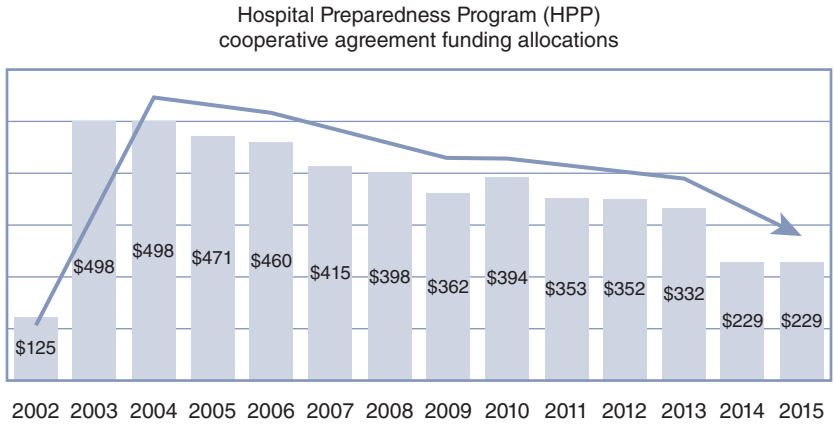


FIGURE 1-1B HPP Cooperative Agreement funding

Data from U.S. Department of Health and Human Services. Office of the Assistant Secretary for Preparedness and Response.

The initial work of the expansion of bioterrorism programs in the United States focused the role of public health as being a critical leader in the country's response to a terrorist attack.[4] This work focused on seven areas: preparedness planning and readiness assessment (focus area A), surveillance and epidemiology capacity (focus area B), laboratory capacity—biological agents (focus area C), laboratory capacity—chemical agents (focus area D), health alert networks/communications and information technology (focus area E), risk communication and health information dissemination (focus area F), and education and training (focus area G). Jurisdictions conducted planning activities around these focus areas, as well as cross-cutting areas that were integrated with hospital preparedness benchmarks and requirements funded by the Health Resources and Services Administration.[5] NOTE: The HPP Cooperative Agreement was moved from HRSA to the Office of the Assistant Secretary for Preparedness and Response when this office was created in 2006 by the Pandemic and All-Hazards Preparedness Act, or PAHPA.

In the years after 9/11, public health has used preparedness funding to plan and prepare for the aftereffects of a bioterrorism attack. However, since that time, preparedness programs have evolved from the original focus on bioterrorism attacks. This evolution of focus is not to negate the possibility of a biological, chemical, or other form of terrorist activity; however, the emergence of large-scale infectious disease outbreaks and the increase in catastrophic natural disasters have led public health to an "all-hazards" approach to public health preparedness. There is greater recognition and understanding now that most emergencies are not acts of terrorism, but are most likely natural disasters such as floods, hurricanes, and tornados, or large-scale infectious diseases such as pandemic influenza, or severe respiratory infections and zoonotic diseases, such as Ebola. Public health has also become an integral component of the emergency response community, as an accepted first responder. Public health's role as a first responder was initiated by the 9/11 attacks and subsequent anthrax attacks in 2001. This new role represented a culture shift for both public health and

traditional first responders. For public health professionals, integration into the first responder community has been a big learning curve. One such example is the ICS and the National Incident Management System (NIMS) and the new language that public health first responders had to learn in order to communicate with other first responders when working alongside them during response operations.

The Incident Command System and the National Incident Management System

The ICS is an organizational structure designed to assure an organized, coordinated, rapid, and seamless response to an emergency. The ICS was created in the early 1970s by the National Fire Service as a means of managing the response to forest fires in California. Developed to manage emergencies of various sizes and scopes, the ICS provides a mechanism for managing personnel, facilities, equipment, and communications.[6] Additionally, the ICS provides a common language among multiple responders, clearly identifies the chain of command and reporting structure, is cost-effective and flexible to meet the needs of emergencies of various scales, and can be used for routine operations as well as emergencies.

Today, the ICS is used by the Federal Emergency Management Agency (FEMA) and emergency management agencies across the country. Hospitals and healthcare systems have also adopted a form of ICS that is modified to suit their needs. The Hospital Incident Command System (HICS) applies the structure of ICS within hospitals and healthcare systems to enhance preparedness and response capability within healthcare institutions.[7] Like the application of ICS to public health, this system proved to be a learning curve for healthcare professionals, although it has increased coordination not only within the healthcare sector but also among officials in local and state governments.

In public health, we use what many have termed the Public Health Incident Command System (PHICS). The PHICS has become critically important to public health. Since the recognition of public health as a first responder, public health has struggled with this new role. Public health officials and other first responders have been challenged to work in concert, in both planning and response to emergencies.[8] This increased coordination, the need to forge new partnerships, and the need to integrate with other public safety partners, represented a struggle for public health, but public health responders have found that the system provides everyone with a common language, which facilitates coordination and communication across disciplines.

The traditional ICS structure includes the incident commander and four functional sections: planning, logistics, operations, and finance/administration. Surveillance and epidemiologic response efforts are usually included as a fifth functional section, or as a component of the operations section. This is important in public health response efforts because surveillance drives public health response, particularly where disease occurrence is the identified threat. Surveillance enables public health to apply the science of epidemiology to determine the causative agent of disease and track the disease trends to limit the spread (**FIGURE 1-2**).

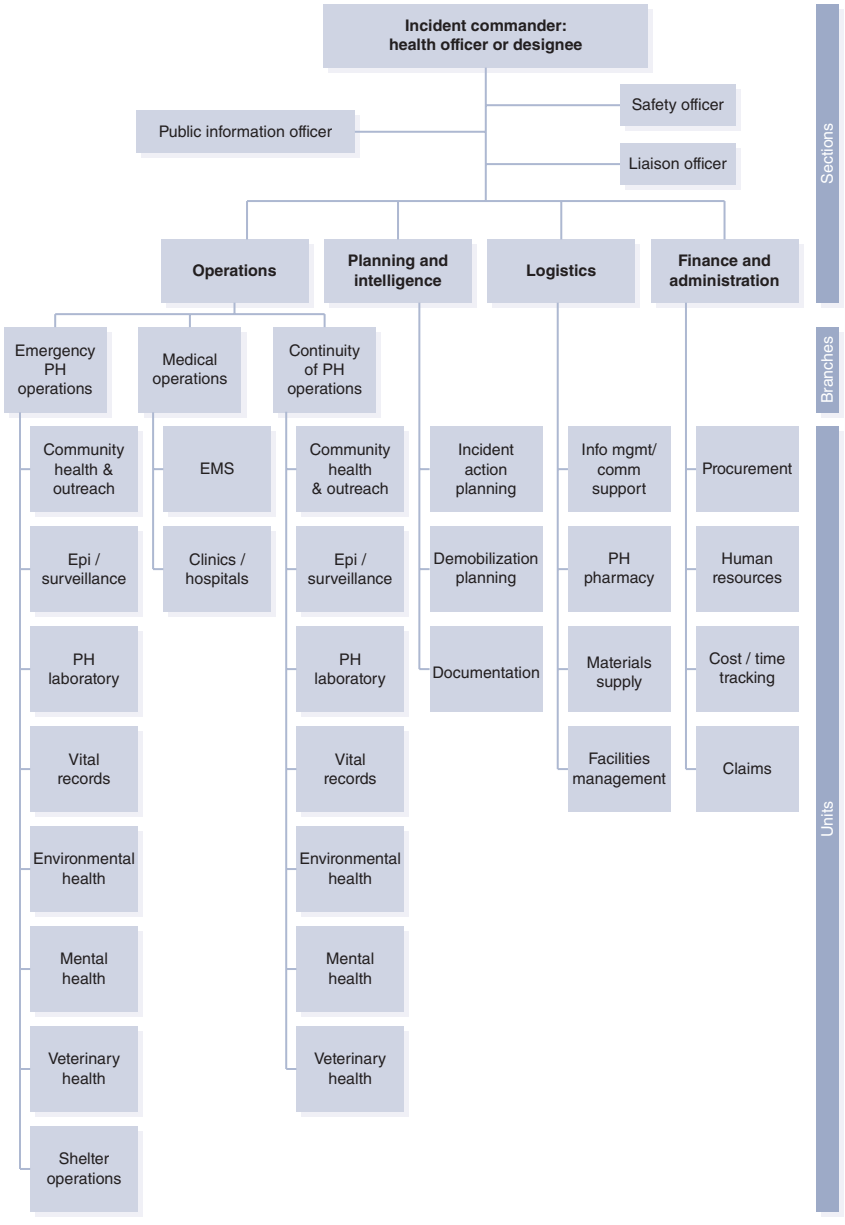


FIGURE 1-2 Public health incident command chart (epi/surveillance within operations section)

Reproduced from Rottman S, Shoaf K, Dorian A. Writing a Disaster Plan: A Guide for Health Departments. July 2005; First edition. Available at: www.ualbanycphp.org/pinata/phics/guide/fig02.cfm Accessed: January 10, 2015.

Presidential Policy Directive-8 (PPD-8) and the Whole Community Approach to Preparedness

Preparedness is a shared responsibility, and as such, preparedness activities should be undertaken with a "whole community" approach.[9] While many preparedness efforts will be coordinated and led by government agencies, those agencies should engage individuals, communities, private-sector businesses, hospitals, and healthcare systems in planning and other preparedness activities. These critical stakeholders can bring great value during the planning process, but can also assist government officials during an emergency response by fostering community and institutional recovery following a disaster. Disasters that are significantly large in their scale and scope may require response assistance from state and federal government partners, as all levels of government have a role in emergency response. However, all emergencies are inherently local first. This means that local governments must be prepared to initiate emergency responses and have the capability to maintain those responses for a minimal amount of time, generally 72 hours. Engagement of the whole community can help ensure a more comprehensive, robust response. The concept of this shared responsibility is further strengthened by PPD-8. Enacted in March 2011 by President Barack Obama, PPD-8 calls for a systematic approach to preparedness for all-hazards threats and disasters. Based on the tenet that all persons possess abilities that can contribute to the nation's security, PPD-8 further calls upon the federal government to develop a national preparedness goal and core capabilities to guide activities and ensure a system-wide approach to preparedness.[10]

Role of State and Local Governments in Preparedness and Response

More than the management of a single emergency or disaster event, emergency preparedness is a process. It is the process of assessing jurisdictional hazards and vulnerabilities to determine which threats are most likely to occur within a given area (community, jurisdiction, city, county, region, state). Once the most likely hazards have been identified, operational plans are developed to describe actions that will be undertaken to mitigate the hazards identified during the assessment. Preparedness plans should employ an "all-hazards" approach, with specific details given to the most likely threats, as identified by the hazard vulnerability assessment. Plans need to be scalable, flexible, and operationally sound in order to be viable during a response. Preparedness plans should be living, breathing documents. This means no good plan is ever final. Instead, the plan is reviewed with regularity, generally on an annual basis.

Those with responsibilities within the plan need to be trained to ensure achievement of the necessary competencies to execute the plan. Drills and exercises should be conducted to test the viability of the plan, and finally, the strengths and weaknesses are analyzed as a means of evaluating the plan. This is also the point at which improvement actions are identified and documented. This entire process of hazard identification, planning, training, exercising, and evaluation is frequently referred to as the preparedness cycle (see **FIGURE 1-3**).[11]

FIGURE 1-3 Preparedness cycle

Reproduced from Federal Emergency Management Agency. Preparedness Cycle. Available at: www.fema.gov/media-library/assets/images/114295#. Accessed August 29, 2017.

As previously stated, all events are inherently local and local jurisdictions must ensure they have the capability to properly respond to emergency events, and sustain themselves for minimally 72 hours. This is not to say that assistance will not be available prior to 72 hours; however, this is the generally accepted timeframe for self-sustainment. Once local resources have become exhausted, localities should request assistance from state level entities. State governments are expected to provide needed assistance to localities up until the state resources are overwhelmed or exhausted. At this point in the response, state governments can request further assistance from the federal government.

Prior to an event, state and local governments can augment their access to resources by entering into mutual aid agreements with neighboring jurisdictions or other partners. Provided the neighboring jurisdiction or partner is not affected by the same disaster, it is reasonably expected that aid will be provided. This is one strategy state and local governments can employ to achieve a longer period of self-sustainment before additional assistance is requested from the state or federal government. Mutual aid agreements are discussed further in Chapter 13.

What Is the Role of Public Health in Emergency Preparedness?

Public health's role in emergency preparedness is to plan the effective strategies to minimize morbidity and mortality following an emergency or disaster. As a starting

point, public health is responsible for participation in the hazard vulnerability assessment of the community or jurisdiction. In the identification of threats and hazards, public health officials should be evaluating the expected consequences of the hazard event, specifically looking to identify health and medical consequences that are likely to occur. Once the relevant threats and hazards, along with their consequences, are identified, work moves to the planning phase. In this phase, public health is responsible for identifying actions, strategies, systems, and resources that are necessary to minimize morbidity and mortality should the hazard or threat occur. Potential actions that public health officials might identify include the initiation of surveillance and epidemiological investigations to determine the source and spread of the disease or other hazard as well as the determination of potential treatment options, including laboratory testing, medical countermeasures, and the appropriateness of quarantine and isolation measures or other nonpharmaceutical interventions. Strategies to limit the spread of disease and illness frequently involve efforts to isolate the disease and implement targeted measures aimed at mitigating the threat.

Often in emergency preparedness, public health officials become overwhelmed when planning for particularly complex hazards and threats. This sense of "overwhelmness" is spurred by a misperception that public health is responsible for all aspects of threat mitigation. In fact, public health is not responsible for all aspects of emergency response, but is, however, responsible for engaging the appropriate stakeholders and partners who hold specific expertise that will aid in the emergency response or those who may also play a role in the response effort. Engagement of community and social service partners who can lend expertise in planning for the needs of at-risk, access, and functional needs persons is critical. Faith-based organizations hold strong trust relationships with community members and have an in-depth knowledge of the needs of the community. Thus, they are uniquely positioned to provide support and assistance not only during the planning phase but also in response.

Public health is also responsible for engagement and coordination with the healthcare system, namely, hospitals, community clinics, long-term care facilities, specialty providers, and other public health entities. Other healthcare system partners could include but are not limited to blood banks, dialysis centers, mental health providers, and home healthcare providers. Public health has a unique role in healthcare system coordination—that of coordinating collaboration among the multiple healthcare partners and ensuring that healthcare partners are equipped with supplies, equipment, and other resources that foster preparedness capability across the healthcare system. Just as no good plan is ever complete, neither is public health's role in emergency preparedness. Public health's planning and coordination role should continuously evolve, employing lessons learned from drills, exercises, and real events to validate and improve mitigation strategies, engaging new partners and refining a system's approach to emergency response.

Importance of Public Health Infrastructure and Capacity Building

To effectively fulfill its role in emergency preparedness and response, public health needs to maintain a strong infrastructure. Public health infrastructure includes maintenance of core public health capabilities and relationships that can aid emergency response

efforts. The most important of these core public health capabilities is surveillance and epidemiology. As the study of diseases and injuries in human populations, disease patterns, and the frequency of occurrence, epidemiology is considered to be the basic science of public health.[12] Epidemiologists conduct outbreak investigations to determine the origin of outbreaks, identify the populations at risk, and characterize the modes of disease transmission. Findings from these investigations are then used to initiate the efforts to control the outbreak and to prevent similar occurrences from happening in the future. Public health surveillance is the mechanism in which diseases and other health conditions are tracked. This too is an important core public health capability. Surveillance data can provide public health officials with important information that can be used to determine the subsets of the population who are affected by a particular condition. Public health surveillance and epidemiological investigation are cornerstones in public health responses to emergencies. Public health must have the ability to maintain and support routine surveillance and investigation processes and systems such that these systems can expand in response to incidents of public health significance.

While epidemiology and surveillance provide critical data and information that fuel public health response, there are many other capabilities that public health agencies must develop in order to ensure full capacity to respond to emergency events. The CDC's Public Health Preparedness Capabilities: National Standards for State and Local Planning are discussed in Chapter 7. These capabilities describe the trainings, skills, equipment and other resources that public health must have, or have access to, in order to properly respond to an emergency or disaster.

Other important aspects of public health infrastructure include human resource and financial management systems. These systems are needed in emergency response in order to maintain employee records, track employee time, and appropriately compensate employees for time worked. Inventory management and communication systems are also necessary to ensure appropriate tracking of equipment, supplies, and staff.

Federal Response Structure: National Response Plan (NRP), National Response Framework (NRF)

The NRP was developed in December 2004 and established a single, comprehensive framework for the management of domestic incidents.[13] More specifically, the NRP established a progressive approach to emergency response, dictating that emergency response begin locally, flow to the state government once local resources are exhausted, and then flow to the federal government at the point that state resources become overwhelmed or are exhausted. The NRP also established multiple coordinating structures, which were designed to effectively guide and coordinate site-specific incident management activities, as well as coordination for management of disasters with national significance.

In 2008, the NRP was replaced by the NRF, which was a more comprehensive guidance that incorporated lessons learned from several events of national significance, most notably Hurricane Katrina.[14]

The NRF builds on the NIMS and strives to guide national response to emergencies and improve coordination among all response partners. The NRF aligns key roles and responsibilities to foster response partnerships at all levels of government

with nongovernmental organizations and the private sector. In doing so, the NRF further promotes the "whole community" approach to preparedness and response, as established by PPD-8, and thus should be used by the whole community for emergency preparedness and response. The priorities of the NRF are to "save lives, protect property and the environment, stabilize the incident and provide for basic human needs."[15(9pg i)] To meet these priorities, the NRF establishes a response vision through five key principles:

1. **Engaged partnership**: All levels of government and the whole community must develop shared response goals and align capabilities to ensure no one entity is overwhelmed in times of crisis.
2. **Tiered response**: Incidents must be managed at the lowest possible jurisdictional level (local) and supported by additional capabilities when needed.
3. **Scalable, flexible, adaptable operational capabilities**: As incidents change in size, scope, and complexity, the response must adapt to meet these changing requirements.
4. **Unity in response through unified command**: Respect the chain of command of participating organizations and ensure seamless coordination across jurisdictions in support of common objectives.
5. **Readiness to act**: Ensure the best response possible that is grounded in a clear understanding of potential risks and decisive actions.

The NRF is composed of multiple components that can be used together or independently, based on the nature, scope, and scale of the emergency. Those components include the base document, Emergency Support Function (ESF) Annexes, Support Annexes, and Incident Annexes (**FIGURE 1-4**).

As indicated in the guidance document, the annexes provide detailed information to assist with the implementation of the NRF. ESF Annexes describe the federal coordinating structures that group resources and capabilities into functional areas that are most frequently needed in a national response. Support Annexes describe the essential

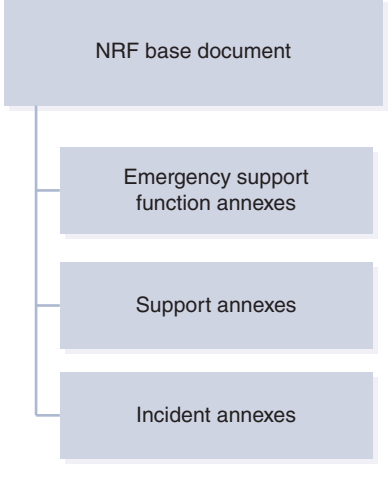


FIGURE 1-4 Structure of the NRF

Data from FEMA. National Response Framework. Available at: www.fema.gov/media-library-data/20130726-1914-25045-1246/final_national_response_framework_20130501.pdf. Accessed January 27, 2015.

supporting processes and considerations that are most common to the majority of incidents. Incident Annexes describe the unique response aspects of incident categories.

The Public Health Workforce and Development of Preparedness Competencies and Association of Schools and Programs of Public Health Core Competencies

Ensuring the public health workforce develops and maintains the appropriate skills, knowledge, and competencies for responding to emergency events is a critical component of the development of emergency preparedness capability. For many years, specific preparedness competency remained a mystery. Early iterations of preparedness competency were developed by staff at the Columbia University School of Nursing, Center for Health Policy. The Pandemic and All-Hazards Preparedness Act called for a comprehensive, competency-based training program that is responsive to the needs of state, local, and tribal public health organizations and emphasizes public health security capabilities. In response to the call for the development of a comprehensive competency framework for educational programs in public health emergency preparedness, the Association of Schools and Programs of Public Health developed the Master's Preparedness & Response Model.[16] This model was designed for use by graduate level educational programs to ensure students obtain the necessary knowledge, skills and attitudes associated with public health emergency preparedness and response. Under this model, students should gain competency in roles and relationships, communication and information management, planning and improvement, assessment and incident management. The model's framework is based on a series of tenets that are all designed to build competency in future generations of the public health workforce with particular expertise in preparedness and response.

Conclusion

Public health emergency preparedness is the ability to prevent, prepare for, protect against, respond to, and recover from health emergencies. As the scope, size, and scale of public health emergencies continue to increase, it is more and more important for public health to maintain the ability to respond to threats and hazards that impact the public's health. While public health preparedness programs date back to the late 1990s, those early programs were narrowly focused. These programs became top of mind for many Americans following the 2001 anthrax attacks in New York City, Florida, and Washington, DC, yet they remained narrowly focused on biological threats. With the increased occurrence of different types of threats, the focus of preparedness programs has now adjusted to include all-hazards emergencies.

The NIMS and the ICS provide responders with a coordinated framework within which to operate during emergency response efforts. While difficult for public health workers to grasp initially, these concepts are now widely accepted and used as the standard framework for managing disasters of all sizes, with participation by multiple agencies and jurisdictions.

Discussion Questions

1. What is public health emergency preparedness?
2. Describe the incidents that led to the creation and/or expansion of public health emergency preparedness programs in the United States.
3. What is the role of state and local governments in preparedness and response? What is meant by the phrase "whole community approach to preparedness"?
4. What is the ICS, and why is it important to preparedness and response?

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