

# Public health infrastructure and services

**Figure 10:** Stages of public health and medicine

Period	Public health	Medicine
Pre-20th century era of infectious disease: cooperation	Focus on prevention, sanitary engineering, environmental hygiene, quarantine	Focus on treatment; direct patient care within comprehensive framework
Early 20th century era of bacteriology: professionalization	Establishment of targeted disease control	Establishment of biomedical model of disease; development of medical education standards
Post-WW II era of biomedical paradigm: functional separation	Focus on behavioral risk factors, establishment of publicly funded medical safety net	Pursuit of biological mechanisms of disease; success with pharmacology, diagnostics, therapeutic procedures

Source: Institute for the Future

The mission of public health is to assure the conditions that transcend individuals in which people can be healthy.<sup>157</sup> Public health shall carry out its mission through organized, interdisciplinary efforts that address the physical, mental and environmental health needs of communities and populations at risk for disease and injury.

## Trends and profile: Public health infrastructure

- The public health system is not a single entity. It is a loosely affiliated network of approximately 3,000 federal, state, and local health agencies that often work closely with private, voluntary and professional health associations.
- It is difficult to assess the status of the public health infrastructure. In order to ensure that the system works efficiently and effectively, there needs to be a clearer understanding of the functional assets, fiscal capabilities and constraints of the system.

- Strengthening the nation's public health infrastructure is important, not only to deal with the health consequences of terrorism and other disasters, but for coping with the many other significant health and safety issues that affect our population (e.g., infectious diseases and immunizations, drinking water, hazardous waste disposal, and insect and rodent control).
- Since September 2001, Congress has allocated approximately \$3 billion to strengthen the public health infrastructure. The U.S. Centers for Disease Control and Prevention (CDC) is the principal agency for allocating funds to the states, which, in turn, distribute the funds to local jurisdictions. The result has been tremendous variation in local preparedness.<sup>158</sup>

## Trends: Globalism

- Public health in the United States is directly affected by the forces of globalism and effective programs cannot be implemented in many areas without a global perspective and international cooperation.
- The world's economy is more interconnected than ever before. The advent of free-trade agreements and expanded world travel has added to the complexity of public health in the United States.
- A global economy brings with it associated health risks. These risks include new infectious disease, contaminated food, spread of emerging and drug-resistant diseases, bioterrorism and toxic substances. These risks require a new level of surveillance and international cooperation.
- Antibiotic resistance remains a growing concern.

## Trends: Health promotion and prevention

To find information about aging, chronic diseases, and behavior related issues, please go to the Health Status chapter.

### Influenza

- Influenza and its complications kill about 36,000 people in the United States each year, mainly the elderly and younger patients whose ability to fight disease has already been compromised. Influenza also leads to an average of more than 200,000 hospitalizations per year. Despite dramatic evidence of the success of the flu vaccine, efforts to expand flu shot campaigns have been hobbled by economic and scientific challenges.
- Less than half of Americans, who are in a segment of the population for which vaccination is recommended, actually get vaccinated each year.
- The current method of manufacturing inactivated influenza vaccine is extremely time intensive. It relies on growing viruses in millions of fertilized chicken eggs and generally takes six-to-eight months to complete.
- There needs to be additional research on ways to produce vaccines that do not depend on eggs.
- For the 2005-2006 flu season, the U.S. Centers for Disease Control and Prevention bought about 11.5 million doses—out of 86 million produced by private manufacturers—with much of it then resold to state health departments.<sup>159</sup>
- The CDC has acknowledged that there are significant flaws in the United States flu vaccine-distribution system and is considering expanding the federal government's role in buying and tracking the flu vaccine. An influenza pandemic will both magnify and be magnified by these problems.

## Vaccination

### *Pediatric*

- An increasing number of new pediatric vaccines are entering the market and being recommended by the Advisory Committee on Immunization Practices. While this pipeline is likely to slow down in the next 10 years, the number of new vaccines are adding a large fiscal burden to the U.S. health care system.
- The 317 discretionary funding programs will hit a crisis in the next few years. The 317 program provides funding to states for the maintenance of the infrastructure needed to deliver pediatric vaccines and in many states, is used to cover underinsured children (VFC only covers uninsured children). The program has been under funded for several years and has been the target of numerous budget cuts.
- The growing anti-vaccine grassroots movement will continue to make it harder for physicians to deliver vaccines. These groups are working at the state level to pass legislation that would remove school entry requirements (as supported by AMA policy), put up barriers to immunization by undermining public trust in the system that approves and recommends vaccine.
- Vaccine supply, while not as unstable as adult vaccines due to a consistent demand, is still fragile and vaccines with single manufacturers are still susceptible to production issues that disrupt the supply chain.

### *Adolescent and adult*

- More than 50,000 adults continue to die in the United States from vaccine-preventable diseases and many more are hospitalized, creating a substantial burden on the health care system.
- Adolescent and Adult Immunization is severely undervalued in the United States. The public are unaware of their huge benefits and physicians serving these populations do not consistently offer vaccines.
- Unlike pediatric vaccines, where the VFC program and the 317 program have funded a fairly stable infrastructure for vaccine delivery, no such infrastructure exists for adolescent and adult vaccines. Influenza vaccine supply issues are a reflection of the problem.
- There is limited public-private collaboration to support adults receiving vaccines and providers immunizing, and to convert non-immunizing providers into immunizers.
- Reimbursement for procuring and administering adult vaccines is unsatisfactory.
- Adult Immunization is very much an access to care and health disparities issue. Unlike pediatric immunization, where disparities are minimal due to the strong acceptance of well-care visits and the existence of the VFC and 317 programs, adult immunization suffers from the general lack of preventive care in the adult population, which is magnified by socio-economic and racial strata.
- Many adult vaccines in the R & D pipeline will not see the light of day in absence of a consistent demand for adult immunization by both the public and by physicians.
- A strong adult immunization infrastructure will prepare the country for events such as major disease outbreaks and any potential influenza pandemic, which would require the delivery of more than 300 million doses of vaccine or medications.

## *Pandemic planning*

- Pandemic influenza is a potential public health threat.
- The CDC has created a National Electronic Disease Surveillance System (NEDSS) designed to integrate and standardize the tracking of infectious diseases. The goal is to speed up reporting and to enable labs to report information about communicable diseases to health departments.
- Public health goals for vaccination during an influenza pandemic include:
  - Developing pre-pandemic strategies for vaccine manufacturing and stockpiling that will maximize manufacturing capability;
  - Stockpiling influenza vaccine for strains and subtypes with pandemic potential;
  - Expediting development of a pandemic virus reference strain and distribution of the strain to vaccine manufacturers;
  - Accelerating production of a pandemic vaccine;
  - Maximizing the immune response to the vaccine;
  - Ensuring efficient and equitable distribution of pandemic vaccine, according to priority lists;
  - Providing ongoing and timely monitoring of vaccine coverage; and
  - Providing ongoing and timely monitoring of vaccine safety.<sup>160</sup>

## **Trends: Emergency preparedness**

- The devastation caused by Hurricane Katrina posed unprecedented challenges to health care systems and has underscored the need for a hazards approach in the arena of emergency preparedness. Catastrophic events can, and do, result from intended and naturally occurring sources.
- Fear of a pandemic flu outbreak is increasing in the United States and around the world.
- The emergence of a new lethal strain of the flu virus, against which people have no immunity, has health authorities and experts on high alert.
- Extensive planning for emergencies and disasters has expanded to include bioterrorism, pandemics, hurricanes, tornados and earthquakes. This planning includes improving surge capacity and stockpiling medical supplies for emergency use.
  - Hospitals in nearly one-third of the states and DC are not sufficiently prepared to care for a surge of extra patients.
  - Hospitals in over 40 percent of states do not have sufficient backup supplies of medical equipment to meet surge capacity needs during a pandemic flu or other major infectious disease outbreak.<sup>161</sup>
  - The Strategic National Stockpile was created to serve as a national repository of antibiotics, chemical antidotes, antitoxins, other pharmaceuticals, and other medical supplies to be used in the event of a terrorist attack or major natural disaster or accident.
- The possibility of chemical incident remains a threat. The CDC has identified over 60 toxic substances that could be used as chemical weapons by terrorists. Many of these substances are used regularly for commercial and industrial purposes in the United States.<sup>162</sup>

- Disease reporting has become a critical component in the control of disease and identification of bioterrorism.
- There is a demand for the medical community to be involved in disaster response.
- Clinical resources, such as laboratories, require enhanced capabilities.
- There is an expectation of coordinated regional or territorial resources and response agencies.
- The Health Alert Network (HAN) was created to coordinate electronic communications among health departments and the CDC through the Internet. According to the CDC in May 2005, states still had room for improvement in emergency communication. Only 16 percent of states could contact all of their response partners within 20 minutes, 56 percent of states could contact most partners, and 28 percent could contact some partners in the same time period.

## **Trends: Public health work force**

- The average age of the state public health work force is approximately 47 years, which is 7 years older than the average age of the nation's work force.<sup>163</sup>
- Vacancy rates are one indicator of work force shortages. State public health agencies report on average an 11 percent vacancy rate. While the average is 11, seven states reported vacancy rates between 16 and 20 percent and two states reported vacancy rate over 21 percent.<sup>164</sup>
- In nearly half of the states, 25 percent or more of the state public health work force will be eligible for retirement within the next 5 years. Eight states may have retiree levels of 40 percent or higher.<sup>165</sup>
- Thirty states identified nurses as the field most affected by the public health worker shortage.<sup>166</sup>
- Fifteen states reported shortages in epidemiologists.<sup>167</sup>
- Public health is a specialty of medicine, yet physicians comprise only 3 percent of the practicing public health workforce. Of those, 67 percent work in federal agencies.<sup>168</sup>

## **Predicted impacts for patients**

- In catastrophic events the true “first responder” has been shown to be family and neighbors—everyday citizens. So, education and training programs in disaster preparedness will need to include citizen volunteers in the target audience.
- Patients, especially the elderly, disabled, and chronically impaired will need to be educated about emergency preparedness plans in their communities.
- The lack of patient awareness regarding the importance of immunization among adolescents and adults will exacerbate the problem in the event of an epidemic. An educational effort aimed at this issue is needed.
- Patient suspicion of deleterious effects of vaccines for children, in spite of scientific evidence to the contrary, requires ongoing educational efforts.
- The loose-knit nature of the public health infrastructure will make patient access to public health services in a crisis more difficult.

## Predicted impacts for physicians

- Response to recent natural and man-made disasters has revealed deep inadequacies and vulnerabilities in the preparedness and coordination among clinical, public health, and governmental organizations. Such events clearly indicate the significant need to identify, train, and when indicated, mobilize physicians, in a timely and effective manner. This can only be accomplished through a “registration system” for physician volunteers pre-event.
- Physician leadership and advocacy also will be needed at the local, state and national level of planning for and responding to catastrophic events.
- The public health and private health care systems will need to enhance their communication within their component parts so as to maximize their effectiveness.
- Physicians will be asked to recognize and respond to an unusual increase in demand for broad-based services (e.g., protection against or treatment for chemical exposure, pandemics, etc.).
- Physicians will need to understand and be prepared for their role in public health response.
- If the vaccine supply problems persist, then physicians will no longer provide immunizations.