Public Health's Infrastructure

Every health department fully prepared; every community better protected

A Status Report

Prepared for

The Appropriations Committee of the United States Senate

by the

Department of Health and Human Services

Centers for Disease Control and Prevention

CDC

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Appropriations Committee Request for Report

"The Committee is concerned over the disparities of quality and capabilities of the American public health infrastructure. While biosecurity and bioterrorism threats should be confronted, there continues to be insufficient capital funding by private and public sources of hospitals, laboratories, clinics, information networks, and other necessary elements to the provision of public health services. The Committee intends that future funding for biosecurity purposes will incorporate a growing proportion dedicated to public health infrastructure needs. **Therefore, the Committee requests a report that assesses the current state of the Nation's public health infrastructure and makes recommendations on possible actions that could be taken to strengthen key components.** Such a report should include: an identification of the components of infrastructure, the operational capabilities of each component and their interrelationships, the desired goals and outcomes of the national infrastructure, and the suggested means to improve the system in ways that improve public health efficiently and effectively. In addition, the report should also assess global health factors that might influence the domestic public health infrastructure. The department should consult broadly within the public health, medical and international health communities to receive a diversity of viewpoints."

-- Senate Appropriations Committee, Senate Report 106-166, 1999

Executive Summary

We are a Nation at risk. We face a world of new threats and ancient foes. Is public health's infrastructure prepared to respond?

Microbes are coming to our shores, hitching rides on travelers, immigrants, and food – and they are here to stay. West Nile Virus and multi-drug resistant tuberculosis (TB) are but a few examples of the ceaseless traffic across borders that cannot be hermetically sealed.

> "In public health terms, every city is a 'sister city' with every other metropolis on earth."
> *-- Laurie Garrett,*
> **Betrayal of Trust**

Today, 20 percent of TB cases around the world are now resistant to the drugs previously used to successfully treat the disease. In the 1940s and thereafter, when penicillin was rightly touted as a medical miracle, moderate doses of penicillin and other drugs in its class cured all *staphylococcus* infections. By 1998, 9 out of 10 *staphylococcus* infections – 90 percent – were resistant to penicillin and its related compounds.

These threats are man-made, but they are not intentional. Yet we are now also plagued by the threat of a whole new category of deliberate horrors – the death and destruction caused by bioterrorism, the willful unleashing of infectious agents into unsuspecting populations.

Chronic diseases also pose an increasing threat. More than 90 million Americans live each day with chronic disease. Heart disease, cancer, diabetes, and other chronic conditions now account for 70 percent of all deaths in the United States each year and for one-third of the years of potential life lost. This tragedy is compounded by the fact that these deaths are largely preventable.

Chronic diseases and high-risk behaviors also rob our children of healthy futures. Automobile injuries, homicide, and suicide account for 60 percent of deaths among youth. Five million of today's school children will die prematurely from tobacco use. Twenty-six percent of teens are overweight and at increased risk of high blood pressure, stroke, and diabetes. And one million teenage girls will become pregnant in the United States this year – the highest rate for any developed country.

How can we protect ourselves from these threats? Our national public health infrastructure is the first – and in many cases the *only* – line of defense. Like our system of national military preparedness, our public health armaments – a skilled professional workforce, robust information and data systems, and strong health departments and laboratories – must be at a constant state of "battle readiness" nationwide. Because many environmental and health threats know no boundaries,

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we can afford no weaknesses in our line of defense. Either we are *all protected*, or we are *all at risk*.

But is public health's infrastructure up to the task, prepared for the global health threats of the 21st century? Unfortunately, the answer is no. Recognizing the importance of this issue, rebuilding public health infrastructure has been a key priority of the Secretary and the Department of Health and Human Services for the past several years, and important strides have been made on many fronts. Recent initiatives linked to improving preparedness to bioterrorism, developing public health training centers, improving response to emerging infectious diseases, and the development of a comprehensive food safety program are examples of programs that have begun to positively impact infrastructure. However, as this status report documents, the U.S. public health infrastructure, which protects the Nation against the spread of disease and environmental and occupational hazards, is still structurally weak in nearly every area. Yet these weaknesses can be corrected. For example, recent congressional funding for such initiatives as the Health Alert Network has provided much needed support to strengthen electronic communications in selected communities. However, assuring structural soundness across the board will require a more comprehensive, sustainable effort from the Federal, State, and local governments as well as the private sector.

This report provides recommendations, supported by the Centers for Disease Control and Prevention (CDC) and its partners, to bolster our foundations, anticipate threats to health, and avert both unnecessary costs and needless morbidity and mortality. Most importantly, these recommendations are built on an ethic of accountability and a commitment to measuring not only health outcomes but also the performance and contributions of public health's infrastructure.

Recommendations to Improve Public Health's Infrastructure

Every health department fully prepared; every community better protected.

What would it take to be fully prepared for threats to the Nation's health, to protect communities across the country? In response to a request from the Senate Appropriations Committee to write "a report that assesses the current state of the Nation's public health infrastructure" , CDC, with its public health partners, has reviewed the current state of the public health infrastructure and proposes a major national initiative, linking partners at the local, State, and Federal levels, to address crucial gaps in:

- Workforce capacity and competency,
- Information and data systems, and
- Organizational capacities of local and State health departments and laboratories.

Specifically, CDC proposes a performance-based approach to capacity-building to:

- Assess capacity at the local and State levels using consensus performance standards,

- Develop state-wide public health infrastructure improvement plans based upon the capacity assessment,
- Provide core capacity grants and technical assistance to close specific gaps, and
- Evaluate the impact of the assistance using the consensus performance standards.

The recommendations below will require a comprehensive effort from CDC and its public and private sector partners.

Specific goals and recommendations for the program are as follows:

1. A Skilled Public Health Workforce

Goal: Each community will be served by a fully trained, culturally competent public health team, representing the optimal mix of professional disciplines.

Recommendation 1: *By 2010, ensure that all public health workers have specific competencies in their areas of specialty, interest, and responsibility, including public health officers, epidemiologists, nurses, occupational and environmental health specialists, laboratorians, behavioral and social scientists, health educators, health communicators, and informatics specialists. This should be accomplished both through the training and credentialing of existing professional staff as well as the addition of new credentialed public health professionals.*

Recommendation 2: *By 2010, fully deploy a national, "lifelong distance-learning system" for frontline public health practitioners to ensure continuing education and skill enhancement and to certify core skills in: public health methods, public health surveillance, evidence-based prevention, health promotion, informatics, quality improvement, leadership, program management, and key technical disciplines.*

Recommendation 3: *By 2010, ensure that all State and local public health officers have received formal training as senior public health officials.*

Recommendation 4: *By 2010, ensure that all public health practitioners are competent in the culture(s) and language(s) of the people they serve.*

2. Robust Information and Data Systems

Goal: Each health department will be able to electronically access and distribute up-to-date public health information and emergency health alerts, monitor the health of communities, and assist in the detection of emerging public health problems.

Recommendation 5: *By 2010, ensure that all health departments have continuous, high-speed access to the Internet and standard protocols for data collection, transport, electronic reporting, and information exchange that protect privacy and seamlessly connect local, State, and Federal data systems.*

Recommendation 6: *By 2010, ensure that all health departments have immediate, online access to current public health recommendations, health and medical data, treatment guidelines, and information on the effectiveness of public health interventions.*

Recommendation 7: *By 2010, ensure that all health departments have the capacity to send and receive sensitive health information via secure electronic systems and to broadcast emergency health alerts among hospitals, medical centers, universities, and local public health systems and agencies.*

3. Effective Health Departments and Laboratories

Goal: Each health department and laboratory will meet basic performance and accountability standards that recognize their population base, including census, geography, and risk factors, with specific needs identified through state public health improvement plans.

Recommendation 8: *By 2010, fully implement national consensus performance standards to assess gaps in public health infrastructure and strengthen local and State capacity to: assess health status, prevent disease outbreaks and injuries, protect against occupational and environmental hazards, respond to disasters and emergencies, promote healthy behaviors, and assure the quality and accessibility of health services.*

Recommendation 9: *By 2010, ensure that all health departments have sufficient public health laws and authorities to carry out the essential public health services.*

Recommendation 10: *By 2010, ensure that each health department has access to rapid, high-quality testing and that standards for standards for specimen collection, transport, testing, confirmation, and reporting are utilized.*

Conclusion

In the past century, we have witnessed unprecedented advances in science, technology, longevity, and overall standards of living. With breakthroughs like the mapping of the human genome, it becomes easy – and tempting – to believe that this progress will continue at an ever accelerated pace, allowing us to conquer new problems as they occur.

Yet, as we have seen, some of these advances have spawned new threats, and we are losing ground against both old and new threats to our Nation's health. Only with a uniformly strong public health infrastructure can we combat these threats. Our immediate investment today will buy something truly priceless for tomorrow – enhanced protection for all Americans and improved health for future generations.

I. Introduction

We are a Nation at risk. We face a world of new threats and ancient foes. As we enter the 21st century, the very air we breathe, water we drink, and foods we eat are under new assault. Deadly diseases, once conquered, are becoming resistant to even our most advanced medicines. Rising rates of heart disease, cancer, and diabetes reflect the impact of tobacco, alcohol, and poor diets. Violence plagues our communities. And racial and ethnic health disparities are widening.

Today, deadly contagious diseases, including those routinely preventable through vaccination that erupt in one part of the world can be transported across the globe with the speed of a jet aircraft. Ebola virus and other plagues once unknown to science can quickly reach our shores. Biological and chemical weapons, with their potential for massive death and destruction, pose daunting global challenges.

> **"The idea that the health of every Nation depends on the health of all others is not an empty piety but an epidemiological fact."** [1]
>
> **--Laurie Garrett**
> **Betrayal of Trust**

In almost every State, public health workers can point to a recent event that confirms this fact. West Nile Virus, encephalitis, and other outbreaks are examples of how new diseases and their vectors have found their way onto our shores, joining old threats that have re-emerged in more virulent and drug-resistant forms such as drug-resistant strains of TB. New York's Central Park was closed for pesticide spraying on the evening of July 24, 2000, after mosquitoes infected with West Nile virus were found there. Until last year's outbreak, which killed 7 people and hospitalized another 55, West Nile virus had never been detected in this hemisphere.[2]

Food-borne diseases, such as those caused by *Salmonella* and *E. coli* 0157:H7, are estimated to cause 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths each year in the United States.[3] Last May, across the border in Canada, in the farming town of Walkerton, Ontario, 40 percent of the population was affected by a deadly strain of *E. coli* that had contaminated the city's water supply. In that outbreak, at least 7 people died, 90 were hospitalized, and 1,000 were treated and released.[4]

Today, 20 percent of TB cases around the world are resistant to the drugs used to treat the disease. In the 1940s and thereafter, when penicillin was rightly touted as a medical miracle, moderate doses of penicillin and other drugs in its class cured *all staphylococcus* infections. By 1998, 9 out of 10 *staphylococcus* infections – 90 percent – were resistant to penicillin and its related compounds. Forty percent of pneumococci (the culprit in bacterial pneumonia and most ear infections) are no longer susceptible to penicillin. We have one antibiotic, vancomycin, left in our dwindling arsenal of "effective" antibiotics against resistant *staphylococcus* organisms, but it is expensive and already losing ground to rapidly mutating strains.[5]

Chronic diseases also pose an increasing threat. More than 90 million Americans live each day with chronic disease. Heart disease, cancer, diabetes and other chronic conditions now account for 70 percent of all deaths in the United States each year and for one-third of the years of potential life lost. These killers disproportionately affect women and racial/ethnic minorities and present special challenges for an overburdened public health system. Heart disease is the leading cause of death for women 35 and older, claiming the lives of more than

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a half million women each year. The prevalence of diabetes is 1.7 times greater among African Americans, 1.9 times greater among Hispanics, and 2.8 times greater between American Indian and Alaska Natives than among whites. The death rates from cervical and prostate cancer are more than twice as high for African Americans than for whites.[6]

Chronic diseases and high-risk behaviors also rob our children of healthy futures. Automobile injuries, homicide, and suicide account for 60 percent of deaths among youth. Five million of today's school children will die prematurely from tobacco use. Twenty-six percent of teens are overweight and at increased risk of high blood pressure, stroke, and diabetes. And one million teenage girls will become pregnant this year in the United States – the highest rate for any developed country.[7]

Tracking a Silent Killer

CDC researchers have found that over the last decade, **diabetes among adults** has increased rapidly across all regions, demographic groups, and nearly all states, for an overall national increase of 33 percent during the 1990s.

This trend was most marked among adults between the ages of 30 and 39, who showed a 70 percent increase between 1990 and 1998.

Diabetes is the 7th leading cause of death in the United States and a major contributor to heart disease, stroke, blindness, high blood pressure, kidney disease, and amputations.

Rapid increases in obesity rates suggest that we can expect higher diabetes rates in the future.

"This study sends a clear message that American lifestyles, including inactivity and poor nutrition, are having a dramatic influence on our health and will ultimately increase the need for diabetes care in the future," said CDC Director Jeffrey P. Koplan, M.D., MPH.

> **Continued progress against microbes and other causes of disease is not guaranteed.**

These trends are early, persistent alarms, warning us that continued progress against microbes, chronic diseases, and injuries is not guaranteed. Fueled by greater mobility of people and goods around the world, infectious disease outbreaks could become more common and, in many cases, more severe. Most importantly, we cannot individually control our exposure to many of these threats. They are hazards regardless of whether we are insured, rich or poor, or under a doctor's care.

Progress against chronic diseases is not guaranteed, either. Today, the United States faces an alarming epidemic of increasing obesity – especially among our young people – and of physical inactivity. Together, these two trends *already* contribute to over 300,000 cancer, heart disease, and diabetes deaths each year.[8] This tragedy is compounded by the fact that many of these deaths are preventable.[9]

Current trends suggest that unless we change our daily habits, we will see higher rates of these chronic diseases in the future, instead of the lower rates many would expect. More than a quarter of American adults are completely sedentary.[10] More than half (52 percent) of adult Americans are either overweight (with a Body Mass Index or BMI of 25 or greater) or obese (BMI of 30 or greater, which translates to being approximately 30 pounds or more overweight). The percentage of American children who are overweight has more than doubled since the 1960s – from 5 percent in 1964 to nearly 13 percent in 1994.[11] And since obese children and teenagers are likely to become obese adults, this means that they will be more susceptible to diabetes and the precursors of heart disease and stroke.[12] The emergence of Type II diabetes in children is also very alarming. These are a largely preventable outcome; public health's infrastructure has significant roles to play by documenting problems, monitoring progress, advocating improved clinical screening and counseling, and educating the public about healthy behaviors.

Morbidity and mortality from each of the above conditions could be substantially reduced by a more effective public health system. Although we spend substantially more on health care per

capita than the rest of the developed world, the United States is ranked 37th out of 191 countries (behind most other developed countries) in terms of the overall quality of its health care system.[13]

To be more effective in improving the Nation's health, we need to build a better infrastructure. Our local public health agencies lack basic equipment, such as computers and Internet connections. Our public health laboratories are old and unsafe. Our State and local health departments do not have the capacity to institute proven intervention strategies to prevent behaviors and conditions that account for nearly half of the deaths in the United States, including tobacco use, poor nutritional intake, and lack of exercise. Our public health physicians and nurses are untrained in new threats like West Nile virus and weaponized microorganisms. It is vital that we take steps now to strengthen this infrastructure "to embrace not just the essential elements of disease prevention and surveillance[*]... but also new strategies and tactics capable of addressing global challenges".[14]

> **In short, we must ensure that every health agency has the needed capacity and is fully prepared and that every community is served by an efficacious public health system.**

About This Report

This report has been prepared for the Senate Appropriations Committee by the Centers for Disease Control and Prevention in response to Senate Report 106-166 (Sept 29, 1999), pages 244-245.

> "The Committee is concerned over the disparities of quality and capabilities of the American public health infrastructure. While biosecurity and bioterrorism threats should be confronted, there continues to be insufficient capital funding by private and public sources of hospitals, laboratories, clinics, information networks, and other necessary elements to the provision of public health services. The Committee intends that future funding for biosecurity purposes will incorporate a growing proportion dedicated to public health infrastructure needs. **Therefore, the Committee requests a report that assesses the current state of the Nation's public health infrastructure and makes recommendations on possible actions that could be taken to strengthen key components.** Such a report should include: an identification of the components of infrastructure, the operational capabilities of each component and their interrelationships, the desired goals and outcomes of the national infrastructure, and the suggested means to improve the system in ways that improve public health efficiently and effectively. In addition, the report should also assess global health factors that might influence the domestic public health infrastructure. The department should consult broadly within the public health, medical and international health communities to receive a diversity of viewpoints."

The focus of the report is the domestic public health infrastructure, with an emphasis on its local and State components.

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[*] In the public health arena, the term "surveillance" is defined as the ongoing, systematic collection, analysis, and interpretation of health data necessary for designing, implementing, and evaluating public health programs. (Klaucke DN, Buehler JW, Thacker SB, et al. Guidelines for evaluating surveillance systems. MMWR 1988;37 (s-5):1-18.)

Its purpose is to:

- describe the components of the public health infrastructure, their operational capabilities, and their interrelationships,
- describe desired goals and outcomes of the national public health infrastructure,
- recommend improvements to make public health more efficient and effective, and
- assess global health factors that might influence the domestic public health infrastructure.

To develop the report, CDC staff reviewed current reports and literature about the definition and status of public health's infrastructure and interviewed individuals representing a wide variety of organizations and associations with different perspectives on the state of public health's infrastructure. (A bibliography and list of interviewees are provided in Appendices A and B, respectively.) Key to the preparation was coordination, via senior executive liaison, with a number of ongoing activities at the Federal, state, and local levels, including, planning for the nation's *Bioterrorism Initiative*, development of the *Healthy People 2010 Objectives for the Nation,* implementation of the national *Turning Point Initiative,* and many others. Each of these programs fills unique gaps in the nation's overall pyramid of public health preparedness.

II. Components of Public Health's Infrastructure

What Is the Public Health System?

The Nation's public health system is a complex network of people, systems, and organizations working at the local, State, and national levels. The public health system is distinct from other parts of the health care system in two key respects: its primary emphasis on preventing disease and disability, and its focus on the health of entire populations, rather than individuals. Exhibit 1, Public Health in America, describes public health's functions and the essential services it provides to the Nation.

Exhibit 1: Public Health in America

Vision: Healthy people in healthy communities
Mission: Promote physical and mental health and prevent disease, injury, and disability

Public health:

- Prevents epidemics and the spread of disease
- Protects against environmental hazards
- Prevents injuries
- Promotes and encourages healthy behaviors
- Responds to disasters and assists communities in recovery
- Assures the quality and accessibility of health services

Essential public health services:

- Monitor health status to identify and solve community health problems
- Diagnose and investigate health problems and health hazards in the community
- Inform, educate, and empower people about health issues
- Mobilize community partnerships and action to solve health problems
- Develop policies and plans that support individual and community health efforts
- Enforce laws and regulations that protect health and assure safety
- Link people to needed personal health services and assure the provision of health care when otherwise unavailable
- Assure a competent workforce – public health and personal care
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services
- Research for new insights and innovative solutions to health problems.
  Source: Public Health Functions Steering Committee. *Public Health in America.* July 1995.
  http://www.health.gov/phfunctions/public.htm

Both the public and private sectors have key roles and responsibilities in public health. The Nation is served by more than 3,000 county and city health departments, more than 3,000 local boards of health, 59 State and territorial health departments, Tribal health departments, more than 160,000 public and private laboratories, and a series of Federal health and environmental agencies that set national standards and provide funding, training, scientific guidance, and technical support. Their work is joined by a variety of managed care organizations, hospitals, numerous faith, civic, and volunteer groups, and key national associations, including the National Association of County and City Health Officials (NACCHO), the Association of State and Territorial Health Officials (ASTHO), the Association of Public Health Laboratories (APHL), the National Association of Local Boards of Health (NALBOH), the Council of State and Territorial Epidemiologists (CSTE), veterinarians' professional associations, and the American Public Health Association (APHA). All must work together to ensure a healthy citizenry and a healthy environment.

Building Public Health's Infrastructure: One of Four Goals in *Preventing Emerging Infectious Diseases: A Strategy for the 21st Century*

"The **public health infrastructure is the underlying foundation** that supports the planning, delivery, and evaluation of public health activities and practices.

For Goal III: Infrastructure and Training, the objectives and activities focus on enhancing epidemiologic and laboratory capacity in the United States and internationally.

In the United States, this requires improving CDC's ability to communicate electronically with its partners and strengthening CDC's capacity to serve as a reference center for diagnosis of infectious diseases and drug-resistance testing.

The objectives and activities also address the need to enhance the nation's capacity to respond to outbreaks, including those caused by bioterrorism, and to provide training opportunities to ensure that today's workers and future generations are able to respond to emerging threats."
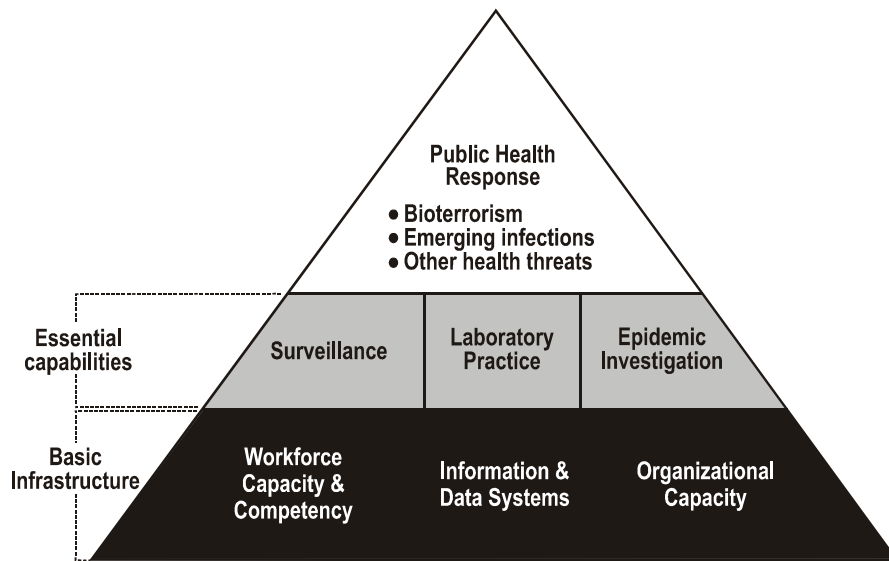

Unfortunately, this network of people, systems, and organizations is fragile and has been under stress for decades. Beginning with the Institute of Medicine's (IOM)1988 report*, The Future of Public Health*, the past decade saw a number of calls for improving public health's infrastructure.[15] These include the *Centers for Disease Control and Prevention's Strategic Plan for Preventing Emerging Infectious Diseases*.[16] One of the Plan's four goals addresses strengthening the public health infrastructure to support surveillance and research and to implement prevention and control programs.

The common good of a solid public health infrastructure depends on a sustained, consistent Federal, State, and local investments. Federal investment will help leverage funding to improve not only the infrastructure but also the leadership needed to set standards, maintain accountability, and deliver the greatest possible protection against a variety of threats to our health.

What Is the Public Health Infrastructure?

The public health infrastructure is but one piece of a larger public health system. Turnock has described public health infrastructure as "the nerve center of public health."[17] The three components of public health infrastructure, taken together, form the foundation for our Nation's overall "Pyramid of Preparedness" (Exhibit 2).

Exhibit 2
Pyramid of Public Health System Preparedness

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                    Public Health
                      Response
                   • Bioterrorism
                   • Emerging infections
                   • Other health threats

Essential        Surveillance | Laboratory  | Epidemic
capabilities                  | Practice    | Investigation

Basic            Workforce    | Information &| Organizational
Infrastructure   Capacity &   | Data Systems | Capacity
                 Competency   |              |
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The three components of the basic public health infrastructure are:

- **Workforce Capacity and Competency**: the expertise of the approximately 500,000 professionals who work in Federal, State, and local public health agencies to protect the public's health.

- **Information and Data Systems**: up-to-date guidelines, recommendations, and health alerts and modern, standards-based information and communication systems that monitor disease and enable efficient communication among public and private health organizations, the media, and the public.

- **Organizational Capacity**: the consortium of local and State public health departments and laboratories, working side-by-side with private partners, to provide the essential services of public health.

These components are interrelated. Deficiencies in one area – or in one jurisdiction – have a ripple effect throughout the entire public health system. Therefore, the goal of strengthening public health's infrastructure is to achieve improvements in all three of these areas, in every part of the country.

As with military preparedness, our public health system must be ready at all times to ward off threats and respond to crises. That same system can, through community partnerships and efficacious interventions, elicit improvements in the health of its community residents. If the public health system is fully **prepared** to carry out the essential services, then communities across the country will be better **protected** from both routine and acute health events.

Every health department fully prepared; every community better protected.

The current status of each of these components is described below.

Workforce Capacity and Competency

Current estimates suggest that the governmental portion of the public health workforce includes 500,000 professionals, deployed approximately evenly at the local, State, and national levels. At the local level, public health workers are found not only in local health agencies, but also in private and nonprofit organizations concerned with the public's health (Exhibit 3). The most common professional disciplines are physicians, nurses, environmental specialists, laboratorians, health educators, disease investigators, outreach workers, and managers. The public health ranks also include dentists, social workers, nutritionists, anthropologists, psychologists, economists, political scientists, engineers, information technology specialists, public health informaticians, epidemiologists, biostatisticians, and lawyers.[18]

Exhibit 3
The Professional Public Health Workforce by Setting
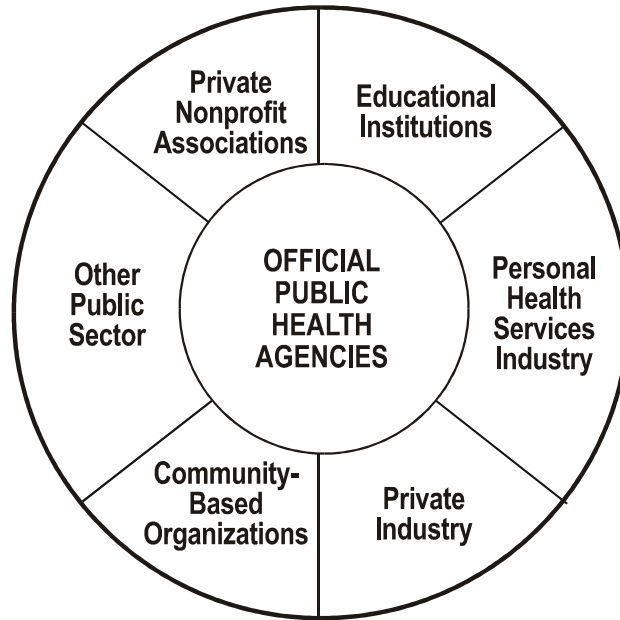
According to the Health Resources and Services Administration (HRSA), in 1989 only 44 percent of these 500,000 workers had formal, academic training in public health, and those with graduate public health degrees were an even smaller fraction.[19] This was true at all levels and in all areas of expertise within public health, including its top leadership. As of 1997, 78 percent of local health department executives did not have graduate degrees in public health.[20] Many public health professionals also lack opportunities for continuing education in their fields.

This lack of formal training creates barriers to individual development as well as to the development of public health as a recognized profession. The statistics highlight the gap between the increasing demands placed on the highly dedicated and motivated public health workforce and the increasing complexity of disease patterns, interventions, and partnerships and the technology, tools, and training necessary to meet these escalating demands.

Furthermore, especially at the State level, government hiring freezes and personnel policies hinder the ability of health departments to recruit and retain talented public health professionals. The average tenure of a State health department chief executive – increasingly a political appointee – is two years.[21]

In the early 1990s, a joint Public Health Faculty-Agency Forum outlined a set of core competencies for public health professionals to help identify the specific competencies required for optimal public health performance. These competencies, shown in Appendix C, were then tied to the essential public health services. These competencies must be continually strengthened through a system of lifelong learning to ensure a workforce ready to meet the latest demands.

Information and Data Systems

As with the workforce, demands on our Nation's public health information infrastructure have never been greater. Today, global travel, immigration, and commerce can move microbes and disease vectors around the world at jet speed, yet our public health surveillance systems still rely, in many cases, on a time-consuming, resource-intensive "Pony Express" system of paper-based reporting and telephone calls.

A Data and Information Gap . . .

What's behind asthma's explosive growth?

Asthma is the most common medical cause of absence from school and the most frequent cause of trips to hospital emergency rooms – and it is increasing at a rapid and mysterious pace, reaching epidemic proportions.

Why? We don't know. Today, 27 States have no asthma monitoring program, and 30 States have no current information on asthma among State residents.

"We have blindfolded ourselves," said James O'Hara, executive director of Georgetown University's Health Track, **"because most States don't have access to one of the least expensive and most effective tools for preventing the spread of the disease: information."**

In our day-to-day world of pagers, cell phones, and frequent e-mail communication between everyone from kindergartners to grandparents, it is sobering to consider the current status of public health's data and information systems. In 1999, CDC and NACCHO conducted an e-mail test to see how quickly local health departments could be contacted in the event of a health alert or bioterrorist emergency. In this test, only 35 percent of CDC's e-mails were delivered successfully, for a variety of reasons. Some public health laboratories – often the first to detect a new pathogen – still report their results by surface mail, with lag times up to 10 to 14 days.[22]

In a February 1999 survey of local health departments, CDC found that only 45 percent had the capacity to send broadcast facsimile alerts (i.e., multiple "faxes" sent simultaneously to labs, physicians, State health agencies, CDC, or others). Similarly, fewer than half had high-speed continuous access to the Internet, and 20 percent lacked e-mail capabilities.

Lack of access to communication networks is not the only issue of concern. In response to a 1998 survey about infrastructure problems, a local health department confessed to not reporting diseases because doing so would have meant a long-distance phone call.

These gaps in the basic information infrastructure are troubling because not only do they prevent public health agencies from communicating with each other in a timely manner,

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but they also hinder communication between public health staff, private clinicians, or other sources of information about emerging health problems.

> **The public health surveillance system is a network that simply cannot perform its protective function if its detection and reporting capacity is uneven.**
>
> -- M. Osterholm

These basic communication gaps also exacerbate other problems, particularly the existing fragmentation of surveillance systems and the variability between various jurisdictions in terms of their communication infrastructure. A strong and responsive communication and surveillance system cannot realize its full public health potential if some jurisdictions lack the skills and/or technology to detect and report emerging problems. The public health surveillance system is a network that simply cannot perform its protective function if its detection and reporting capacity is uneven. [23]

Several recent infusions of funding and attention have begun to address some of these problems.
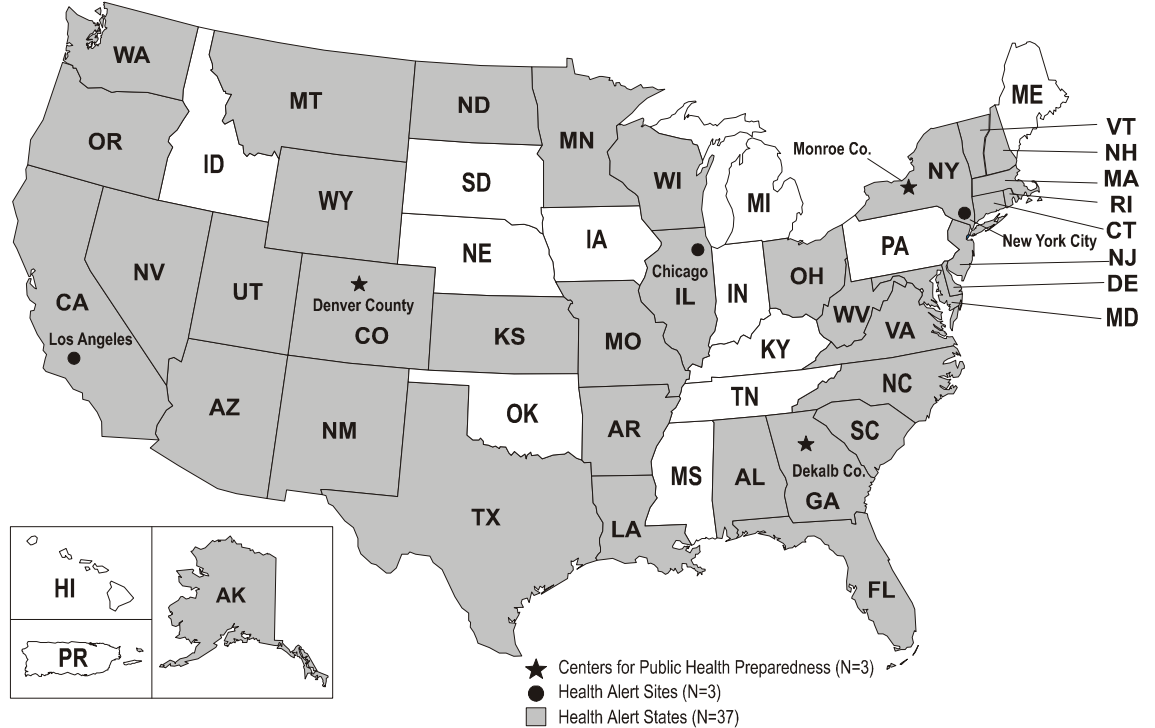
In FY1999, with congressional support and funding, CDC launched the national Health Alert Network to improve information access and training for local health departments. A total of 40 sites—37 States and 3 large cities—have now been funded to begin **basic** implementation of Internet connectivity, broadcast communications, and distance-learning capacity at the local level. In addition, 3 local health departments have been funded as "Centers for Public Health Preparedness" to develop more advanced applications for sister agencies nationwide. The Network is being jointly developed by local, State, and Federal partners, and initial implementation is progressing successfully in the funded sites.

Health Alert Network (HAN)

- Public health preparedness and response begins at the local level.
- Purpose of HAN: Ensure that local health agencies have core capacity to:
  - Access technical information immediately,
  - Track diseases and exposures,
  - Communicate rapidly with health officials, the public, and media,
  - Keep public health professionals trained.
- The HAN will build a standard nationwide information technology infrastructure, focusing on three primary areas:
  - High-speed, continuous Internet connectivity,
  - Broadcast communications,
  - Satellite- and Web-based distance learning.
- The HAN targets local health agencies strategically located in each state and territory.
- The HAN leverages Federal, State, and local funding to accomplish its goals.
  http://www.phppo.cdc.gov/han

**Health Alert Network and Local Centers for Public Health Preparedness
Funded Sites (1999-2000)**

Map legend:
★ Centers for Public Health Preparedness (N=3)
● Health Alert Sites (N=3)
▦ Health Alert States (N=37)

Map labels: WA, MT, ND, MN, ME, OR, ID, WY, SD, WI, MI, Monroe Co., NY, VT, NH, MA, RI, CT, NJ, DE, MD, NV, UT, Denver County, CO, NE, IA, Chicago, IL, IN, OH, PA, New York City, CA, Los Angeles, KS, MO, KY, WV, VA, NC, AZ, NM, OK, AR, TN, SC, Dekalb Co., MS, AL, GA, TX, LA, FL, HI, AK, PR

West Nile Virus: Infrastructure Investments Pay Off

For a year before the 1999 West Nile virus outbreak in New York, the state's health department had benefited from extensive infrastructure investments to improve the health department's information systems.

In the winter following the outbreak, this foundation allowed the New York team to rapidly develop five new secure statewide disease surveillance systems, a secure electronic collaboration system, and a secure system for rapid information in just 2.5 months.

Without the experienced staff, sophisticated tools, and secure electronic connectivity in place, these activities would have taken years to develop.

In FY 2000, with congressional support and funding, CDC launched the National Electronic Disease Surveillance System (NEDSS) by providing support to 46 States and 3 large metropolitan areas. NEDSS provides national standards, specifications, and working prototypes so that critical information collected by the local health departments supported by the Health Alert Network can be used to detect and manage outbreaks that affect more than one local or State jurisdiction. This is critical because, like the recent West Nile virus outbreak, a food-borne disease outbreak due to a widely distributed commercial product or a bioterrorist event could potentially involve widely dispersed geographic areas.

Also promising is the effort to develop standardized electronic reporting of surveillance data from emergency departments to health departments. The Data Elements for Emergency Department Systems (DEEDS) program, currently in a pilot testing phase, would establish uniform specifications for data that are entered in emergency department patient records. If these standards are widely adopted, then the current incompatibilities in emergency department data will be reduced, making this important source of information more accurate, useful, and efficient.

Sustained development at all levels is required to fill the current gaps and keep pace with future changes and to ensure that public health data are relevant and usable at all levels.

Organizational Capacity

As noted above, public health organizations include a network of Federal, State, and local health departments and laboratories. Local public health is often further subdivided into categories that sort health departments by the size of the population they serve. At the larger end of the spectrum, these include large city and county health departments that serve more than 100,000 people with staffs of dozens or even hundreds of people. In rural counties, a local health department might include only a public health nurse and environmental health worker, serving 10,000 or fewer people.

State and local public health agencies, in turn, work in concert with a range of other public organizations, as well as private and not-for-profit organizations, to monitor and improve the public's health and deliver the essential services of public health. These partnerships include hospitals and managed care organizations, community-based organizations that provide services at the local level, advocacy groups that track progress in combating particular diseases or disabilities, the research community, academia, and an array of faith, civic, and voluntary groups.

In many communities, issues such as HIV/AIDS testing, teen pregnancy prevention, immunizations, racial disparities in health outcomes, and firearm injuries are viewed not only as public health issues but as political and social issues on which opinions differ and a consensus on solutions is elusive. In these situations, public health organizations must draw not only on their technical skills in disease prevention and health promotion but also on talents for participating in collaborative efforts, building trust in communities, and providing objective data on health trends to policy makers and community members.

In addition, public health organizations, as stewards of the public's health, rely on regulatory authorities to enforce State and local statutes designed to protect the public's health, including inspections of restaurants, swimming pools, drinking water supplies, and environmental hazards. This feature of public health can also draw resistance from individuals and organizations.

Against this backdrop, what do we know about the performance of public health organizations? Throughout the 1990s, a number of studies tried to gauge health department performance against 20 public health practice performance measures that capture the types of activities reflected in the essential services of public health: investigating adverse health events, maintaining laboratory services, implementing public health programs, maintaining collaborative networks with other organizations, providing information to the public, collecting data about risk factors, and evaluating public health programs. In a 1998 study conducted by the University of North Carolina using these 20 measures, the nations largest health departments had an overall average score of only 64 percent.[24]

Through field testing activities of the National Public Health Performance Standards Program in 2000, CDC collected extensive data from three State public health systems and 131 local public health systems on their capacity to deliver the essential public health services. The three State public health systems have performance levels of 51, 40, and 56 percent. These data are the first measures of performance of State public health systems and show that states have half or less of the organizational capacity they need to perform the essential services optimally. The average performance scores for the local public health in the three states were 55, 62, and 53 percent. While these scores indicate the local public health systems are performing at slightly higher levels than State public health systems, they are still performing very poorly.

Although other studies used slightly different methods, they yielded a consistent result: "less than optimal functioning of the public health system nationally and in many States."[25] The studies generally showed that health departments serving larger jurisdictions performed more of these types of services than smaller health departments. Even so, the studies showed that overall, local health departments were performing somewhere between 50 and 70 percent of the services deemed essential for protecting the public's health.

Another way of looking at the performance of public health organizations is to ask, "What percentage of the American population is effectively served by its health departments?" Two national studies, also conducted during the 1990s, concluded that only a third of the U.S. population was effectively served.[26]

These results are troubling on several fronts. First, as noted above, a patchwork system with considerable variation – some pieces working reasonably well while others are falling apart – is no system at all. Since public health threats are unpredictable, effective responses depend on being prepared. Both the vigilance to anticipate and identify threats and the capacity to respond quickly are lacking in too many health departments.

In part, this is the cumulative result of budget cuts, lack of staff training, and outmoded information systems and laboratories. But the gap has persisted and widened because in addition to this attrition, the demands on the public health system have grown. For both reasons, the public health infrastructure has not been able to keep pace.

III. Factors Affecting Public Health's Infrastructure

A number of domestic and global factors affect whether or not public health can achieve its goal of being fully prepared to protect the American people.

Domestic factors

Domestic factors include:

- **Complacency.** Continued progress against microbes and other causes of disease is not guaranteed. Complacency about the need to maintain vigilance against public health threats has allowed the costly resurgence of many nearly eliminated diseases, including, most recently, tuberculosis and measles (estimates of the costs of losing control of TB were $1 billion in New York City alone).[27]

- **Scope and variability of skills required.** Throughout the public health system, the required skill set includes the ability to investigate outbreaks (including questionnaire

design, interview techniques, and specimen collection), assess population health status, formulate effective community prevention services, use computer and communication systems, apply interpretive and analytic skills, and other activities. The gap between the needed skills and existing skills is wide.

■ **Relationships with other health organizations.** Public health cannot successfully fulfill its mandates without the cooperation of others. For example, disease reporting requires skill in recognition and commitment from private clinicians. These relationships and communication channels are not as strong or uniform as they could be, adding to the variability of public health's basic functions.

The Costs of Neglecting TB

"Without question, the major reason for the resurgence of tuberculosis was the deterioration of the public health infrastructure essential for the control of tuberculosis. It has been estimated that the monetary costs of losing control of TB were in excess of **$1 billion** in New York City alone."

Ending Neglect, 2000

Treatment of multidrug-resistant tuberculosis costs $250,000 per person, compared to conventional treatment costs of $25,000 per person.

IOM, 1997

Global Factors

Distinctions between domestic and international health problems are losing their usefulness and often are misleading. *IOM, 1997*

A recent IOM report, *America's Vital Interest in Global Health*, makes a persuasive case that the distinctions between domestic and global health problems are becoming increasingly blurred. The constant and massive movement of people and goods around the world makes national boundaries meaningless, at least in terms of disease transmission.

For this reason, the effectiveness of the U.S. public health depends, in part, on the strength of a broader global public health infrastructure. For example, the IOM report suggests that the AIDS epidemic might have been contained if international surveillance had been able to detect the presence of a new disease pattern before it had already spread so widely around the world.[28]

Global factors that affect our own public health infrastructure include:

■ **Global movement of goods and people.** Travel, immigration, migration, and global commerce (especially of agricultural products) make the movement of diseases and vectors not only possible, but likely.

■ **Antimicrobial resistance.** Continued misuse of antibiotics in the United States and abroad (in both humans and animals) has led to drug-resistant strains of many major microbes that cause infectious diseases including tuberculosis, malaria, and gonorrhea.

- **Global public health infrastructure gaps.** Diseases that are undetected and uncontrolled in other countries have a higher likelihood of reaching our shores. Tuberculosis[29] and antimicrobial resistance are examples of global health problems that cannot be resolved exclusively within our borders.

- **Environmental and ecologic changes.** Deforestation, irrigation, and patterns in agricultural production and pesticide use all affect our environment.

- **Bioterrorism.** The United States is a target for the deliberate introduction of communicable diseases into our midst; however, bioterrorist events should be considered within the broader context of other infectious disease threats.[30] Since biologic weapons are designed to cause diseases that exist in nature, the detection and investigation of unusual symptoms and clusters is exactly the same as it would be for other diseases. In a biologic attack scenario, victims will seek medical attention from doctors and hospitals – probably days after their initial exposure. The best defense, therefore, is the same strong infrastructure with the capacity to detect and respond to other diseases.

IV. Desired Outcomes

The overall goal for public health's infrastructure is to have every health department fully prepared with capacity to fulfill the Ten Essential Public Health Services and every community better protected by an efficacious public health system. A key priority of the Secretary and the Department has been the improvement of public health infrastructure through the development of new initiatives and activities aimed at strengthening specific aspects of infrastructure (see Appendix E). However, achieving this goal of strengthening the public health system will require investments at all levels to achieve top performance and accountability of health agencies throughout the public health system.

National Public Health Performance Standards: Accountability in Public Health Investments

In the past decade there have been unprecedented efforts to improve performance measurement and accountability, driven in part by the Federal Government Performance and Results Act (GPRA).

Public health has responded to the calls for greater accountability with specific, measurable objectives for the field's infrastructure, particularly the Nation's *Healthy People 2010* objectives (see Appendix D), and with a plan to implement national performance standards for public health agencies. These parallel efforts, built with the input and consensus of all public health partners, help describe goals and outcomes for a fully functioning and appropriately funded public health infrastructure.

The National Public Health Performance Standards Program has been initiated by CDC in partnership with the National Association of County and City Health Officials, the Association of State and Territorial Health Officials, the National Association of Local Boards of Health, the American Public Health Association, and the Public Health Foundation. The purpose of this program is to develop clear, measurable performance standards that State and local health departments can use to ensure delivery of essential public health services.

Operating under the principle that "what gets measured gets done," the National Public Health Performance Standards Program seeks to:

- Create objective measures that define performance expectations for public health systems at all levels,
- Collect data on these measures to document baseline status and progress over time, and, in doing so,
- Strengthen public health's performance and its perceived value within communities and at the State and national levels.

The consensus performance standards, based on the essential services of public health, have been field tested and, with sufficient funding, are ready to be implemented in a core set of States. These standards can be put to use immediately to identify critical gaps in capacity, improve performance, and provide accountability for infrastructure investments. National implementation is anticipated in 2001.

V. Achieving the Goal: Recommended Improvements

To be fully prepared for threats to the Nation's health and to protect American communities across the country, CDC believes a major national initiative, linking partners at the local, State, and Federal level, would help address crucial gaps in:

- Workforce capacity and competency,
- Information and data systems, and
- Organizational capacities of local and State health departments and laboratories.

Specifically, CDC proposes a performance-based approach to capacity-building to:

- Assess capacity at the local and State levels using consensus performance standards,
- Develop State-wide public health infrastructure improvement plans based upon the capacity assessment,
- Provide core capacity grants and technical assistance to close specific gaps, and
- Evaluate the impact of the assistance using the consensus performance standards.

Local and State planning partnerships could be developed to provide program direction and to guide resource acquisition and allocation. Accountability for program success at the local, State, and Federal level would be tied to specific roles and responsibilities and to performance targets. The recommendations below will require a comprehensive effort from CDC and its public and private sector partners. Specific goals and recommendations for the program are as follows:

1. A Skilled Public Health Workforce

Goal: Each community will be served by a fully trained, culturally competent public health team, representing the optimal mix of professional disciplines.

Recommendation 1: By 2010, ensure that all public health workers have specific competencies in their areas of specialty, interest, and responsibility, including public

health officers, epidemiologists, nurses, occupational and environmental health specialists, laboratorians, behavioral and social scientists, health educators, health communicators, and informatics specialists. This should be accomplished both through the training and credentialing of existing professional staff as well as the addition of new credentialed public health professionals.

Recommendation 2: *By 2010, fully deploy a national, "lifelong distance-learning system" for frontline public health practitioners to ensure continuing education and skill enhancement and to certify core skills in: public health methods, public health surveillance, evidence-based prevention, health promotion, informatics, quality improvement, leadership, program management, and key technical disciplines.*

Recommendation 3: *By 2010, ensure that all State and local public health officers have received formal training as senior public health officials.*

Recommendation 4: *By 2010, ensure that all public health practitioners are competent in the culture(s) and language(s) of the people they serve.*

2. Robust Information and Data Systems

Goal: Each health department will be able to electronically access and distribute up-to-date public health information and emergency health alerts, monitor the health of communities, and assist in the detection of emerging public health problems.

Recommendation 5: *By 2010, ensure that all health departments have continuous, high-speed access to the Internet and standard protocols for data collection, transport, electronic reporting, and information exchange that protect privacy and seamlessly connect local, State, and Federal data systems.*

Recommendation 6: *By 2010, ensure that all health departments have immediate, online access to current public health recommendations, health and medical data, treatment guidelines, and information on the effectiveness of public health interventions.*

Recommendation 7: *By 2010, ensure that all health departments have the capacity to send and receive sensitive health information via secure electronic systems and to broadcast emergency health alerts among hospitals, medical centers, universities, and local public health systems and agencies.*

3. Effective Health Departments and Laboratories

Goal: Each health department and laboratory will meet basic performance and accountability standards that recognize their population base, including census, geography, and risk factors, with specific needs identified through state public health improvement plans.

Recommendation 8: *By 2010, fully implement national consensus performance standards to assess gaps in public health infrastructure and strengthen local and State capacity to: assess health status, prevent disease outbreaks and injuries, protect against occupational and environmental hazards, respond to disasters and emergencies, promote healthy behaviors, and assure the quality and accessibility of health services.*

Recommendation 9: *By 2010, ensure that all health departments have sufficient public health laws and authorities to carry out the essential public health services.*

Recommendation 10: *By 2010, ensure that each health department has access to rapid, high-quality testing and that standards for standards for specimen collection, transport, testing, confirmation, and reporting are utilized.*

V.   Conclusion

In the past century, we have witnessed unprecedented advances in science, technology, longevity, and overall standards of living. With breakthroughs like the mapping of the human genome, it becomes easy – and tempting – to believe that this progress will continue at an ever accelerated pace, allowing us to conquer new problems as they occur.

Yet, as we've seen, some of these very advances have spawned new threats. Only with a uniformly strong public health infrastructure can we combat these threats. Our immediate investment today will buy something truly priceless for tomorrow – enhanced protection for all Americans and improved health for future generations.

Appendix A

Bibliography

Association of State and Territorial Health Officials. Study of State Health Official Turnover. [Unpublished ASTHO data].

Baker EL, Melton RJ, Stange PV, et al. Health Reform and the Health of the Public. *JAMA* 1994; 272:1276-1282.

Bloom, BR. The Future of Public Health. *Nature* 1999;402;C63-64.

Brooke, J. Few Left Untouched After Deadly E. Coli Flows Through an Ontario Town's Water. *The New York Times,* 7/10/00.

Callahan, D. *False Hopes: Why America's Quest for Perfect Health Is a Recipe for Failure.* Simon and Schuster, New York, 1998.

CDC. Strengthening Community Health Protection Through Technology and Training: The Health Alert Network. Report and Recommendations to the Appropriations Committee, United States Senate. April, 1998.

CDC. Public Opinion about Public Health – United States, 1999. *MMWR*, 2000;49(12):258-260.

CDC. Morbidity and Mortality Weekly Reports, Preventing Emerging Infectious Diseases: A Strategy for the 21st *Century*.

Evaluation of Local Public Health System Performance Assessment Tool. Summary of Results for Florida, October-November 1999. [Unpublished Report, 1/00.]

CDC/PAHO/WHO. Public Health in the Americas: National-Level Instrument for Measuring Essential Public Health Functions [Pilot test document]. May 2000.

Editorial. Losing Ground Against Microbes. *The New York Times*, June 18, 2000, p. A14.

Garrett, L. *Betrayal of Trust: The Collapse of Global Public Health.* Hyperion, New York, 2000.

Gebbie K, Hwang I. Preparing Currently Employed Public Health Professionals for Changes in the Health System. Columbia University School of Nursing, New York, 1998.

Geiter, L. [Ed.] *Ending Neglect: The Elimination of Tuberculosis in the United States.* IOM/NAS, Washington, DC, 2000.

Halverson P, Haley D, Mays G. Current Practice and Evolving Roles in Public Health.   In: Halverson P, Kaluzy A, McLaughlin C. Managed Care and Public Health.

Halverson, P. and Mays, G. Public Health Assessment. In: Public Health Administration. Aspen Publishers, Gaithersburg, MD.

Hilts, PJ. Study Find Most States Lack System for Monitoring Asthma. *The New York Times*, June 3, 2000, p. A7.

HRSA. *Health personnel in the United States: Eighth report to Congress.* Washington, DC: US Public Health Service; 1992.

Institute of Medicine. *America's Vital Interest in Global Health.* IOM/NAS, Washington DC, 1997.

Institute of Medicine. *The Future of Public Health.* IOM/NAS, Washington DC, 1988.

Lipton, E. Central Park Shut to Spray for Virus. *The New York Times*, 7/25/00, p. A1.

Mays GP, Miller CA, Halverson PK. Local Public Health Practice: Trends &Models. APHA, Washington DC, 2000.

Mead et al. Food-related illness and death in the United States. *Emerging Infectious Diseases* 1999; 5:607-625.

Morse, SM. Factors in the Emergence of Infectious Diseases. Emerging Infectious Diseases, 1(1): 1995; 7-14.

National Association of County and City Health Officials. Profile of Local Health Department Capacity to Respond to Potential Bioterrorist Incidents. [Unpublished report.] March 26, 1999.

Nolan, CM. Topics for Our Times: The Increasing Demand for Tuberculosis Services – A New Encumbrance on Tuberculosis Control Programs. *AJPH* 1997;87(4):551-553.

Osterholm, M. Testimony on behalf of the American Society for Microbiology (ASM) to the Senate Labor, Health, and Human Services, Education and Related Agencies Appropriations Subcommittee on the Nation's Public Health Infrastructure Regarding Epidemics and Bioterrorism, 6/2/98.

Profile of Local Public Health Agencies. [Unpublished data.] CDC, Public Health Practice Program Office, Division of Public Health Systems, March 29, 1999.

Roper, WL. Strengthening the Public Health Infrastructure [Speech]. In: Toward Better Public Health [Monograph of three speeches delivered in 1990.]

Shell, ER. Resurgence of a Deadly Disease. Atlanta Monthly, 8/97.

Sorensen AA, Bialek RG. The Public Health Faculty/Agency Forum: Linking Graduate Education and Practice. Final Report. University of Florida Press, Gainesville, FL, 1993.

Turnock B, Handler A, Miller C. Core Function-Related Local Public Health Practice Effectiveness. *J Public Health Management Practice*, 1998, 4(5), 26-32.

UCLA School of Public Health Technical Assistance Group. Report of Review of Public Health Programs and Services, Los Angeles County Department of Health Services. [Unpublished report.] July 1997.

Appendix B

Interviewees and Reviewers

American Public Health Association (APHA)

>Carol Easley Allen, PHD, RN, President, APHA and Professor and Chair, Department of Nursing, Oakwood College, Huntsville, Alabama

>Mohammed Akhter, MD, MPH, Executive Director, American Association of Public Health (APHA)

Association of State & Territorial Health Officials (ASTHO)

>Pat Nolan, MD, MPH, President, ASTHO and Director of Health, Rhode Island Department of Health

>George Hardy, MD, MPH, Executive Director, ASTHO

Association of Public Health Laboratories (APHL)

>Mary Gilchrist, President, APHL

>Scott Becker, Executive Director, APHL

Council of State and Territorial Epidemiologists, Donna Knutson, MS, Executive Director

DeKalb County Board of Health, Georgia, Paul Wiesner, MD, Director

Division of Health Systems and Services Department, Pan American Health Organization (PAHO)
Daniel Lopez-Acuna, MD, PhD, Director

National Association of County & City Health Officials (NACCHO)

>Stephanie Bailey, MD, President, NACCHO and Director of Health, Metro Nashville/Davidson County Health Department, Tennessee

>Pat Libby, MS, NACCHO and Director, Thurston County Public Health and Social Services Department, Olympia, Washington

>Tom Milne, Executive Director, NACCHO

National Association of Local Boards of Health (NALBOH), Ted Pratt, Director of Liaison and Government Relations

Public Health Foundation (PHF)

>Mo Mullet, MD, President, PHF

>Ron Bialek, MPP, Executive Director, PHF

Texas Department of Health, William R. Archer, MD, Commissioner of Health

University of North Carolina School of Public Health, William Roper, MD, MPH, Dean, and Vaughn Upshaw, DrPH

University of South Florida College of Public Health and Association of Schools of Public Health, Charles Mahan, MD, Dean

Washington Department of Health, Mary Selecky, Secretary of Health

Appendix C

Sample Public Health Competencies

Essential Service: Diagnose and investigate health problems and health hazards in the community.

Competencies:

Analytic Skills
- Define a problem
- Determine appropriate use of data and statistical methods for problem identification and resolution, and program planning, implementation and evaluation
- Select and define variables relevant to defined public health problems
- Evaluate the integrity and comparability of data and identify gaps in data sources
- Understand how the data illuminate ethical, political, economic, and overall public health issues
- Make relevant inferences from data

Communication Skills
- *Communicate effectively both in writing and orally (unless a handicap precludes one of these forms of communication)
- Present accurately and effectively demographic, statistical, programmatic, and scientific information for professional and lay audiences
- Solicit input from individuals and organizations
- Lead and participate in groups to address specific issues
- Use the media to communicate public health information

Policy and Development/Program Planning Skills
- Collect and summarize data relevant to an issue
- State policy options
- Articulate the health, fiscal, administrative, legal, social, and political implications of each policy option
- State the feasibility and expected outcomes of each policy option

Cultural Skills
- Understand the dynamic forces contributing to cultural diversity
- Interact sensitively, effectively, and professionally with persons from diverse cultural, socioeconomic, educational, and professional backgrounds and with persons of all ages and lifestyle preferences
- Identify the role of cultural, social, and behavioral factors in determining disease, disease prevention, health promoting behavior, and medical service organization and delivery
- Develop and adopt approaches to problems that take into account cultural differences

Public Health Sciences Skills
- Define, assess, and understand the health status of populations, determinants of health and illness, factors contributing to health promotion and disease prevention, and factors influencing the use of health services
- Understand research methods in all basic public health sciences
- Apply the basic public health sciences including behavioral and social sciences, biostatistics, epidemiology, environmental public health, and prevention of chronic and infectious diseases and injuries

New

- Understands environmental health issues and environmental morbidity factors
- Establish ties with nontraditional public health providers such as school health clinics and occupational safety offices in industry
- Utilize risk assessments (i.e., identifying hazardous exposure and health effects)
- Apply laboratory science skills
- Understand study design, including outbreak cluster investigation
- Facilitate interview (including cultural competencies) and qualitative survey methods
- Utilize public relation skills
- Know existing network of consultants and technical assistance and community-based assets to collect and analyze community health data
- Understands relevant legal and regulatory information
- Identify the scientific underpinnings and ascertain strength of evidence from literature, including effectiveness of interventions
- Prepare and interpret data from vital statistics, census, surveys, service utilization, and other relevant special reports

> *(These lists of organizational competencies for providing essential public health services were done by the Competency-Based Curriculum Work Group of the Subcommittee on Public Health Workforce, Training, and Education. The Work Group began with the universal competencies developed by the Faculty/Agency Forum, divided them into the 10 essential services of public health framework, and added new competencies. Those marked with a * are universal competencies that have been modified.)*
>
> Source: Turnock, BJ. *Public Health: What it is and how it works.* Aspen Publishers, Gaithersburg, MD, 2000.
>
> Reprinted from U.S. Public Health Service. *The Public Health Workforce: An Agenda for the 21st Century.* Washington DC; USDHHS-PHS; 1997.

DATA AND INFORMATION SYSTEMS
- Increase the proportion of public health agencies that provide Internet and E-mail access for at least 75 percent of their employees and that teach employees how to use the Internet and other electronic information systems to apply data and information to public health practice.
- Increase the proportion of public health agencies that have made information available to the public in the last year on the Leading Health Indicators, Health Status Indicators, and Priority Data Needs.
- Increase the proportion of all major National, State, and local health data systems that use geocoding to promote the development of geographic information system (GIS) at all levels.
- Increase the proportion of population-based *Healthy People 2010* objectives for which national data are available for all population groups identified for the objective.
- Increase the proportion of Leading Health Indicators, Health Status Indicators, and Priority Data Needs for which data--especially for select populations--are available at the Tribal, State, and local levels.
- Increase the proportion of *Healthy People 2010* objectives that are tracked regularly at the national level.
- Increase the proportion of *Healthy People 2010* objectives for which national data are released within one year of data collection.

SKILLED WORKFORCE
- Increase the proportion of public health agencies that incorporate specific competencies in the essential public health services into personnel systems.
- Increase the proportion of schools for public health workers that integrate into their curricula specific content to develop competency in the essential public health services.
- Increase the proportion of public health agencies that provide continuing education to develop competency in essential public health services for their employees.

EFFECTIVE PUBLIC HEALTH ORGANIZATIONS
- Increase the proportion of public health agencies that meet national performance standards for essential public health services.
- Increase the proportion of Tribes, States, and the District of Columbia that have a health improvement plan and increase the proportion of local jurisdictions that have a health improvement plan linked with their State plan.
- Increase the proportion of State and local public health agencies that provide or ensure access to comprehensive laboratory services to support essential public health services.
- Increase the proportion of public health agencies that provide or ensure access to comprehensive epidemiology services to support essential public health services.
- Increase the proportion of Federal, State, and local jurisdictions that review and evaluate the extent to which their statutes, ordinances, and bylaws ensure the delivery of essential public health services.

RESOURCES
- Increase the proportion of Federal, State, and local public health agencies that gather accurate data on public health expenditures, categorized by essential public health service.

PREVENTION RESEARCH
- Increase the proportion of public health agencies that conduct or collaborate on population-based prevention research.

Source: Reprinted from U.S. Department of Health and Human Services. *Healthy People 2010: Understanding and Improving Health.* Washington DC; DHHS-PHS; 2000.

Appendix E

Recent CDC/HRSA Initiatives Related to Public Health Infrastructure

Bioterrorism Initiative
Health Alert Network
National Electronic Disease Surveillance System
Emerging Infectious Diseases Program
Food Safety Program
Centers for Public Health Preparedness
National Public Health Leadership Programs
National Public Health Performance Standards Program
Public Health Training Centers
Centers for Health Workforce Distribution
National Health Service Corps
Community Access Program
Critical Access Hospital Program

References

1 Wolinsky, SM. Introduction to *Betrayal of Trust: The Collapse of Global Public Health* by Laurie Garrett, Hyperion, New York, 2000.

2 Lipton, E. Central Park Shut to Spray for Virus. *The New York Times*, 7/25/00, p. A1.

3 Mead et al. Food-related illness and death in the United States. *Emerging Infectious Diseases* 1999;5:607-625.

4 Brooke, J. Few Left Untouched After Deadly E. Coli Flows Through an Ontario Town's Water. New York Times, 7/10/00.

5 Garrett, L. *Betrayal of Trust: The Collapse of Global Public Health.* Hyperion, New York, 2000.

6 National Center for Chronic Disease and Health Promotion. About Chronic Disease; Overall Burden. http://www.cdc.gov/nccdphp/about.htm. August 21, 2000.

7 National Center for Chronic Disease and Health Promotion. Teen Pregnancy. http://www.cdc.gov/nccdphp/teen.htm. August 21, 2000.

8 McGinnis JM, Foege WH. Actual causes of death in the United States. *JAMA* 1993;270(18):2207-12.

9 McGinnis JM, Foege WH. Actual causes of death in the United States. *JAMA* 1993;270(18):2207-12.

10 Centers for Disease Control and Prevention. 2000. *Chronic Diseases and their Risk Factors: The Nation's Leading Causes of Death, 1999.* CDC.

11 National Center for Health Statistics, unpublished data.

12 Guo SS et al. The predictive value of childhood body mass index values for overweight at age 35 years. *American Journal of Clinical Nutrition* 1994;59:810-9.

13 World Health organization. *World Health Report 2000.* Geneva: WHO; 2000.

14 Garrett, L. *Betrayal of Trust: The Collapse of Global Public Health.* Hyperion, New York, 2000.

15 Institute of Medicine. *The Future of Public Health.* IOM/NAS, Washington DC, 1988.

16 Centers for Disease Control and Prevention. Preventing emerging infectious diseases: a strategy for the 21st century. CDC/NCID, 1998.

17 Ibid.

18 Gerzoff, R.B., Brown, C.K., Baker, E.L. *Full-Time Employees of U.S. Local Health Departments, 1992 – 1993*. Journal of Public Health Management Practice, 1999, 5(3), 1- 9.

19 HRSA. *Health personnel in the United States: Eighth report to Congress.* Washington, DC: US Public Health Service; 1992.

20 Gerzoff RB, Richards TB. The education of local health department top executives. J Public Health Management Practice 1997; 3(4):50-56.

21 Association of State and Territorial Health Officials. Study of State Health Official Turnover. 1997

22 Lederberg, J., Shope, R., Oaks, S. Jr. *Committee on Emerging Microbial Threats to Health.* Institute of Medicine, 1992, p. 23.

[23] Osterholm, M. Testimony on behalf of the American Society for Microbiology (ASM) to the Senate Labor, Health, and Human Services, Education and Related Agencies Appropriations Subcommittee on the Nation's Public Health Infrastructure Regarding Epidemics and Bioterrorism, 6/2/98.

[24] Halverson, P. and Mays, G. "Public Health Assessment" in Public Health Administration: Principles for Population-Based Management by Novick, Lloyd E. and Glen P. Mays, Aspen Publishers, Gaithersburg, MD, 2001, p.288)

[25] Association of State and Territorial Health Officials.   Study of State Health Official Turnover. 1997

[26] Turnock BJ, Handler AS, Hall W, Potsic S, Nalluri R, Vaught EH. Local Health Department Effectiveness in Addressing the Core Functions of Public Health. Public Health Reports 1994;109(5):653-658.

Turnock BJ, Handler AS, Miller CA. Core Function-Related Local Public Health Practice Effectiveness. Journal of Public Health Management and Practice 1998;4(5):26-32.

[27] Geiter, L. [Ed.] *Ending Neglect: The Elimination of Tuberculosis in the United States*. IOM/NAS, Washington, DC, 2000.
[28] Institute of Medicine. *America's Vital Interest in Global Health*. IOM/NAS, Washington DC, 1997.

[29] Geiter, L. [Ed.] *Ending Neglect: The Elimination of Tuberculosis in the United States*. IOM/NAS, Washington, DC, 2000.

[30] Osterholm, M. Testimony on behalf of the American Society for Microbiology (ASM) to the Senate Labor, Health, and Human Services, Education and Related Agencies Appropriations Subcommittee on the Nation's Public Health Infrastructure Regarding Epidemics and Bioterrorism, 6/2/98.