



Public Health Emergency Preparedness: Fundamentals of the "System"

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OVERVIEW — *This paper examines the existing public health infrastructure with an emphasis on the resources and activities necessary for public health emergency preparedness and response. It provides a brief historical overview of the evolution of public health and contrasts public health interventions with medicine and health care services. The paper summarizes the broad range of activities that constitute public health practice today and provides a more detailed review of functions and services that are critical to emergency response capabilities. It explores the legal foundation for public health authorities, discussing constitutional, federal, and state public health law. The paper also summarizes how public health is organized and structured at all levels of government and discusses the roles and responsibilities of the multiple organizations responsible for responding to a public health emergency.*

PUBLIC HEALTH EMERGENCY PREPAREDNESS: A POLICY PRIMER

The threat of bioterrorism appears much more real to the average citizen today than it did a year or even a few months ago. With this newly acknowledged threat has come the realization that the nation's public health infrastructure is not adequately prepared to respond to a broad-scale bioterrorism attack. After decades of complacency regarding the dangers posed by infectious diseases, Americans are recognizing the need to make significant investments in public health, and Congress has taken actions to expedite these investments. Unprecedented levels of federal funding have been appropriated to strengthen the capacity and capabilities of the public health system. Bioterrorism bills that create new mechanisms for federal support for public health preparedness and confer new authorities on public health agencies have passed both the Senate and the House and are awaiting the action of a conference committee.

As the initial legislative responses to the terrorist events of the fall of 2001 are being implemented, fundamental questions have been raised regarding our nation's public health system: Who should be responsible for providing a public health response in the event of an emergency? What resources are needed to be prepared? How can the nation ensure an adequate return on its investments in public health? The answers to these questions hinge, in part, on the nature and structure of the existing public health system. The public health system is complex and fragmented and can be difficult to understand. This background paper is intended to provide policymakers with a comprehensive overview of how public health is currently structured and organized. It provides a summary of the services and activities that make up public health practice, describes the legal foundation for public health interventions, and discusses the roles and responsibilities of the multiple organizations responsible for responding to a public health emergency.

WHAT IS PUBLIC HEALTH?

The mission of public health is to promote physical and mental health, prevent disease, injury, and disability, and protect the public from environmental hazards.¹ It is distinct from health care in that public health focuses on the prevention of disease within populations, while health care focuses on the treatment of disease in individuals. Public health and health care are clearly interrelated and interdependent, so much so that there is no consensus on the precise boundaries between the two disciplines. Public health and health care share the common vision of ensuring good health

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and often pursue overlapping strategies to achieve this vision. Just as public health may deliver services to individuals (for example, immunizations) to ensure the health of the broader population, medical practitioners may draw from population-based studies of health determinants to guide preventive care for their patients (for example, nutritional counseling and smoking cessation). Despite their close relationship, medicine and public health represent distinct fields with separate infrastructures and financing mechanisms, unique perspectives, and a divergent, sometimes, tumultuous history. A brief examination of this history provides a deeper understanding of the services and systems that are typically referred to as “public health” today.

A Historical Perspective

Prior to the early 20th century, when the scientific basis of disease was poorly understood, public health and medicine worked together collaboratively. What are now known to be infectious diseases, such as tuberculosis, influenza, pneumonia, and streptococcal infections, were the major causes of death and disability.² Prevailing medical treatments, such as purging and bleeding, were largely ineffective, and public health measures, such as sanitation and quarantine, were relied on to control disease. Although the etiologic nature of disease was not known, early efforts to systematically track diseases had established associations between illnesses and sources of exposure (for example, contaminated food and water). Public health measures that sought to limit these exposures were societies’ most successful tools for staying healthy. Physicians who treated individual patients who had already succumbed to disease were often in the best position to notice similarities in the locations and practices of those infected and, thus, were instrumental in targeting public health interventions.³

After the advent of bacteriology in the late 19th century, which established bacteria as the causative agent in many infectious diseases, the medical diagnosis and treatment of these diseases became dramatically more effective.⁴ Therapies such as antitoxins, vaccinations, and, later, antibiotics provided physicians with powerful tools for preventing and curing disease in individual patients. As these medical practices became more advanced and sophisticated and scientific knowledge expanded dramatically post-World War II, the biomedical paradigm for responding to infectious disease began to eclipse the public health approach. Traditional public health measures continued and in fact were strengthened by the improving science base of microbiology. However, the public began to take these practices for granted and came to expect clean water and safe food, with little awareness of the systems and services required to ensure these conditions. Public expectations focused increasingly on the promises of the next “medical miracle” that would enhance longevity.⁵

As the combined efforts of medicine and public health drastically reduced the threat and changed the management of infectious diseases, public

Leading Causes of Death in the United States, 1900 and 2000

1900

- Pneumonia and influenza
- Tuberculosis
- Diarrhea, enteritis, and ulceration of intestines
- Diseases of the heart
- Intracranial lesions of vascular origin
- Nephritis
- All accidents
- Cancer and other malignant tumors
- Senility
- Diphtheria

Source: National Office of Vital Statistics, December 1947.

2000

- Diseases of the heart
- Malignant neoplasms
- Cerebrovascular disease
- Chronic lower respiratory diseases
- Accidents
- Diabetes mellitus
- Influenza and pneumonia
- Alzheimer’s disease
- Nephritis, nephrotic syndrome, and nephrosis
- Septicemia

Source: National Vital Statistics Report, 49, no.12 (October 9, 2001).

health's mission began to evolve. In part, this evolution entailed an increasing emphasis on interventions targeted at individuals as a means of preventing the spread of disease through communities.⁶ Public health became, and in some areas of the country remains, an important provider of health care services—for example, immunizations and treatment for tuberculosis (TB) and sexually transmitted diseases (STDs)—particularly for low-income persons or rural citizens who lack access to private health care providers. Seeing the broad needs of these patients, some public health organizations also expanded their service offerings beyond those related exclusively to infectious disease and began to provide more comprehensive primary care services, such as prenatal care, well child clinics, and disease screenings. Public health agencies generally view themselves as the health care provider of last resort and tend not to offer these services if they are otherwise available within the community. Despite this limitation, these activities began to consume such a large proportion of public health resources that, to some, public health became synonymous with publicly financed medical care.

At the same time, chronic diseases, such as cardiovascular disease, cancer, and diabetes, replaced infectious diseases as the nation's major health threat, and public health also began to direct its prevention efforts toward the lifestyle-related risk factors associated with these diseases. Public health efforts aimed at developing and sponsoring programming to promote healthy behaviors (for example, good nutrition, physical activity, tobacco cessation, and responsible sexual behavior) became increasingly prominent.⁷ This expansion into behavioral interventions brought new political challenges as many began to question government's role in the value-laden, personal life-style choices of its citizens.

Current Scope of Public Health Practice

Today, public health retains its responsibilities for preventing and controlling infectious diseases but has also embraced a much wider set of obligations. Public health prevents epidemics and the spread of disease, protects against environmental hazards, prevents injury, promotes and encourages healthy behaviors, responds to disasters and assists communities in recovery, and assures the quality and accessibility of health services. Public health practices to accomplish these objectives are summarized conceptually by the ten "essential services of public health" laid out by the Public Health Services Steering Committee of the U.S. Department of Health and Human Services (DHHS).⁸

The activities that can be undertaken to discharge these services are incredibly diverse. Determining which activities and practices to pursue is a decision that is made at state and local levels. As the landmark 1988 Institute of Medicine (IOM) report *The Future of Public Health* observed, "Different communities have different health problems and they have appreciably different political and social organizations and values. So

Ten Essential Services of Public Health

- Monitor health status to identify community health problems.
- Diagnose and investigate health problems and health hazards in the community.
- Inform, educate, and empower people about health needs.
- Mobilize community partnerships to identify and solve health problems.
- Develop policies and plans that support individual and community health efforts.
- Enforce laws and regulations that protect health and ensure safety.
- Link people to needed personal health services and assure the provision of health care when otherwise unavailable.
- Assure competent public health and personal health care workforce.
- Evaluate effectiveness, accessibility, and quality of personal and population-based services.
- Conduct research for new insights and innovative solutions to health problems.

public health systems in these communities vary widely and offer widely differing public health services.⁹

While it is difficult to make sweeping generalizations about the nature of public health services throughout the nation, local public health capacity typically includes capabilities in each of the three “core functions” identified in the 1988 IOM report: (a) assessment, (b) policy development, and (c) assurance.

Assessment — Assessment activities are focused on determining the nature, extent, and characteristics of diseases and injuries within populations and evaluating health conditions and resources within communities. These activities are grounded in the scientific base of disease surveillance and epidemiology. Disease surveillance is “the *on-going, systematic* collection, analysis, and interpretation of outcome-specific data for use in planning, implementation, and evaluation of public health practice.”¹⁰ Epidemiology is the study of the prevalence and spread of disease within a community. Although epidemiology is often based on surveillance data, epidemiology is an independent public health practice that can proceed in the absence of an established database. Epidemiological investigations are undertaken to establish the cause, modes of transmission, distribution, and environmental and other factors contributing to the disease.

Assessment activities include the following:

- Collecting data (for example, vital statistics, health facilities, health manpower, health interviews and assessments, and behavioral risk factor surveys).
- Establishing health objectives.
- Monitoring and analyzing communicable disease reports.
- Performing epidemiological case investigations.
- Tracing contacts of persons known to be exposed to communicable disease agents.
- Performing disease screening (for example, specimen collection, cancer screening, and TB screening).
- Conducting laboratory analyses (for example, toxicology screens, and DNA fingerprinting).
- Conducting epidemiological research.
- Assessing community quality of life.
- Monitoring progress in attaining community health goals.
- Establishing links with private-sector organizations to develop comprehensive information on health indicators.
- Establishing and promoting standards for data collection and dissemination.^{11,12}

Policy Development — Policy development activities represent the laws, regulations, ordinances, standards, plans, budgets, and guidance that public health officials establish to guide the actions of public and private

organizations. These policies include rules for food safety, occupational health, health care delivery system operations, environmental standards, emergency preparedness plans, and public health authorities for emergency action. Policy development represents a process that involves elected officials, appointed decision makers, advocacy groups, the community at large, and those affected by the policy decisions. It is through this process that community needs and priorities are framed, debated, and addressed.

Assurance — Assurance activities represent actions to intervene in disease or care processes to prevent the spread of disease through populations, promote healthy conditions, and ensure the quality of medical care available to treat disease in individuals. Assurance activities include the following:

- Licensing, inspecting, and regulating food service, recreation, day care, housing, and health care facilities to ensure compliance with standards.
- Providing education and training to make people aware of health risks and to communicate strategies to avoid these risks.
- Monitoring and managing environmental conditions (for example, air quality, occupational safety, radiation control, solid waste management, hazardous waste management, water safety, and sewage disposal).
- Controlling disease vectors (for example, mosquito spraying) and animal reservoirs (for example, rodent control).
- Providing personal health care services (for example, immunizations, TB/STD clinics, maternal and child health clinics, home health, mental health, dental care, and substance abuse treatment).
- Facilitating enrollment in public insurance programs.
- Instituting isolation and quarantine protocols, when necessary.
- Advocating for additional resources.
- Providing technical assistance to health care providers and businesses (for example, providing guidance to pharmacies on appropriate inventories of antibiotics).
- Mobilizing community partnerships to improve capacities and encourage coordination.¹³

While public health activities are carried out by both the public and the private sectors, government (federal, state, and local) plays a central role in protecting the health of the public. The IOM committee that produced *The Future of Public Health* found “that federal, state, and local public health agencies have an obligation to assume certain vital [public health] functions directly....these responsibilities cannot properly be delegated to the private sector.”¹⁴ The specific activities that make up these vital functions are not clearly defined and, in fact, have been interpreted differently over time and across political jurisdictions. However, historically government has assumed primary responsibility for responding to those health threats that most

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directly influence the collective health of the population, including infectious disease control, environmental safety, and disaster response. Other public health objectives, such as preventing injury, promoting healthy behaviors, and assuring the quality and accessibility of health services rely more heavily on public-private partnerships.

Public Health Emergencies: Preparedness and Response

In the event of a public health emergency, such as a bioterrorism attack; a naturally occurring infectious disease epidemic; an earthquake, flood, hurricane or other natural disaster; or any event that has the potential for significant health impacts, Americans expect governmental public health agencies to take action to limit the extent of death and disability within the population. The responsibilities that governmental public health agencies must be positioned to discharge in the event of a public health emergency represent a special, particularly critical, subset of public health practice. These practices can be divided into preparedness and response capabilities.

Public health preparedness capabilities involve both activities directed at preventing possible public health emergencies and activities directed at planning to ensure an adequate response if an emergency occurs. Relevant public health preparedness activities include the following:

■ ***Regulating environmental conditions and food and water safety to minimize disease threats.*** Public health officials assure healthy conditions through a number of mechanisms, including setting standards for health and safety, inspecting food production and importation facilities, monitoring environmental conditions, abating conditions that foster infectious disease (for example, insect and animal control), and enforcing private-sector compliance with established standards. This range of activities helps to lessen the likelihood that a biological or chemical threat will lead to disease. Whether naturally occurring or initiated by man, these disease threats can be ameliorated through rigorous monitoring and enforcement activities.

■ ***Planning for emergency medical and public health response capabilities.*** Although strong prevention measures are an important role of public health, it is not feasible to eliminate all biological or chemical disease threats. Therefore, public health officials must also engage in planning exercises to ensure that, in the event of a public health emergency, emergency medical services are available to treat the sick and public health interventions can be mobilized to minimize the spread of disease and disability throughout the population. These planning activities include monitoring available response resources, establishing action protocols, simulating emergency events to improve readiness, training public and private-sector personnel, assessing communication capabilities, supplies, and resources, and maintaining relationships with partner organizations to improve coordination.

If a public health emergency does occur, public health plays an important, but not exclusive role, in responding to the emergency. Relevant public health response capabilities include:

■ ***Detecting a disease outbreak.*** Although some public health emergencies will be readily apparent, others may not manifest themselves immediately. Given that exposed persons may seek medical care in multiple locations, it may be difficult for individual medical practitioners to recognize that a widespread disease epidemic is occurring. This is why regular, prompt reporting of disease cases to public health officials is critical.¹⁵ Public health authorities are in a position to collect reports of disease from multiple parties and can analyze these reports for trends and anomalies. Public health officials may use sophisticated analytic tools such as pattern recognition software and geographic information systems to determine patterns in disease cases. Such disease surveillance activities help to ensure that disease outbreaks are identified quickly and that appropriate response actions, such as the issuance of health alerts for area providers and communication with response partners, are initiated. Although passive disease surveillance systems (that is, relying on providers to initiate disease reports) predominate, public health officials also engage in active surveillance, wherein staff proactively seek information from providers and others to monitor disease trends. Such active systems are likely to be triggered and expanded in the event of a public health emergency.

■ ***Conducting epidemiological investigations to ascertain the nature of a disease epidemic.*** While the data collected through ongoing surveillance activities can signal the advent of a public health emergency, serving as a “red flag” for public health officials, it is likely that additional information will be needed to ascertain the identity, source, and modes of transmission of the disease agent. Epidemiological investigations seek to determine what is causing the disease, how the disease is spreading, and who is at risk. Answers to these questions are necessary to identify appropriate, effective public health interventions. To get these answers, epidemiologists and other trained public health staff act as “disease detectives.” They contact patients identified through case reports and ask them a variety of questions seeking to identify how they contracted the disease. They explore where the persons were, who they had contact with, what they ate, what they drank. As “leads” on possible sources of exposure emerge, epidemiologists will also take samples from suspected disease transmission vehicles (for example, food, water, soil, and air) and specimens from patients to assist in their investigations. These investigations are very resource-intensive and require significant manpower to follow multiple leads and potential contacts.

■ ***Performing laboratory analyses to support surveillance and epidemiology.*** Laboratory services support surveillance and epidemiology in a number of ways. In many instances, clinical laboratories will diagnose a case of disease, identify the disease agent, and forward these results to a public health lab for confirmation. This report into the

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disease surveillance system may represent the first step in identifying a disease outbreak. In other instances, more sophisticated laboratory analyses (for example, serotyping, DNA fingerprinting, and antibiotic susceptibility testing) must be performed to identify the disease agent or explore the characteristics of those agents. Many clinical laboratories may lack the capacity to perform these tests, particularly for rare or unusual diseases. In these cases, specimens will be sent to a state public health laboratory or a federal Centers for Disease Control and Prevention (CDC) "reference" laboratory for analysis and confirmation. Tests like serotyping (which determines the antigenic profile of a microorganism) and DNA fingerprinting help to identify not only the type of microorganism causing an infectious disease, but also pinpoint the particular strain of bacterium or virus involved. Such information helps epidemiologists determine if reported disease cases are part of the same epidemic (and therefore linked in terms of disease source) or if they represent separate, unrelated outbreaks. Such molecular fingerprinting techniques also support criminal investigations, as they can be used to trace the origin of a particular strain of microorganism. Public health labs also provide specialized protective laboratory equipment and facilities. If a highly dangerous agent is suspected, such as smallpox, special biocontainment equipment and procedures (for example, Biosafety Level 4) must be used to conduct testing; only a small number of labs maintain these capabilities.

■ *Pursuing public health interventions to limit the spread of disease.*

Once a disease source is identified, public health authorities initiate actions to limit the spread of the disease. These actions involve imposing temporary or permanent barriers around sources of contamination (for example, sealing buildings, closing restaurants, and cutting off water supplies). Under severe circumstances, public health officials can issue quarantine¹⁶ and isolation orders that limit human travel and commerce with affected areas. In some cases, special emergency powers may be triggered. Public health interventions also include educational efforts directed at informing the public of health risks and communicating strategies for avoiding those risks (for example, notices to boil drinking water, food safety advisories and product recalls, and safe practices for handling mail).

■ *Assuring the provision of emergency medical treatment and prophylaxis.*

While the goal of public health is to initiate actions to prevent the widespread dissemination of disease, emergencies do occur in which large numbers of persons are exposed to and stricken with a biological or chemical disease agent. Although the private-sector health care system is likely to have a major role in providing the treatment services required to respond to a public health emergency, public health authorities are often responsible for coordinating, advising, and overseeing the delivery of those services. Countermeasures such as antibiotics, antitoxins, and chemical antidotes must be administered to the sick, preventive treatments, such as prophylactic antibiotics and vaccines must

be administered to those at risk, and mental health services must be provided to those affected. Health care providers must be prepared to perform decontamination and triage of those seeking care, to minimize further disease exposure. In the event of a public health emergency that results in mass casualties, the resources of a particular locality become quickly overwhelmed, necessitating the mobilization of regional and federal assistance. Public health authorities help to assure adequate emergency medical service capabilities by educating health care providers about disease threats and appropriate clinical interventions, coordinating regional planning and preparedness activities, and, in some instances, delivering services directly to supplement private-sector capacity (for example, mass immunizations). As the recent anthrax attacks illustrate, even an event resulting in a small number of confirmed disease cases can put enormous strains on the health care system. The number of people potentially exposed to the disease threat and in need of prophylactic care can be quite large relative to the number that actually contract the disease and require treatment.

■ ***Remediating environmental conditions.*** Public health authorities may play a role in decontaminating the sites and facilities found to be exposed to disease agents. The nature and extent of this decontamination will depend in large part on the nature of the disease agent and its ability to remain viable outside a human host or animal/insect vector.

■ ***Preventing secondary public health emergencies following a disaster.*** In the event of a natural disaster or terrorist attack, the primary instrument of mass casualties may not be biological or chemical in nature. However, the devastation resulting from these disasters, such as the World Trade Center bombing, leads to such a high degree of social disruption and impaired infrastructure that conditions can emerge that foster secondary infectious disease and toxicity threats. For example, the mass evacuation of the area around the World Trade Center led to the abandonment of food supplies in surrounding homes and restaurants. Public health officials in New York City took steps to secure these premises to avoid the proliferation of rodents and other pests that could have resulted in secondary health threats.

Bioterrorism threats represent a particularly challenging type of public health emergency. Biological or chemical disease threats that are intentionally launched by criminals differ from naturally occurring disease threats in a number of ways:

■ Bioterrorism is a crime and prevention and response will include criminal justice, military, and intelligence agencies, who are not likely to be involved in naturally occurring disease outbreaks. In fact, the Federal Bureau of Investigation has lead responsibility for responding to a bioterrorism attack.

■ Bioterrorism attacks are likely to involve disease agents that occur infrequently in nature. Therefore, public health officials and clinicians

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probably have very limited experience with these diseases. In fact, there is some evidence that foreign powers have developed genetically engineered chimeras (for example, microorganisms created in laboratories to blend the pathogenic qualities of multiple disease agents).¹⁷ These organisms do not exist in nature and would be completely unknown to public health and medical experts.

■ Biological or chemical threats initiated by man are not likely to follow known epidemiological patterns. Because the transmission of the disease is being intentionally manipulated, past experience with disease transmission and manifestation may not be predictive.

■ Bioterrorism attacks may be covert, with the terrorist expending great energy and attention to assure the delayed discovery of the disease to maximize the population's exposure.

■ Outbreaks may occur in multiple locations simultaneously, a circumstance less likely to occur in a natural epidemic. Such a dynamic would tax federal resources to provide support to multiple states and local jurisdictions.

While bioterrorism threats represent a particularly frightening stimulus for public health emergency preparedness, it is important to recognize that naturally occurring infectious diseases and chemical exposures can pose equally grave dangers for the American public. New diseases (for example, hantavirus pulmonary syndrome, Ebola, and West Nile) are constantly emerging, and other diseases (for example, TB and malaria) reemerge in drug-resistant form.¹⁸ Given the intrinsic nature of microbes and their ability to quickly evolve and adapt to the changing environment, the precise nature of the next public health emergency cannot be predicted. It could be rooted in an intentional act or it could result from the chance mutation of an avian strain of influenza virus, leading to a particularly virulent and contagious influenza pandemic.

This concept of multiple threats and unknown hazards has led many experts to advocate for a robust public health infrastructure capable of responding to many types of emergencies. The public health infrastructure represents the capacities and resources that enable the provision of public health services.¹⁹ Clearly, preparing for and responding to a bioterrorism attack or other public health emergency will involve a wide range of professional disciplines, in addition to public health. Defense, intelligence, law enforcement, public safety, and medical resources must all be brought to bear to minimize the threat of bioterrorism and other public health emergencies. The focus of this paper, however, is on the role of the public health infrastructure in ensuring homeland security.

THE LEGAL UNDERPINNINGS OF PUBLIC HEALTH

Public health practice obviously involves activities wherein government must intercede in the lives of its citizens. The authority for these incursions in people's private lives stems from the statutes, regulations, and

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case law that constitute public health law. Public health law represents the basis for public health practice, as well as an instrument through which public health interventions are implemented. In his seminal work, *Public Health Law: Power, Duty, Restraint*, Lawrence O. Gostin defines public health law as “the legal powers and duties of the state to assure the conditions for people to be healthy...and the limitations on the power of the state to constrain the autonomy, privacy, liberty, propriety, or other legally protected interests of individuals for the protection or promotion of community health.”²⁰

Constitutional Foundation

Gostin finds that government’s special responsibilities in matters of public health are rooted in the constitutional design. He notes that the Preamble to the Constitution establishes the legislative power to provide for the “common defence” and “general welfare” of the United States and reveals a clear intent to vest power in government to protect community health and safety. In discussing the application of constitutional law to public health, Gostin states:

The Constitution serves three primary functions: to allocate power between the federal government and the states (federalism), to divide power among the branches of government (separation of powers), and to limit government power (protection of individual liberties)...the Constitution acts as both a fountain and a levee: it originates the flow of power (to preserve the public health) and curbs that power (to protect individual freedoms).

Each of these principles—federalism, separation of powers, and protection of individual liberties—has important implications for the practice of public health.

■ **Federalism.** The Constitution establishes a balance of power among federal and state governments, granting the federal government only specific enumerated powers. The power to tax and spend and the power to govern interstate commerce are the enumerated powers most relevant to public health law. In contrast, the Constitution grants the states all the authority necessary to govern, provided it is neither expressly granted to the federal government nor prohibited to the states. Article VI of the Constitution contains the Supremacy Clause, which allows Congress to preempt state public health laws in those areas where the Constitution establishes federal authority.

■ **Separation of powers.** In addition to providing the foundation for the sharing of power between the federal government and the states, the Constitution also divides power among the three branches of government: Congress, the executive branch, and the judiciary. Congress enacts federal public health policy and appropriates the resources to implement that policy. Executive agencies implement public health legislation and establish complex regulations to advance the policy

The principles of federalism, separation of power, and protection of individual liberties have important implications for the practice of public health.

goals articulated by the legislature. The judiciary interprets laws and resolves legal disputes, establishing legal precedents through case law. As Gostin notes “the courts have exerted substantial control over public health policy by determining the boundaries of government power... [deciding] whether public health statute is constitutional, whether agency action is authorized by legislation, whether agency officials have marshaled sufficient evidence to support their actions, and whether government officials and private parties have acted negligently.”²¹ The separation of powers doctrine establishes checks and balances to ensure that public health (and other laws) are politically accountable and do not overreach.

■ **Limited powers.** The Constitution also limits government power for the purpose of protecting individual liberties. Public health laws and interventions directed at promoting the public good (for example, isolation and quarantine, regulation of pharmaceutical products, and food safety regulation) frequently infringe on the rights and freedoms of individuals and businesses. The constitutional design seeks to balance the need to vest power in government to promote the common good with the need to protect individual liberties. In seeking this balance with respect to public health law, the courts have generally found public health interventions permissible, provided they are necessary to prevent avoidable harm, represent a reasonable means to achieve the public health objective, are proportional to the public health threat, do not cause harm to those required to submit to compulsory measures, offer appropriate due process protections, and provide equal protection under the law.²²

Federal Statute and Regulations

Although theoretically limited by the Constitution, the federal government has far reaching power to influence public health through its powers to (a) tax and spend and (b) regulate interstate and international commerce.²³ Taxation policy provides an indirect means for influencing the behavior of individuals and businesses through tax relief (for example, tax incentives to promote pharmaceutical research for rare diseases) or tax burdens (for example, tobacco excise taxes). Spending policy authorizes expenditures for public health activities, including activities that go beyond those federal powers enumerated in the Constitution. Because Congress has the power to prescribe the terms upon which federal funds will flow to the states (provided these terms are clearly articulated in statute and a relationship exists between the conditions imposed and the purpose of the grant), spending policy can also be used to encourage state conformance to federal statutory or regulatory standards.

The Constitution’s Commerce Clause affords the federal government considerable power to establish public health regulations. Although the Commerce Clause is limited to controlling the flow of goods and services across

Spending policy can encourage state conformance to federal standards.

state lines, modern interpretations of it have been broad. As the economy has become national (and even global) in scale, it is increasingly difficult to identify commerce activities that are not interstate in nature. Therefore, the Constitution grants the federal government with direct, far reaching authority to enact public health laws and regulations, including those related to safe food, clean water, safe and effective pharmaceutical products, and healthy environmental conditions.²⁴

Federal public health statutes are largely expressed through the Public Health Service Act; the Food, Drug and Cosmetic Act; the National Environmental Policy Act; the Clean Air Act; and other related statutes. In general, the Public Health Service Act authorizes the activities of the public health service agencies and creates important vehicles for federal funding of public health activities in states and communities. The Food, Drug, and Cosmetic Act authorizes the Food and Drug Administration (FDA) to directly regulate the safety of food and cosmetics and the safety and effectiveness of pharmaceuticals, biologics, and medical devices. The National Environmental Policy Act and related environmental statutes authorize the Environmental Protection Agency (EPA) to regulate the safety of the air, the water, and the ecological system. These legal frameworks are important because they establish the FDA and the EPA as regulatory agencies, while the CDC and other agencies of the Public Health Service influence state and local public health practices largely through funding decisions, technical assistance, and advisory consultation.

Although the CDC's involvement in public health activities is largely nonregulatory, the Public Health Services Act does contain some provisions for federal authorities in responding to epidemics. Sections 361 through 369 of the Public Health Service Act authorize the surgeon general to make and enforce regulations to prevent the introduction or spread of communicable diseases from foreign countries and from one state to another and vests the surgeon general with powers to inspect, seize property, and quarantine persons. DHHS is currently reviewing its legislative authorities and regulations to ensure that they are adequate and appropriate to respond to contemporary public health threats.

Certain provisions of federal code specifically address federal assistance to states and localities under emergency circumstances. The Stafford Act (42 U.S.C. 5170 et seq.) establishes provisions for federal assistance to states in the event of a disaster. The act requires the governor of the affected state to request a declaration of a disaster and vests the president with the authority to make such a declaration and charge federal agencies to provide support to state and local efforts. The Public Health Threats and Emergency Act of 2000 gives the secretary of health and human services the authority to identify a public health emergency, take action to respond, and establishes a Public Health Emergency Fund to support emergency response efforts. Bioterrorism preparedness legislation (H.R. 3448) currently being considered by conference committee builds on the authorities established under the Public Health Threats and Emergencies Act.

State Law and Local Ordinances

Although federal authority for public health matters has become fairly sweeping in modern times, the states have primary responsibility for protecting the health and welfare of their citizenry. The Constitution recognizes the states' sovereignty to safeguard the public's welfare and provides for two specific powers, the power to regulate private interest for the public good (commonly referred to as police power) and the *parens patriae* power to defend the interests of persons unable to secure their own interests. These powers give states broad latitude in determining the nature and characteristics of their governmental public health system.²⁵

Given that states have a high degree of discretion in establishing public health law, bounded only by the U.S. and state constitutions, it is not surprising that a wide variety of approaches have emerged from state legislatures. States have pursued different paths in defining their role in public health, including determining the breadth and depth of government interventions, establishing the degree to which public health authority is delegated to local governments, and identifying the organizational framework for state public health functions.

Scope and Content of State Public Health Statutes — In defining the parameters of public health, states have established statutory definitions of the concept and have legislatively delineated the powers and duties of state and local public health officials.²⁶ In general, state public health statutes and the case law that interprets them provide public health authorities with the power to collect data, license businesses and health care delivery facilities, conduct inspections, and engage in enforcement activities (including control of persons and property).²⁷

However, the legal basis and specific provisions governing these functions varies substantially by state. For example, in some states the specific conditions and diseases subject to compulsory reporting are identified in statute, and additions or modifications require legislative action. In other states, state health departments are vested with the authority to define the diseases and information that must be reported to state officials. Because states establish the specific circumstances under which reporting occurs and the procedures for such reporting, it is not surprising that communicable disease data vary across states. Similarly, licensing requirements, inspection standards and protocols, and enforcement authorities and remedies differ from state to state.²⁸ Researchers have found a wide range of congruence among states' public health enabling legislation and the missions and functions set forth in the ten essential services of public health.²⁹

Delegation of Authority to Local Public Health Officials — Local governments derive all of their power and authority from the state. States have taken very different approaches to the delegation of public health duties to local governments. Some states provide local governments with very

States have primary responsibility for protecting the public's health and welfare.

limited authority, while others offer local jurisdiction “home rule” over public health matters. Absent delegations of power provided under state constitutions, states may modify or remove home rule powers of local governments at will. Such home rule provisions empower local governments to enact ordinances and establish fees, and may prescribe the governance structure for health departments (for example, local boards of health).³⁰ Some states have established statutes that explicitly allow local public health agencies (LPHAs) to form intergovernmental compacts to consolidate public health services across political jurisdictions.

In general, distribution of public health authority can be classified into three categories: (a) a centralized approach in which state agencies have extensive legal and operational control over local authorities, (b) a decentralized approach in which local governments are delegated significant control, and (c) a hybrid approach in which some public health responsibilities are provided directly by the state, while others are assumed by localities.³¹ Table 1 summarizes the approach taken by each of the states.

While the information presented in Table 1 provides a general overview of state approaches, delegation of specific powers may differ from the general approach pursued. For example, although Arizona, Indiana, and Utah generally pursue a decentralized approach to the delegation of public health authority, these states do not delegate authority for issuing quarantine orders to local public health officials.³²

TABLE 1
State Approaches to Delegation of Public Health Authority

Distributional Approach	Brief Description	States	Total
Centralized	State public health agency either performs directly or regulates the level and extent of public health services provided at the local level	AR, DE*, FL, HI*, LA, MS, NM, RI*, SC, VA, VT*	11
Decentralized	Authority and direct responsibility of many public health functions lie at the local level of government	AZ, CO, CT, ID, IN, IA, ME, MO, MT, NE, NV, NJ, ND, OR, UT, WA, WI	17
Hybrid	Direct responsibility for public health functions are shared between state and local government	AL, AK, CA, GA, IL, KA, KY, MD, MA, MI, MN, NH, NC, NY, OH, OK, PA, SD, TN, TX WV, WY	22

*State-run systems that do not classify their field offices as local health departments.

Source: Lawrence O. Gostin and J. G. Hodge, *State Public Health Law—Assessment Report*, unpublished paper sponsored by the Turning Point Public Health Statute Modernization National Collaborative, July 2001, 26; supplemented by Centers for Disease Control and Prevention, *Profile of State and Territorial Public Health Systems*. Table based on George E. Pickett and John Hanlon, *Public Health Administration and Practice*, 108 (1990).

Modernization of State Public Health Statutes — State public health statutes are not generally organized in a coherent structure. Rather, state public health legislation has been enacted in a piecemeal fashion as new public health threats have become identified.³³ In *The Future of Public Health*, the IOM recommended that states review their public health statutes to ensure that basic authorities are clearly delineated, modern disease control measures are supported, and appropriate due process safeguards are incorporated. Although nearly 20 state legislatures have considered additions or changes to their statutory public health laws in recent years,³⁴ many of the laws currently on the books reflect a very dated perspective on government's role in public health interventions.³⁵

Seeking to stimulate the modernization of public health law, the Turning Point Public Health Statute Modernization National Collaborative is developing a Model State Public Health Act. This collaborative represents a broad coalition of public health organizations, including the National Association of City and County Health Officers (NACCHO), the Association of State and Territorial Health Officers (ASTHO), the National Governors Association, the National Conference of State Legislatures, and the National Association of Local Boards of Health. The collaborative found that public health law reform is necessary to update antiquated laws, keep pace with scientific developments, comply with modern constitutional requirements, clarify powers and duties, and stimulate public health dialogue with policymakers.³⁶

Expected to be completed in the summer of 2003, the model law is expected to be divided into 12 articles:

- Presentation of legislative findings.
- Definition of public health mission and functions.
- Delineation of the fundamental capabilities required to support the mission (that is, data systems, workforce, organizational structure, financing, and research capacity).
- Identification of public and private partners.
- Identification of conditions of public health importance.
- Statement of public health authorities and powers (for example, disease control and prevention, environmental health services, licensing and permits, administrative searches and inspections, and nuisance abatement).
- Clarification of emergency powers.
- Statement of administrative procedures.
- Provision to protect the privacy of public health information.
- Provision to ensure nondiscrimination in public health.
- Establishment of enforcement and sovereign immunity.
- Miscellaneous provisions related to severability, repeals, conflicting laws, and reports.

Many laws currently on the books reflect a dated perspective on government's role in public health.

In a related effort, the CDC funded the Center for Law and the Public's Health at Georgetown and Johns Hopkins Universities to develop a Model State Emergency Health Powers Act. The current draft of the model law provides an outline of the issues state policymakers must assess as they consider the adequacy of their existing emergency powers statutes, including measures to detect and track potential and existing public health emergencies, provisions to define and declare a public health emergency, powers to control property and persons during a state of emergency, requirements related to public communication, and provisions to mandate planning for an emergency.³⁷

Some critics of this draft model law maintain that government has the inherent powers to deal with crisis situations and this statutory language is unnecessary. Others have identified gaps in the model language related to the regulation of health care financing (for example, the power of insurers to exclude from coverage treatments related to public health emergencies).³⁸ Civil rights advocates have also voiced concerns that the model statute tilts too much toward public health powers at the expense of individual civil liberties.³⁹ Defenders of the effort have countered that a substantive debate about public health authorities must occur in state legislatures and this model statute provides a comprehensive road map for discussing important, yet potentially controversial, issues. These issues include defining who can declare a public health emergency and the circumstances under which this action can be taken, the extent of government power to detain individuals and seize property, and the balance of decision-making authority between governors and state legislatures. At least 29 state legislatures have indicated that public health preparedness will be a priority for the 2002 legislative session.⁴⁰

WHO'S WHO? ORGANIZATIONAL ROLES AND FINANCIAL SUPPORT FOR PUBLIC HEALTH EMERGENCY PREPAREDNESS

Public health services and activities have historically been grounded in state authority, as the preceding section suggests. While rooted in state-based policy, the public health system is complex, involving multiple players across all levels of government as well as collaborative relationships with the private sector. Federal, state, and local public health agencies work together in partnership to deliver public health services. Given the complexity of these relationships and the level of variation across states, it is extremely difficult to definitively characterize the relative contributions among federal, state, and local public health agencies (Figure 1).

The National Health Accounts published by DHHS estimate that \$41.1 billion were spent on governmental public health activities in 1999, excluding funding for biomedical research, environmental programs, and personal health care services. Federal funding accounted for nearly 11

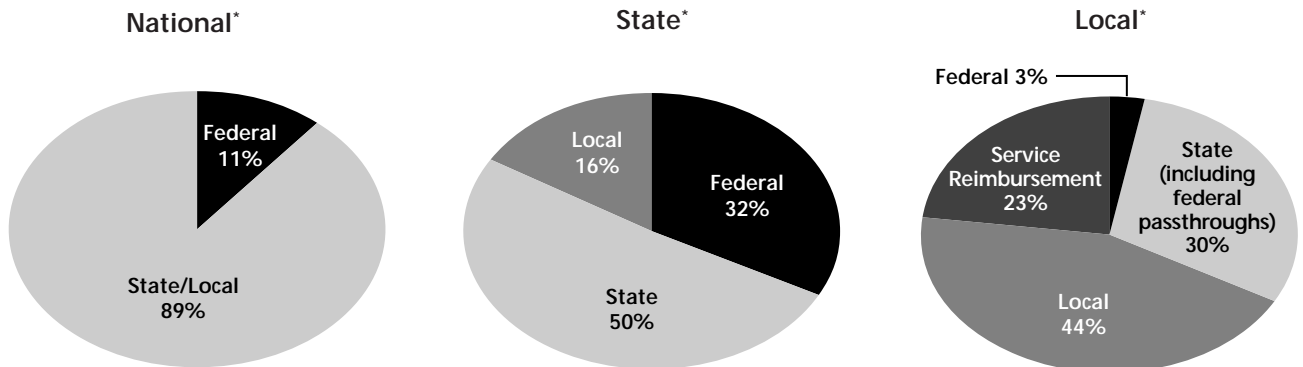
At least 29 state legislatures have indicated that public health preparedness will be a priority in 2002.

percent of total public health spending (\$4.4 billion), with state and local government providing the majority of financial support (approximately 89 percent).⁴¹

Studies of state expenditures yield different estimates, indicating that federal funding plays a stronger role in supporting state and local activities than the National Health Accounts suggest. Based on data from the early 1990s, the Public Health Foundation estimated that federal funding accounted for 32 percent of public health expenditures within the sample of states studied, with state and local sources contributing 50 and 16 percent of funding respectively.⁴² It should be noted that state contributions to public health vary widely across states and the Public Health Foundation did not claim that the nine states selected in their sample were statistically representative of all states.

A review of LPHA funding provides yet a different perspective. A recent NACCHO survey of LPHAs found that local governments contribute 44 percent of LPHA funding, with state support (including federal pass-throughs) representing 30 percent of funding, and direct federal support representing 3 percent. Service reimbursements and other revenue sources constitute the remaining 23 percent.⁴³ NACCHO's budget

FIGURE 1
Public Health Spending by Source of Funds
at National, State, and Local Levels (in percent)



**All governmental public health expenditures made in the United States for population-based public health services, excluding biomedical research.*

Source: 1999 National Health Accounts, Office of the Actuary, Health Care Financing Administration, U.S. Department of Health and Human Services.

**All governmental public health expenditures made within the states for population-based public health, including those made at the local level (does not include expenditures made at the federal level but not passed through to states, e.g., CDC laboratories).*

Source: Public Health Foundation, Measuring Expenditures for Essential Public Health Service.

**All expenditures for local public health departments (both population-based and personal health care services).*

Source: National Association of County and City Health Officials, Local Public Health Infrastructure.

summaries are not limited to population-based services and include the personal health services delivered by LPHAs, accounting for the large proportion of expenditures funded through service reimbursements. The seeming discrepancies observed in local/state contributions between the NACCHO and the Public Health Foundation studies likely result from expenditures that are made only at the state level (for example, state laboratory support). The expenses associated with these activities performed directly by state government are accounted for in the states' share of public health funding in the Public Health Foundation analysis, but they are not represented in the local health agency budgets reviewed by NACCHO.

Although the precise contribution of each level of government to the public health infrastructure is difficult to quantify, the available data confirm that public health is primarily a state-sponsored and -funded activity, with federal and local agencies playing significant roles.

Federal Agencies

A recent U.S. General Accounting Office (GAO) report identified over 20 federal departments and agencies as having a role in preparing for or responding to a bioterrorist attack.⁴⁴ While bioterrorism attacks represent a single type of potential public health emergency, GAO's review of bioterrorism preparedness programs represents an inclusive overview of the multiple federal agencies that would have a role in any public health emergency. The Federal Response Plan,⁴⁵ which defines how the federal government will respond to domestic situations in which the president has declared an emergency requiring federal disaster assistance, identifies DHHS as the primary federal agency responsible for the medical and public health response to emergencies (including major disasters and terrorist events).

DHHS discharges these responsibilities through several operating divisions, including the following:

■ ***Centers for Disease Control and Prevention.*** The CDC works with state public health agencies to detect, investigate, and prevent the spread of disease in communities. The CDC provides support to state public health agencies in a variety of ways, including financial assistance, training programs, technical assistance and expert consultation, sophisticated laboratory services, research activities, and standards development.

■ ***Food and Drug Administration.*** The FDA has responsibilities both for ensuring the safety of the food supply and for assuring the safety and efficacy of pharmaceuticals, biologics, and medical devices. The FDA fulfills its food safety responsibilities in partnership with the Department of Agriculture which is responsible for the safety of meat, poultry, and processed egg products.

- **National Institutes of Health (NIH).** The NIH conducts and supports biomedical research, including research targeted at the development of rapid diagnostics and new and more effective vaccines and antimicrobial therapies.
- **Office of Emergency Preparedness (OEP).** Housed within the Office of the Secretary, the OEP is responsible for coordinating emergency medical response in the event of a public health emergency. OEP coordinates both the National Disaster Medical Service and the Metropolitan Medical Response System.
- **Health Resources and Services Administration (HRSA).** HRSA administers the state grant program to facilitate regional hospital preparedness planning and to upgrade the capacity of hospitals and other health care facilities to respond to public health emergencies. HRSA is also generally responsible for health care workforce development.

A variety of other federal agencies have organizational responsibilities related to bioterrorism and public health emergency preparedness. The Federal Emergency Management Agency (FEMA) is the lead agency responsible for coordinating federal aid for any disaster that prompts federal assistance through the Stafford Act. The EPA is responsible for responding to emergencies involving chemicals and other hazardous substances. The Department of Defense supports public health preparedness through its research on bioweapons, intelligence gathering on bioterrorism threats, and civil support functions in the event of an emergency that results in severe social unrest. The Department of Justice has lead responsibility for assessing and investigating terrorist threats and provides funds and assistance to emergency responders (for example, police, fire, and rescue personnel) at state and local levels. The Department of Veterans Affairs purchases drugs and other therapeutics for the National Pharmaceutical Stockpile and operates one of the nation's largest health care systems, which could provide critical surge capacity in the event of a mass causality event. Several other federal agencies, including the Departments of Transportation, Commerce, and Energy also have potential roles to play in preparing for and responding to a public health emergency. A more detailed summary of federal agency roles and responsibilities is presented in Appendix A.

The GAO found that although efforts have been made to better coordinate federal efforts to combat terrorism, significant fragmentation continues to exist. The congressionally established Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction (also known as the Gilmore Commission) also concluded that existing coordination mechanisms fail to provide adequate authority and accountability.⁴⁶ The GAO raised particular concerns about the range of agencies providing assistance to state and local governments and recommended consolidation of some emergency planning efforts under FEMA.

Although multiple agencies provide federal funding for emergency preparedness, federal support for the public health infrastructure at the state

Although efforts have been made to better coordinate federal efforts to combat terrorism, significant fragmentation still exists.

and local levels is drawn largely from grants and cooperative agreements with the CDC. Some of these funding streams represent nondirected mechanisms, such as the Preventive Services Block Grant, a flexible grant that supports states' efforts to prevent morbidity and mortality. ASTHO estimated that approximately 9 percent of Preventive Health Service Block Grant dollars are allocated by states to infectious disease prevention and control activities (\$12.15 million out of \$135 million total block grant funding).⁴⁷ However, most CDC grants to states are categorical in nature, focusing on specific diseases or activities. Categorical grants and cooperative agreements that have supported the public health infrastructure (and indirectly contribute to emergency preparedness activities, given the dual use nature of many of these investments) include those related to STDs, TB, HIV/AIDS, immunizations, epidemiology and laboratory capacity, and environmental health.

Some of these categorical grants are awarded to all 50 states. Others resemble demonstration projects that seek to develop and test more advanced capabilities. These demonstration/research grants are awarded on a competitive basis and may be expanded to additional states as funds become available. For example, the Emerging Infections Program provides funding to nine states to conduct sophisticated, active surveillance on food-borne illnesses and other emerging infectious diseases. An overview of key CDC and other relevant DHHS programs is presented in Appendix B.

While a detailed accounting of these many funding vehicles is not readily available, CDC funding for state and local preparedness had been limited prior to the infusion of funding provided for in the fiscal year (FY) 2002 appropriations. Beginning in 1999, CDC was appropriated dollars expressly to support bioterrorism preparedness activities. In FY 2001, \$180.9 million was appropriated for these efforts, with \$66.7 million allocated to building state and local preparedness. In the wake of September 11 and the anthrax attacks, increased concerns regarding homeland security led to a \$2.1 billion FY 2002 appropriation for CDC's anti-terrorism activities, over a ten-fold increase from FY 2001 levels. The FY 2002 supplemental appropriations targeted \$865 million to upgrading state and local capacity, which, combined with dollars from CDC's regular appropriation, resulted in \$917 million for grants to states and localities. The first installment of this funding, approximately 20 percent of the total, was made to states in mid-February.

State Agencies

As does the federal government, most states rely on multiple agencies to deliver public health emergency services. These functions tend to be concentrated within a limited number of agencies at the state level. Most public health emergency preparedness functions are typically housed within a state health agency or department of health. The majority of

states (35) have freestanding state health agencies, while the remainder of states have consolidated public health organizations into “super agencies” that are responsible for a wide range of activities (for example, human services).⁴⁸

Public health preparedness functions that are often organizationally separate from the primary state health agency include environmental health services and emergency medical services. Most states (36) have an environmental health agency that is separate from the state health agency.⁴⁹ Although these states may have a small environmental health section within the health agency, the environmental health agency is charged with monitoring environmental contaminants and remediating hazardous conditions. Similarly, in at least seven states, the state health agency is not responsible for emergency medical services (EMS). States that separate EMS from other public health functions typically house EMS activities in a department of public safety or in freestanding EMS authorities or boards.⁵⁰ In responding to a public health emergency, the state health agency would work collaboratively with the environmental agency and emergency medical services agency (if separated organizationally), as well as with state law enforcement, public safety, and transportation agencies and, possibly, the National Guard.

As the preceding section on public health law discussed, states vary considerably in the nature and scope of the public health services they provide. States differ both in the breadth and depth of services provided within their jurisdictions and the degree to which public health service delivery responsibilities are delegated to local governments. In general, however, state governments are ultimately responsible for responding to a public health emergency and tend to play certain key roles in preparedness and response, regardless of how decentralized a particular public health system might be. Except in the largest metropolitan local public health departments, local public health officials will tend to rely on state personnel and capacity for a number of key functions, including providing advanced laboratory capacity and epidemiological expertise and serving as a conduit for federal assistance.

States vary considerably in the amount of funding they contribute to public health. Although there are no current centralized data on state health budgets, data from the late 1980s suggest that some states, such as Colorado, rely heavily on federal funding and contribute relatively few state dollars. Other states, such as California and New York, make investments that far exceed federal support.⁵¹ Past efforts to document state variations in per capita spending on public health were stymied by both technical challenges in resolving the many ways states organize and define public health and political sensitivities to making explicit cross-state comparisons. Although anecdotal accounts confirm that the patterns observed in older data continue to be true, systematic national reporting of state investments in public health have not occurred in over a decade.

States vary considerably in the resources they contribute to public health.

State funds for public health expenditures are derived from many sources, including distributions from general revenues, specific set-asides based on ad valorem (real property) taxes or sales taxes, fees (for example, fees for distribution of vital statistic records and licensure fees), settlement funds (for example, tobacco settlement), reimbursement for services (for example, third party payment for immunizations), and philanthropic donations.

Local Public Health Agencies

In general, LPHAs are on the “front line” in responding to public health emergencies and must work collaboratively with other “first responders,” such as fire and rescue personnel, emergency medical service providers, law enforcement officers, hazardous materials teams, physicians, and hospitals in preparing for and managing the consequences of those emergencies. Although the relationships between state and local public health agencies vary substantially across the country, in most states significant responsibilities have been delegated to localities.

A recent survey conducted by NACCHO estimated that there are currently 2,912 local health departments in the United States.⁵² The majority of these LPHAs are county-based (60 percent), with the remainder divided among city-based (10 percent), city-county (7 percent), township (15 percent), and multicounty (8 percent) configurations. The populations served by these LPHAs vary considerably, with 50 percent of LPHAs serving populations of fewer than 25,000 persons, 19 percent serving 25,000 to 49,999 persons, 13 percent serving 50,000 to 99,999 persons, 14 percent serving 100,000 to 499,999 persons, and 4 percent serving over 500,000 persons.⁵³

The service offerings of LPHAs also vary substantially, with LPHAs serving larger populations more likely to offer a wide range of services. A comprehensive summary of services provided by LPHAs is presented in Appendix C.⁵⁴ Focusing on the services most directly related to emergency preparedness, the vast majority of LPHAs have responsibilities for epidemiology and surveillance (84 percent), communicable disease control measures (94 percent), food safety (85 percent), and restaurant inspections (80 percent). LPHAs are less likely to be responsible for laboratory services (45 percent), air quality (44 percent), vector control (61 percent), animal control (40 percent), water inspections (44 percent), or emergency medical response (61 percent).

In those cases where the LPHA is not responsible for these services, they are typically delivered by a sister local government agency (for example, an environmental services agency) or the state. When services are offered by an LPHA, the breadth and depth of those services may vary quite extensively. For example, although nearly half of LPHAs report providing laboratory services, these services may be quite limited in nature (for example, to support TB and STD testing). Many LPHAs who report having laboratory services are likely to rely on state public health labs for more specialized diagnostic needs.

In most states, significant responsibilities have been delegated to localities.

The workforce of the LPHA varies significantly, with staffing levels ranging from 0 full-time equivalent staff (FTEs) to 5,600 FTEs. The mean FTE staffing complement is 67 and the median staffing level is 13. Not surprisingly, these differences in staffing correlate strongly to the size of the populations served by the LPHA, as shown in Table 2.⁵⁵ Administrative or clerical staff, public health nurses, and environmental scientists or specialists are the most common occupations represented among LPHA staff.

Given the tremendous diversity in the size of LPHAs, it is not surprising that annual expenditures vary significantly by the size of the population served. The recent NACCHO survey of LPHAs found that annual expenditures ranged from \$0 in LPHAs staffed by volunteer officials to over \$836 million in large metropolitan health departments. Table 3 shows the variation in annual expenditures by size of the population served. NACCHO did not calculate per capita expenditures for the LPHAs who responded to the survey.

It is important to note that these annual expenditures include funding for the delivery of personal health care services (for example, prenatal care clinics) and are not limited to emergency preparedness activities. A study conducted by the Public Health Foundation found significant variation in the percentage of LPHA expenditures devoted to personal health care services.⁵⁶ The budgets of some LPHAs, particularly those that operate county hospitals or home health services, are dominated by personal health care services. Although data on per capita spending for public health emergency preparedness activities are not available, anecdotal reports suggest significant variation in the level of local and state contributions to preparedness efforts. Local governments fund their contributions to LPHAs through a variety of mechanisms, including general revenues, specific taxes, fines, and fees. Some jurisdictions allow local public health authorities to raise capital through the issuance of bonds or other securities.⁵⁷

Differences in the size of population served, staffing, services, budgets, and capabilities of local health departments depend in part on how state governments have elected to structure and organize local public health jurisdictions. There is tremendous variation nationally in how local health departments are configured. Both Idaho and Utah organize local public health activities through regional health districts that serve multiple counties. In contrast, Massachusetts has 351 local public health jurisdictions, serving every township in the state, regardless of size. Only ten local (city or county) health departments exist in Pennsylvania, with the balance of the state served by four small regional offices of the state health department. In Bergen County, New Jersey, alone there are a county health department, 15 township health departments, and 55 boards of health. Approximately 180 communities in the United States are not served by a local public health authority.

TABLE 2
Local Public Health Agency
Staffing Levels
by Size of Population Served

Size of Population	Staffing Levels	
	Mean FTEs	Median FTEs
0 – 24,999	13.9	8.5
25,000 – 49,999	31.3	18.0
50,000 – 99,999	57.8	41.0
100,000 – 499,999	150.9	110.0
500,000+	612.0	437.0

National Association of County and City Health Officials, Local Public Health Agency Infrastructure: A Chartbook, Washington, DC, October 2001.

TABLE 3
Annual Expenditure Levels of Local Public Health Agencies,
by Size of Population Served, 1999

Size of Population	Expenditure Levels			
	Average	25th Percentile	50 th Percentile (Median)	75 th Percentile
0 – 24,999	\$437,637	\$86,500	\$214,658	\$507,283
25,000 – 49,999	\$1,227,538	\$302,000	\$600,000	\$1,400,000
50,000 – 99,999	\$2,552,669	\$1,011,221	\$1,827,526	\$3,250,000
100,000 – 499,999	\$7,674,500	\$3,167,936	\$5,100,000	\$10,500,000
500,000+	\$66,200,000	\$16,500,000	\$27,000,000	\$46,800,000

National Association of County and City Health Officials, Local Public Health Agency Infrastructure: A Chartbook, Washington, DC, October 2001.

Even after segmenting service offerings and staffing levels by the size of the population served by the LPHAs, the average values that emerge can mask significant differences within categories. As Jerry Gibson, director of Disease Control in the South Carolina Department of Health and Environmental Control and immediate past president of the Council of State and Territorial Epidemiologists, noted: “public health organization and capability are highly varied across the 51 states and 3,000 local health departments of the United States. Some are strong, but many are very weak....Our preparedness building cannot ignore the weak departments.”⁵⁸ A recent NACCHO survey revealed that only 26 percent of LPHAs had completed a comprehensive emergency response plan; however, over half of respondents indicated that their response plans were at least 80 percent complete. Of those that had begun development of a comprehensive emergency response plan, only 12 percent indicated that a bioterrorism portion was complete.⁵⁹ In an earlier survey, only 15 percent of local health departments indicated that they were well prepared to respond to a public health emergency.⁶⁰

Private Health Care Providers and Other Private-Sector Partners

While government agencies play a central role in preparing for and responding to a public health emergency, the efforts of private-sector health care providers, pharmaceutical manufacturers, agricultural producers, the food industry, and other private-sector parties are also critical. Effective public health preparedness depends, in large part, on alert clinicians who are trained to recognize potential emergency situations and report these

suspicions to public health officials. Most individual patients who have contracted an infectious disease or are exposed to dangerous chemicals will first present for treatment to hospital emergency rooms or their own physicians. These private-sector providers play a crucial role in identifying threats to the general public's health.

Every state has incorporated requirements in state statute that compel physicians, laboratories, and other health providers to notify public health officials when patients present for particular diseases. Some states include a general provision that physicians should report "unusual" infectious diseases. Despite these laws, it is fairly well-documented that compliance with reportable disease requirements is low and that physicians do not generally understand these requirements or the processes for making reports. Even when requirements are understood, some physicians choose to ignore them, given the effort it takes to make reports and perceptions regarding the utility of such efforts. Reporting from laboratories that make clinical diagnoses tends to be more complete, but concerns have been raised regarding regional labs that have broad geographic service areas and may not be aware of the reporting requirements in the many states from which they receive specimens.

In addition to playing a critical role in detecting public health emergencies, private providers also play a central role in responding to the medical consequences of those emergencies. Given that they will probably have limited experience dealing with the rare disease threats typically associated with public health emergency situations, health care providers will likely look to public health officials for clinical guidance. Under the direction of public health authorities, private-sector delivery systems, hospitals, physicians, pharmacies, nursing homes, and others would be mobilized in the event of an emergency to provide needed treatment to those affected by disease and to provide prophylactic care to those at risk for exposure to disease. State and federal laws that confer tax-exempt status on hospitals typically require those institutions to provide significant community benefit, including the provision of emergency medical services and participation in regional emergency medical service planning. The FY 2002 appropriations included \$135 million for grants to states to conduct regional planning and to improve the capacity of hospitals and other health care facilities to respond to bioterrorism.

Health care providers are not the only private-sector group contributing to public health emergency preparedness. Although NIH makes significant investments in the development of new vaccines and antimicrobial agents, pharmaceutical manufacturers represent the primary source of funding for research and development. Efforts to encourage industry interest in the development of vaccines and other countermeasures include incentives such as liability protections, antitrust waivers, patent extensions, and long-term contracts. Similarly, activities to improve the safety and security of the food supply will rely on the agricultural and food

Health care providers will likely look to public health officials for clinical guidance.

production industries to make necessary upgrades to their processes and to seek innovative ways to minimize disease threats.

CONCLUSION

Public health emergency preparedness has become an imperative. The existing public health system is extremely complex, both legally and organizationally, resulting in a public health infrastructure that varies widely from state to state and community to community. The events of September 11 and the subsequent anthrax attacks have heightened awareness that some standard level of preparedness must be demonstrated by every community in the country. Achieving this goal will require a tremendous degree of resources, intergovernmental coordination, and leadership.

The FY 2002 emergency supplemental appropriations bill called on states to prepare plans that would both assess their current capacity for responding to a public health emergency and detail the actions that would be taken to achieve upgraded capabilities. On February 15, 2002, the CDC issued guidance to the states for the preparation of these plans. This guidance included the identification of critical and enhanced capacities and critical benchmarks for progress in the following areas: preparedness planning and readiness assessment, surveillance and epidemiology capacity, laboratory capacity for the diagnosis of biological agents, communications and information technology, communication of health risks and dissemination of health information, and education and training. For each of these capacities, states must provide a brief description of existing capacity, an assessment of whether capacity is adequate, and a proposal for effecting improvements in those areas judged to be inadequate. Critical capacities must be addressed before enhanced capacities can be pursued.

In preparing these plans, which are due to the CDC by April 15, states face a range of formidable challenges. State public health officials must quickly and critically take stock of their existing capacities. In the face of looming state budget deficits and possible hiring freezes, they must begin to make significant investments in the public health infrastructure and plan for additional longer-term improvements. They must work closely with their local health departments to determine how best to allocate resources within the state and must consider appropriate cross-state collaborations. They must also consider the dual-use nature of these investments in the public health infrastructure and make decisions that optimize the balance between bioterrorism-focused enhancements and improvements that contribute to broader system development and response capabilities.

Similarly, federal officials are confronted with multiple challenges. They must assess the plans and proposals emanating from states, promote coordination and highlight best practices, refine critical capacities to ensure meaningful and measurable benchmarks for achievement, monitor implementation to ensure accountability, and develop a long-term strategic vision for ongoing improvements to the system.

The current influx of resources and renewed attention to the public health infrastructure has the potential to truly transform the nation's public health system. Unprecedented federal support and oversight may lead to more uniform and robust public health preparedness capabilities across the country. Although the potential is great, the obstacles are also numerous. The sustained involvement and commitment of policymakers at the federal, state, and local levels will determine the success of these efforts.

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Appendix A

Public Health Emergency Preparedness and Response: Roles of Key Federal Agencies

Based on information compiled in "U.S. General Accounting Office, Bioterrorism: Federal Research and Preparedness Activities," September 2001, GAO-01-915.

DEPARTMENT OF HEALTH AND HUMAN SERVICES

The Federal Response Plan,¹ which defines how the federal government will respond to domestic situations in which the president has declared an emergency requiring federal disaster assistance, identifies the Department of Health and Human Services (DHHS) as the primary federal agency responsible for the medical and public health response to emergencies (including major disasters and terrorist events). Multiple agencies within DHHS discharge this mission:

Centers for Disease Control and Prevention (CDC)

The CDC does not generally have regulatory authority to intervene in public health matters, rather it works in partnership with state and local governments to complement and bolster state-based capacity. CDC supports public health emergency preparedness and response in five major ways:

- Financial support for the public health activities of states and localities through grants and cooperative agreements.
- Training programs and curriculum development to build the expertise and skills of state and local public health officials.
- Technical assistance and expert consultation to supplement state and local capabilities when needed, including sophisticated laboratory capacity to aid states in epidemiological investigations and the provision of emergency pharmaceuticals (for example, National Pharmaceutical Stockpile), laboratory reagents, and other supplies and equipment needed for emergency response.
- Research activities to study the applied use of practices, countermeasures, and technology to respond to biological and chemical threats, including broad-based demonstration projects that collectively represent significant financial support for capacity-building at state and local levels.
- Efforts to develop standards such as those related to laboratory protocols and National Institute for Occupational Safety and Health efforts to define standards for protective equipment used in laboratories and emergency response.

An overview of key CDC programs to support public health emergency preparedness is provided in Appendix B.

Appendix A — Roles of Key Federal Agencies

While some of the CDC's efforts are focused specifically on bioterrorism threats, the agency supports public health emergency preparedness in a much broader manner. The agency maintains that the best defense against potential biological and chemical terrorist attacks is a robust public health infrastructure prepared to respond to both naturally occurring and man-made infectious disease threats. Just as investments to counter bioterrorism have the "dual use" of improving preparedness for naturally occurring threats (such as hantavirus, West Nile virus, and influenza), capacity-building support not directly linked to bioterrorism (such as training epidemiologists and federal support for tuberculosis surveillance) strengthens the public health infrastructure and enhances its ability to respond to bioterrorist incidents.

Food and Drug Administration (FDA)

The FDA's responsibilities related to public health emergency preparedness and response can be divided into two broad categories, those related to safeguarding the food supply and those related to regulating the development of new vaccines, antibiotics, other countermeasures, and diagnostic devices. As a regulatory agency, the FDA had direct authority for establishing standards for food safety, inspecting manufacturing, processing, and import facilities to ensure compliance with standards, and taking corrective action to enforce those standards if they are not met. These actions seek to safeguard the American public from disease threats, both those occurring in nature and those initiated by man. As the regulator of pharmaceuticals, biologic products, and medical devices, the FDA also oversees the development of new therapies and technologies that could be used to prepare for and respond to a public health emergency. This includes the development of new vaccines and other countermeasures (for example, smallpox vaccine), as well as equipment to diagnose the presence of pathogens or toxic substances in humans. As with its role in safeguarding the food supply, the FDA has regulatory responsibility to ensure that pharmaceutical and other products designed for human consumption and use do not pose safety threats.

National Institutes of Health (NIH)

The NIH conducts and supports biomedical research. It funds basic research geared toward gaining a better understanding of microorganisms and other disease agents, as well as elucidating disease processes and their impact on human health. The NIH also funds research targeted more directly at the development of rapid diagnostics, more effective therapies, and vaccines and other preventive measures.

Appendix A — Roles of Key Federal Agencies

Office of Emergency Preparedness (OEP)

The OEP, housed within the Office of the Secretary in DHHS, is responsible for coordinating medical response to public health emergencies, including terrorist attacks, natural disasters, and natural disease epidemics. Working closely with other DHHS agencies and with the Federal Emergency Management Agency, Department of Veterans Affairs, Department of Defense, state and local governments, and private health care providers (for example, hospitals and physician groups) through the National Disaster Medical System, OEP ensures that resources are available to provide medical services following a disaster or public health crisis resulting in casualties that could overwhelm local capabilities. Activities include assisting with the emergency medical response planning in states and communities, the maintenance of Disaster Medical Assistance Teams that can deploy to disaster sites, and the Metropolitan Medical Response System, a contractual arrangement with 97 localities to develop and coordinate emergency medical response capabilities.

Agency for Health Care Quality and Research (AHRQ)

AHRQ is a research agency whose goal is to improve the quality, effectiveness, efficiency, and accessibility of health care services. AHRQ's activities related to public health emergencies have focused on sponsoring research that seeks to improve the clinical preparedness of health care providers. For example, the agency has studied how best to communicate with physicians and other private health care providers in the event of a public health emergency and has assessed the most effective methods for training physicians about bioterrorist threats.

Office of Public Health Preparedness (OPHP)

The OPHP is a newly created office within the Immediate Office of the Secretary charged with overseeing and coordinating preparedness activities within DHHS. The director of the OPHP reports directly to the secretary and serves as the department's liaison with the Office of Homeland Security. Although the precise role of the office is still evolving, many expect the OPHP to play an instrumental role in defining the department's priorities and monitoring agency performance relative to those objectives.

Public Health Service Commissioned Corps

One of the seven uniformed services of the United States, the Commissioned Corps is a specialized career system to attract and retain health professionals for government service. The corps is lead by the surgeon general and consists of approximately 6,000 officers in a variety of health

Appendix A — Roles of Key Federal Agencies

professions, including physicians, dentists, pharmacists, dietitians, nurses, and veterinarians. Commissioned Corps officers are employed in a number of federal agencies, including the CDC, FDA, NIH, the Health Resources and Services Administration, the Substance Abuse and Mental Health Services Administration, and the Indian Health Service.

DEPARTMENT OF AGRICULTURE (USDA)

The USDA's responsibilities related to public health emergencies fall into two general categories, those related to ensuring the safety of the food supply and those related to responding to disease in animals and plants. The USDA shares its food safety responsibilities with the FDA. While the USDA has regulatory oversight for the safety of meat, poultry, and processed egg products, the FDA is charged with ensuring the safety of most other foods. The USDA is also responsible for monitoring and promoting the health of animals and plants. Because some diseases can infect both humans and animals, the USDA would have a very important role to play in any public health emergency that involved exposure to diseased animals.

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

FEMA is the lead federal agency for responding to and managing the consequences of any disaster that prompts federal assistance. FEMA works closely with a wide range of federal agencies, using the protocols and relationships established in the Federal Response Plan. In addition to coordinating federal disaster assistance, FEMA also provides grants and training to states and localities to support first responder and emergency medical capabilities and planning activities.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

The EPA is responsible for preparing for and responding to emergencies involving oil, hazardous substances, pollutants, or contaminants. The EPA has regulatory authority for establishing standards and thresholds for the presence of these substances in the environment and has expertise in environmental monitoring, sampling, decontamination efforts, and longer term site clean-up. The EPA also provides grant funding to states to promote clean air and water and to support compliance and enforcement of other environmental standards.

DEPARTMENT OF VETERANS AFFAIRS (VA)

The VA operates one of the nation's largest health care systems and is the nation's largest purchaser of pharmaceutical products. The VA purchases

Appendix A — Roles of Key Federal Agencies

drugs and other therapeutics for the National Pharmaceutical Stockpile program and the National Medical Response Team stockpiles. At the local level, VA facilities participate in community emergency medical preparedness planning and would play a crucial role in ensuring adequate surge capacity in the event of a public health emergency. With 163 hospitals, over 800 medical clinics, and 135 nursing homes, the VA has a presence in every state and many communities.

DEPARTMENT OF DEFENSE (DOD)

DOD's role in preparing for and responding to public health emergencies can be summarized in three major activities: (a) research, (b) intelligence gathering, and (c) civil support functions. Because many of the disease agents identified as critical threats from a public health perspective have been harnessed as weapons of mass destruction (WMDs), the U.S. military has invested significant resources in developing better detection, prophylaxis, and treatment for these disease agents. DOD conducts extensive research on infectious and chemical disease agents. The U.S. Army Medical Research Institute of Infectious Diseases, or USAMRIID, serves as a confirmatory diagnostic laboratory and subject matter expert for the CDC. Working with others in the intelligence community, DOD also plays a key role in assessing the threat of bioterrorism sponsored by foreign interests and helps to evaluate the relative risk of different public health emergency scenarios.

DOD also sponsors training programs designed to enhance the capabilities of federal, state, and local emergency responders in addressing WMDs and high-yield explosives. Portions of this program, known as the Domestic Preparedness Program, related to facilitating local emergency preparedness were transferred to the Department of Justice in October 2000.² In the event of a profound public health emergency, DOD could also play a role in subduing civil unrest and ensuring social order. Although the U.S. military is precluded from enforcing U.S. law, under presidential executive order, the military can be mobilized to assist civil authorities in maintaining order. The Joint Task Force for Civil Support plans and coordinates DOD's support to FEMA in responding to federally declared disasters.

DEPARTMENT OF JUSTICE (DOJ)

DOJ sponsors research, training, and grants to improve the capabilities of emergency responders, including police, fire and rescue personnel, and emergency management personnel. For example, in 2001, DOJ sponsored tabletop exercises in 52 cities to simulate the detection and management of a bioterrorism incident. DOJ's involvement in public health emergency preparedness and response is not necessarily limited to bioterrorism threats. The emergency capabilities supported by DOJ activities have "dual

Appendix A — Roles of Key Federal Agencies

use” for naturally occurring emergencies. However, DOJ has a unique role to play in emergencies that are of man-made origin. The Federal Bureau of Investigation (FBI) is the lead agency for crisis management associated with terrorist events. These activities include assessing the credibility of WMD threats and the criminal investigation of WMD incidents. The FBI also houses the National Domestic Preparedness Office, which coordinates all federal efforts to assist state and local emergency responders with planning, training, equipment, and supply needs.

OTHERS

A variety of other federal agencies, including the Department of Transportation (DOT), the Department of the Treasury, the Department of Commerce, and the Department of Energy (DOE) have roles to play in preparing for and responding to public health emergencies. DOT has regulatory authority over airports and shipping, important control points to guard against the introduction and transmission of disease agents. The Secret Service, which is housed within Treasury and includes experts focused on chemical, biological, and radiological threats, is responsible for protecting the safety of the president, the vice president, and their families and of visiting heads of state. Commerce establishes standards, test procedures, and user guides for the equipment used by criminal justice and public safety personnel. DOE sponsors research related to enhancing WMD response capabilities.

ENDNOTES

1. Drafted in 1992 and updated in 1999, the Federal Response Plan is authorized under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (P.L. 93-2888, as amended). The Stafford Act authorizes the president to provide financial and other assistance to state and local governments, certain private nonprofit organizations, and individuals in instances of presidentially declared disasters and emergencies.
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Appendix B

Selected DHHS Programs and Initiatives Focused on Public Health Preparedness

CENTERS FOR PUBLIC HEALTH PREPAREDNESS (CPHP)

The CDC initiated a national system of Centers for Public Health Preparedness to ensure that frontline public health workers have the skills and competencies required to respond effectively to current and emerging health threats. The CPHP includes academic centers, specialty centers, and local exemplar centers.

■ Academic centers link schools of public health, state and local health agencies, and other academic and community health partners to foster individual preparedness at the front line. Seven recently funded centers include the University of Illinois at Chicago School of Public Health, University of North Carolina–Chapel Hill School of Public Health, University of Washington School of Public Health and Community Medicine, Columbia University Mailman School of Public Health, University of Iowa College of Public Health, University of South Florida College of Public Health, and St. Louis University School of Public Health. These academic centers develop and deliver curricula to public health practitioners, with many utilizing distance learning capabilities to reach a broad audience.

■ Specialty centers of the CPHP focus on a specific topic, professional discipline, core public health competency, practice setting, or application of learning technology. The four funded centers are Dartmouth College Medical School Interactive Media Laboratory (focused on Internet applications for public health training), St. Louis University School of Public Health (focused on comprehensive training), Johns Hopkins University Bloomberg School of Public Health and Georgetown University Law Center (focused on public health law), and University of Findlay National Center of Excellence for Environmental Management (focused on emergency response training).

■ Local exemplar centers develop advanced applications at the community level in three areas of key importance to preparedness for bioterrorism and other urgent health threats: integrated communications and information systems across multiple sectors, advanced operational readiness assessment, and comprehensive training and evaluation. These Centers are the DeKalb County (Georgia) Health Department; Denver Health, Denver Public Health; and the Monroe County (New York) Health Department. (For additional information, see <http://www.phppo.cdc.gov/owpp/CPHPLocations.asp> and [http://www.slu.edu/colleges/sph/bioterrorism/internet/centers.htm/.](http://www.slu.edu/colleges/sph/bioterrorism/internet/centers.htm/))

Appendix B — Selected CDC Programs and Initiatives

EMERGING INFECTIONS PROGRAM (EIP)

The EIP is a network of CDC and state health departments (currently in nine funded states). The network works with academic centers, local health departments, hospital infection control practitioners, and other collaborators to assess the public health impact of emerging infections and evaluate methods for their prevention and control. EIP funds allow states to conduct specialized, active disease surveillance programs that would not otherwise be part of their disease surveillance systems. Because the EIP's aim is to be a national resource for surveillance, prevention, and control of emerging infections, it transfers its findings broadly to public health agencies in all 50 states. Two major projects are conducted at all EIP sites:

- Active Bacterial Core surveillance (ABCs)—population-based, active laboratory surveillance for invasive diseases caused by emerging, vaccine-preventable, or drug resistant organisms.
- Foodborne Diseases Active Surveillance Network (FoodNet)—a population-based, active laboratory surveillance designed to monitor incidences of foodborne and waterborne diseases.

Two additional projects are conducted at selected EIP sites: (a) Unexplained Deaths and Critical Illnesses Project (in California, Connecticut, Minnesota, and Oregon)—population-based, active surveillance evaluating the frequency of unexplained deaths and critical illnesses in previously healthy persons aged 1 to 49 years and (b) Electronic Laboratory-Based Reporting (ELR) for public health. (For additional information, see <http://www.cdc.gov/ncidod/osr/EIP.htm>.)

EPIDEMIC INTELLIGENCE SERVICE (EIS)

The EIS is a two-year postgraduate program of service and on-the-job training for health professionals interested in epidemiology. Headquartered at the CDC, the EIS selects 60 to 80 persons per year from among the health professional applicants to continue on-the-job training in applied epidemiologic skills. Physicians with at least one year of clinical training, doctorate-level epidemiologists, dentists, veterinarians, physician assistants, and nurses with a master's of public health degree are eligible to apply. EIS officers serve as part of national and international epidemiologic programs by conducting investigations, research, and public health surveillance. They help address needs of state health departments, publish their work in the scientific literature, and disseminate vital public health information to the media and the public. (For additional information, see <http://www.cdc.gov/eis/index.htm>.)

Appendix B — Selected CDC Programs and Initiatives

EPIDEMIOLOGY AND LABORATORY CAPACITY (ELC) FOR INFECTIOUS DISEASES COOPERATIVE AGREEMENT

The ELC is intended to strengthen the nation's capacity to recognize and respond to emerging infectious disease threats by assisting state and eligible local public health agencies in improving their basic epidemiologic and laboratory capacity. The program provides funds to all 50 states, Puerto Rico, and six large cities with an emphasis on notifiable disease, food-, water-, and vector-borne diseases; vaccine-preventable diseases; and drug-resistant infections. The programs are intended to identify and monitor disease occurrences, characterize disease determinants, identify and respond to infectious disease emergencies, use public health data to set priorities, and to assess the effectiveness of these activities. Crucial to this program is the strengthening of collaborations between laboratory and epidemiology practice. (For additional information, see <http://www.cdc.gov/ncidod/osr/ELC.htm>.)

EPI-INFO

Epi-Info is public domain software designed for the global community of public health practitioners and researchers. It provides form and database construction, data entry, and analysis with epidemiologic statistics, maps, and graphs. A 1997 survey found 145,000 copies of the various versions of the software in use in 117 countries. Epi-Info is developed and distributed by the Division of Public Health Surveillance and Informatics, whose purpose is to provide and to improve access to and use of public health information. (For additional information, see <http://www.cdc.gov/epiinfo/aboutepi.htm>.)

EPIDEMIC INFORMATION EXCHANGE (EPI-X)

Epi-X is a secure, web-based communications network for the rapid exchange of public health information. The system enables federal, state, and local epidemiologists, laboratorians, and other members of the public health community to notify colleagues of urgent public health events, receive daily e-mail messages about newly posted information, create reports and track information, review information on outbreaks through a searchable database, rapidly communicate with colleagues, find contact information for public health officials, and request assistance from the CDC on-line. The CDC is currently working to expand the user base of Epi-X and to improve the system's capabilities. (For additional information, see <http://www.cdc.gov/programs/research5.htm>.)

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HEALTH ALERT NETWORK (HAN)

HAN provides funding and technical assistance to local and state health departments to ensure adequate information systems and communications capacity, such as full Internet connectivity. HAN is a nationwide information and communication system designed as a platform for distribution of health alerts, dissemination of prevention guidelines, distance learning, national disease surveillance, electronic laboratory reporting and the CDC's bioterrorism preparedness training. HAN will ensure high-speed, secure, Internet access; capacity for rapid and secure communications with first responder agencies; and capacity to securely transmit surveillance, laboratory, and other sensitive data. Included in this plan are early warning broadcast alert systems. HAN funds are used to purchase and install electronic computing and communications equipment; develop and deliver training in the use of information technology; develop electronic tools to support preparedness; disseminate authoritative preparedness, diagnosis, and treatment guidelines; and develop science-based performance standards. HAN funds have been provided to all 50 state health agencies, the District of Columbia, the territory of Guam, three metropolitan health departments (Chicago, Los Angeles, and New York), the three local exemplar Centers for Public Health Preparedness, and the specialty academic Center for Public Health Preparedness at St. Louis University School of Public Health. (For additional information, see <http://www.phppo.cdc.gov/han/FactSheet.asp>.)

LABORATORY RESPONSE NETWORK (LRN)

The LRN is a joint program of the CDC and the Association of Public Health Laboratories. It was developed by the CDC, the Association of Public Health Laboratories (APHL), and the FBI for the express purpose of dealing with bioterrorism and other terrorism threats. The LRN is composed of county, city, state, and federal public health laboratories to ensure adequate capacity for preparing for and responding to acts of terrorism. This network can accept specimens and samples from hospitals, clinics, the FBI and other law enforcement groups, emergency medical services, the military, and other agencies. The LRN comprises four levels of laboratories: Level A, clinical labs; Level B, public health labs; Level C, public health labs with typing capabilities; and Level D, specialized CDC labs with advanced capabilities. The laboratories participating in the LRN use consistent testing protocols and refer to higher-level labs for more advanced testing. (For additional information, see <http://www.phppo.cdc.gov/nltn/pdf/LRN99.pdf>.)

Appendix B — Selected CDC Programs and Initiatives

METROPOLITAN MEDICAL RESPONSE SYSTEM (MMRS)

The MMRS seeks to integrate existing emergency response systems at the local level, including emergency management, medical and mental health providers, public health departments, law enforcement, fire departments, emergency medical services, and the National Guard. Through contractual relationships with municipalities, MMRS provides funding and technical assistance to aid metropolitan areas in developing a unified, regional response to mass casualty events. As of September 30, 2001, the OEP has contracted with 97 municipalities to develop MMRSs, and additional communities are expected to be added in FY 2002. (For additional information, see http://ndms.dhhs.gov/CT_Program/MMRS/mmrs.html.)

NATIONAL DISASTER MEDICAL SYSTEM (NDMS)

The NDMS is a cooperative asset-sharing program among federal government agencies, state and local governments, private businesses, and civilian volunteers to ensure that medical resources are available following a disaster that overwhelms local resources. A Management Support Team provides field command and control in a disaster for deployed federal medical assets, coordinating communications, transportation, a medical cache and other logistical support. In each NDMS area, Disaster Medical Assistance Teams and Specialty Teams are organized by a sponsor, usually a medical center, health department, or disaster organization. The Federal Response Plan includes provisions for NDMS to provide victim identification and mortuary services through its partnership with the National Association for Search and Rescue with activation of the Disaster Mortuary Operational Response Teams. In addition, NDMS provides assistance in assessing the extent of disruption and need for veterinary services following major emergencies through their agreement with the American Veterinary Medical Assistance Teams. All of these teams comprise properly certified and licensed private citizens who are activated in case of a disaster. When activation occurs, all states recognize licensure and certification and team members are compensated for their duty time by the federal government as temporary federal employees. (For additional information, see <http://ndms.dhhs.gov/NDMS/ndms.html>.)

NATIONAL LABORATORY SYSTEM

The NLS is an initiative to strengthen relationships between the medical care community and public health. In partnership with the APHL, CDC founded demonstration projects in four states (Minnesota, Nebraska, Washington, and Michigan) to serve as models for fostering improved relationships between clinical and public health laboratories. Activities

Appendix B — Selected CDC Programs and Initiatives

undertaken by grantees include assessing clinical lab capabilities to determine if these facilities could supplement public health laboratories in the event of a public health emergency, developing specimen transport systems, improving communication capabilities, developing training materials and testing protocols tailored to clinical laboratorians, and improving adherence to existing testing guidelines related to antimicrobial resistance and other testing protocols. (For additional information, see http://www.phppo.cdc.gov/mlp/nls_contacts.asp.)

NATIONAL LABORATORY TRAINING NETWORK (NLTN)

The NLTN provides clinical, environmental, and public health laboratory training courses to laboratorians working in state and local public health labs. The NLTN uses six regional offices to identify training needs, deliver courses, and evaluate NLTN training programs. Continuing education units are available to participants who successfully complete training. The NLTN is sponsored by the Association of Public Health Laboratories and the CDC. (For additional information, see <http://www.phppo.cdc.gov/nltn/default.asp>.)

NATIONAL PHARMACEUTICAL STOCKPILE (NPS)

The NPS ensures the availability of life-saving pharmaceuticals, antibiotics, chemical interventions, and medical and surgical support supplies and equipment in the event of a disaster that overwhelms local resources. Utilizing two response components, NPS is designed to supplement and resupply state and local public health agencies with their repository of antibiotics, chemical antidotes, antitoxins, life-support medications, intravenous administration, airway maintenance supplies, and medical/surgical items. The contents of the stockpile is determined by expert panels convened by the CDC. If a request is made by a state or territory for deployment, the director of the CDC, in consultation with the surgeon general and the secretary of HHS, may release a 12-hour “push package” for quick delivery into the field. Eight of these packages are fully stocked and positioned in environmentally controlled and secured warehouses ready for immediate deployment. Follow-up packages, known as Vendor Managed Inventory (VMI), containing materials customized in response to the emergency type, may follow within 24 to 36 hours if needed. The CDC transfers authority for the NPS material to the state or local authorities once it arrives at the local airfield where it may be repackaged and labeled with the CDC’s technical assistance. (For additional information, see <http://www.cdc.gov/nceh/nps/default.htm>.)

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NATIONAL ELECTRONIC DISEASE SURVEILLANCE SYSTEM (NEDSS)

NEDSS is an initiative that promotes the development and adoption of data and information system standards to advance the development of efficient, integrated, and interoperable disease surveillance systems at the federal, state, and local levels. NEDSS provides funding, technical assistance, and model systems to states to assist them in moving their disease surveillance systems to NEDSS standards, which are based on industry standards for clinical information systems. (For additional information, see <http://www.cdc.gov/nedss/index.htm>.)

NATIONAL PUBLIC HEALTH PERFORMANCE STANDARDS PROGRAM (NPHPSP)

The NPHPSP is a partnership effort to develop performance standards for public health practice as defined by the essential services of public health, collect and analyze performance data, and improve system-wide performance. The CDC is developing comprehensive performance measurement tools for both the state and local levels in conjunction with Association of State and Territorial Health Officials, the National Association of County and City Health Officials, and other national public health organizations. These tools are designed as self-assessment instruments to aid public health officials in assessing the capacity of their own systems. (For additional information, see <http://www.phppo.cdc.gov/nphpsp/>.)

PUBLIC HEALTH TRAINING NETWORK (PHTN)

The PHTN is a distance learning system utilizing a variety of instructional media to meet the training needs of the national public health workforce. PHTN programs have delivered nearly one million training opportunities to professionals and have proven to be effective ways to update and enhance professional competencies. The PHTN's long-term vision is to promote a global network providing training and learning needs for public health professionals worldwide. The PHTN serves as platform upon which a wide variety of educational programming and training is delivered, including training related to emergency preparedness, as well as training for clinical preventive services and other public health interventions. (For additional information, see <http://www.phppo.cdc.gov/PHTN//default.asp>.)

Appendix C — Local Public Health Agency (LPHA) Service Offerings

TABLE C-1
Availability of Population-Based Services from LPHAs and Other Providers
 (by percentage of LPHA jurisdictions in which service is offered)

Population-Based Services	Service Provided by LPHAs (directly or through contract)	Service Provided by Another Agency or Private Sector	Service Not Provided
Infectious Disease Control			
Epidemiology and Surveillance	84	11	6
Communicable Disease Control	94	3	3
Laboratory	45	48	8
Environmental Health			
Air Quality	44	33	22
Food Safety	85	12	2
Sewage	74	23	3
Vectors	61	29	10
Surface Water	43	49	8
Drinking Water	72	23	5
Animal Control	40	51	9
Occupational Health	19	65	15
Inspections			
Food and Milk	62	34	3
Public Drinking Water	44	53	4
Recreational Water	49	42	9
Restaurants	80	19	1
Health-Related Facilities	38	56	7
Population-Based Health Promotion			
Community Assessment	80	10	10
Outreach and Education	90	6	5
Injury Control	37	40	22
Tobacco Prevention	68	22	10
Violence Prevention	22	58	19

Appendix C — Local Public Health Agency Service Offerings

TABLE C-2
Availability of Personal Health Services from LPHAs and Other Providers
 (by percentage of LPHA jurisdictions in which service is offered)

Personal Health Services	LPHAs Provide Service (directly or through contract)	Another Agency or Private Sector Provides Service	Service Not Provided
Emergency Response	61	35	4
Adult Immunizations*	91	7	3
Childhood Immunizations	89	8	3
HIV Testing and Counseling	64	27	8
HIV Treatment	25	65	11
STD Testing and Counseling	65	26	8
TB Testing	88	8	4
TB Treatment	71	24	5
EPSDT	59	33	8
WIC	67	37	8
Family Planning	58	33	8
Prenatal Care	41	46	12
Chronic Disease Screenings†	81	16	3
School Health	46	45	9
Primary Care	18	72	11
Dental	30	53	17
Case Management	67	26	7
Health Education	87	8	5
Home Health	36	58	6
Health Care for Homeless	11	47	43

*Immunization offerings vary. Percentages shown include jurisdictions in which any adult immunization is offered. LPHAs are most likely to offer influenza vaccine (91 percent) and least likely to offer pneumococcal vaccine (75 percent).

†Screening offerings vary. Percentages shown include jurisdictions in which any screening service is offered. LPHAs are most likely to offer blood pressure screening (81percent) and least likely to offer cardiovascular screening (50 percent).