The Public Health Workforce

Without a competent workforce, a public health agency is as useless as a new hospital with no health care workers.

by Kristine Gebbie, Jacqueline Merrill, and Hugh H. Tilson

ABSTRACT: Defining the public health workforce and specifying its performance requirements present equal challenges as the nation anticipates public health needs for the twenty-first century. The core group of professionals employed by government public health agencies works in close partnership with a wide range of public, private, and voluntary organizations. The wider circle includes almost all physicians, dentists, and nurses, plus many other health, environmental, and public safety professionals. The task of ensuring that this workforce is prepared with skills and knowledge to face both identified and emerging public health challenges is immense.

Public health, a deceptively simple phrase, encompasses all activities undertaken by communities to assure the conditions within which people can be healthy.1 To accomplish this, public health practice is at its heart interdisciplinary, weaving together the various skills, knowledge, attitudes, and worldviews of the multiple professions involved. Many partners contribute to this effort, which is distinguished from medical care by its focus on populations and communities rather than individuals.2 Communities are made up of individuals, however, and lack of care does diminish a community's health. Thus public health services include some provision of care, especially to vulnerable groups.

Public health also reaches beyond medicine or health. Achieving healthier communities requires collaboration with educators, child welfare workers, adult employment counselors, transportation experts, recreation specialists, public safety engineers, housing planners, and emergency responders, among others. Public health professionals respect each contribution and collaborate across organizational lines, such as in making epidemiological information useful to emergency, fire, and police commanders responding to emergencies.

Range of public health partners. Recent events highlight the crucial role of partnerships. During the anthrax crises of 2001–02 the public health community provided expert information on the disease agent, public information on the risks of exposure, and treatment guidelines to government agencies and private health caregivers and to the public via information hotlines. Partners in response included law...
enforcement and other public safety agencies, the hospital and community health systems, office-based physicians, and the media.

Both the terrorist hijacking and anthrax events required public health professionals to cooperate across governmental levels as well. In New York City the response involved the FBI, the U.S. Public Health Service, the Environmental Protection Agency, and the Air National Guard, among others. New York State provided additional staff to multiple local agencies, as well as specialized laboratory assistance. Local hospitals and physicians participated in public education, screening for potential disease cases, and distribution of preventive drugs. In the first two weeks of October 2001 collaborators such as these responded not only to actual anthrax exposures but to more than 2,300 false alarms and hoaxes nationwide.3

More than emergencies. Beyond the public health response to emergencies and urgent health threats, public health workers prevent disease and promote health through collaboration with a growing circle of partners. For example, poor nutrition and lack of physical activity have combined to create a heavier population at increased risk of many chronic diseases. Effective community action to change the risk factors and rear a generation of leaner, more fit adults might be accomplished by the combined efforts of the entire health community, educators, recreation specialists, transportation professionals, grocery and restaurant workers, employers, union officials, and civic leaders. It is unlikely that any one of these groups alone could make and sustain the change.4

The systemic underfunding of public health has become a part of public discourse in Congress and elsewhere at a level not heard in recent memory. Within public health, however, dialogue about the need for infrastructure support began in earnest more than a decade ago with a 1988 Institute of Medicine (IOM) study of the U.S. public health system.5 Healthy People 2010 set specific public health infrastructure objectives to improve public health data and information, public health systems and relationships, and the public health workforce.6 Activities targeting the Healthy People 2010 workforce objectives include development of competencies for public health practice, identifying opportunities for and examples of collaboration between public health and traditional medical practice, and clarifying the composition of the workforce.7 This paper summarizes recent efforts by the public health workforce to describe itself and to define its complex knowledge needs. It further identifies research questions and challenges to current policy and resource allocation that must be addressed, if the professionals needed by the nation’s public health infrastructure are to be provided.

Who Is A Public Health Worker?

Public health workers are defined as all those responsible for providing the essential services of public health regardless of the organization in which they work.8 The essential services provided by these workers include the following: (1) Monitor health status to identify community health problems; (2) diagnose and
investigate health problems and health hazards in the community; (3) inform, educate, and empower people about public health issues; (4) mobilize community partnerships to identify and solve health issues; (5) develop policies and plans that support individual and community health efforts; (6) enforce laws and regulations that protect health and ensure safety; (7) link people to needed personal health services and ensure the provision of health care when otherwise unavailable; (8) ensure a competent public health and personal health care workforce; (9) evaluate effectiveness, accessibility, and quality of personal and population-based health services; and (10) conduct research for new insights and innovative solutions to health problems. Some of these workers are obvious: The epidemiologist working for a city health department investigating outbreaks of foodborne disease is clearly a public health worker, as is the restaurant inspection sanitarian or the immunization nurse. But so is a hospital-based nurse investigating nosocomial infections and the office-based physician assistant reporting a notifiable condition to the health department.

Official public health agencies are the most common employers of the nearly 500,000 identifiable public health workers. In 2000 official federal agencies employed 19 percent of this workforce; state agencies, 33 percent; and local public health agencies, 34 percent. Other settings such as schools of public health accounted for the remaining 14 percent.

The public health workforce definition encompasses many others who have not been counted. These include persons responsible for occupational safety and health in industry, unions, and government; those doing population-focused health education on behalf of voluntary organizations (heart disease, cancer, or diabetes) and large health care systems; and those reducing environmental hazards, employed by both governmental agencies and other enterprises.

**Range of definitions.** Public health workers may be defined on three major dimensions: specific profession (the worker), place of employment (the work setting), or focus of concern (the work). A combination of labor market, civil service, and salary dynamics makes the choice of any one of these problematic.

*The worker.* Professional categories define workers by formal educational attainment and in some cases a state-issued license to practice. Those in public health may have initial preparation in one of many professions: dentistry, medicine, nursing, social work, engineering, or law; they may hold a master’s or doctoral degree specifically in public health; some hold both public health and other degrees. Fields include epidemiology, sanitation, statistics, nutrition, and health education. Job titles are frequently an inaccurate reflection of the educational preparation or the work done by an individual. In smaller organizations and rural areas, for example, a registered nurse (RN) with no specialized public health education may be both the community’s epidemiologist and its health educator. Public health practitioners possessing only on-the-job preparation in outreach and education also make important contributions to programs such as HIV prevention,
reproductive health, or chronic disease management.

The work setting. Place-of-employment definitions include separating governmental from nongovernmental public health activities and indicating the level at which the work occurs (local, state, or national). Essential services of public health, the main criteria for defining public health work, are performed in governmental public health agencies and in private-sector settings such as hospitals and community agencies. Examples of non–health department services include HIV/AIDS education, smoking-cessation programs, maternal/child health promotion, or drinking water systems. Essential public health work is accomplished by using a range of public or voluntary agencies such as surveillance for reportable diseases or community education about health problems such as lead poisoning, pest infestations, or domestic violence. Volunteers augment the activities of governmental public health, including the American Red Cross, the American Lung Association, and others. In 2000, a limited assessment identified close to three million such volunteers.

The work. Work descriptions separate workers by the goal of their function or responsibility. Programmatic labels such as infection control, lead poisoning prevention, child health promotion, or injury prevention may be the common approach to budget structures, although they provide little information on workforce. Numbers of people involved are usually reported as full-time equivalents (FTEs), with or without specification by level or qualifications. Workforce analysis and planning based on FTE information is flawed because a number such as “3 FTE” may represent a partial commitment of as many as ten different workers, each of whom needs access to resources and lifelong developmental opportunities.

Snapshot of public health workforce numbers. Accessible information on public health workers is primarily about those in the fifty-six state and territorial public health agencies and nearly 3,000 local agencies. These vary widely in size and composition, from one or two professionals acting as generalists to several thousand with great internal specialization (Exhibit 1).

In 2000, 50,000 public health nurses served in a variety of roles in governmental public health agencies, nearly 10 percent of the total workforce, the largest professional group in public health. Other estimates place the number of RNs in both public health and community health (including home health) at 400,000 out of a total of 2,186,900 RNs in all settings. National projections indicate the need for more than one million additional nurses within the decade. Public health agencies will be at a disadvantage during this period, because they frequently offer lower wages than private organizations do and will experience intense competition in hiring and retaining these essential workers.

More than 20,000 environmental health professionals and technicians were reported by governmental public health agencies in 1999, but their number may be closer to 60,000, as estimated by their leading professional organization. The variance reflects the evolving nature of this profession. Environmental agencies
EXHIBIT 1
Summary Of U.S. Public Health (PH) Professionals, By Occupational Title, 2000

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Federal agencies</th>
<th>Select voluntary agencies</th>
<th>State and territorial agencies</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health administrator</td>
<td>1,152</td>
<td></td>
<td>14,768</td>
<td>15,920</td>
</tr>
<tr>
<td>Professionals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative/business professional</td>
<td>3,133</td>
<td></td>
<td>1,592</td>
<td>4,725</td>
</tr>
<tr>
<td>Attorney/hearing officer</td>
<td>351</td>
<td></td>
<td>250</td>
<td>601</td>
</tr>
<tr>
<td>Biostatistician</td>
<td>684</td>
<td></td>
<td>480</td>
<td>1,164</td>
</tr>
<tr>
<td>Clinical, counseling, and school psychologist</td>
<td>1</td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Environmental engineer</td>
<td>3,092</td>
<td></td>
<td>1,457</td>
<td>4,549</td>
</tr>
<tr>
<td>Environmental scientist and specialist</td>
<td>3,951</td>
<td></td>
<td>10,931</td>
<td>14,882</td>
</tr>
<tr>
<td>Epidemiologist</td>
<td>5</td>
<td></td>
<td>922</td>
<td>927</td>
</tr>
<tr>
<td>Health economist</td>
<td>86</td>
<td></td>
<td>19</td>
<td>105</td>
</tr>
<tr>
<td>Health planner/researcher/analyst</td>
<td>2,074</td>
<td></td>
<td>1,499</td>
<td>3,573</td>
</tr>
<tr>
<td>Infection control/disease investigator</td>
<td>2</td>
<td></td>
<td>781</td>
<td>783</td>
</tr>
<tr>
<td>Licensure/inspection/regulatory specialist</td>
<td>9,625</td>
<td></td>
<td>4,155</td>
<td>13,780</td>
</tr>
<tr>
<td>Marriage and family therapist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical and public health social worker</td>
<td>170</td>
<td></td>
<td>2,006</td>
<td>2,176</td>
</tr>
<tr>
<td>Mental health/substance abuse social worker</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental health counselor</td>
<td>113</td>
<td></td>
<td>673</td>
<td>786</td>
</tr>
<tr>
<td>Occupation/safety and health specialist</td>
<td>3,619</td>
<td></td>
<td>1,974</td>
<td>5,593</td>
</tr>
<tr>
<td>PH dental worker</td>
<td>1,240</td>
<td></td>
<td>792</td>
<td>2,032</td>
</tr>
<tr>
<td>PH educator</td>
<td>126</td>
<td></td>
<td>2,104</td>
<td>2,230</td>
</tr>
<tr>
<td>PH laboratory professional</td>
<td>9,603</td>
<td></td>
<td>4,485</td>
<td>14,088</td>
</tr>
<tr>
<td>PH nurse</td>
<td>4,311</td>
<td>8,000</td>
<td>36,921</td>
<td>49,232</td>
</tr>
<tr>
<td>PH nutritionian</td>
<td>269</td>
<td></td>
<td>6,411</td>
<td>6,680</td>
</tr>
<tr>
<td>PH optometrist</td>
<td>5</td>
<td></td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>PH pharmacist</td>
<td>1,180</td>
<td></td>
<td>316</td>
<td>1,496</td>
</tr>
<tr>
<td>PH physical therapist</td>
<td>12</td>
<td></td>
<td>60</td>
<td>72</td>
</tr>
<tr>
<td>PH physician</td>
<td>4,055</td>
<td></td>
<td>1,953</td>
<td>6,008</td>
</tr>
<tr>
<td>PH program specialist</td>
<td>3,836</td>
<td></td>
<td>3,984</td>
<td>7,820</td>
</tr>
<tr>
<td>PH student</td>
<td>37</td>
<td></td>
<td>14,996</td>
<td>15,033</td>
</tr>
<tr>
<td>PH veterinarian/animal control specialist</td>
<td>1,929</td>
<td></td>
<td>108</td>
<td>2,037</td>
</tr>
<tr>
<td>Psychiatric nurse</td>
<td></td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Psychiatrist</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Psychologist</td>
<td>688</td>
<td></td>
<td>67</td>
<td>755</td>
</tr>
<tr>
<td>Public relations/media specialist</td>
<td>448</td>
<td>12</td>
<td>115</td>
<td>575</td>
</tr>
<tr>
<td>Substance abuse and behavioral disorders counselor</td>
<td>2</td>
<td></td>
<td>36</td>
<td>38</td>
</tr>
</tbody>
</table>


independent from local public health agencies are common, and the private sector realizes the importance of environmental services. Many sanitarians, for example, are employed in various parts of the food supply and food service industries.
Public health physicians form a relatively small part of the practicing public health workforce (3 percent) but serve in crucial roles, often as chief health official or senior clinician in epidemiology, disease control, or maternal and child health. Recent attention has focused on the need to retain and strengthen the physician's voice in interdisciplinary public health practice and on the need for all physicians to understand and contribute to public health. Neither can happen if physicians are employed by public health programs only for a limited number of clinical hours, or if the public health component of medical education is not strengthened.

Public health laboratory workers support public health surveillance and epidemiology. In governmental agencies they are estimated to number more than 20,000 professionals and technicians. These workers require skills to recognize the public health significance of findings in ways that differ from those of the clinical laboratory. One hallmark is their readiness to respond quickly to surge demands associated with outbreak investigations. Any complete count of these workers, however, would include the staff in other clinical and environmental laboratories such as those that perform testing for hazardous exposure in the workplace.

Supply of professionals. Workforce analysis in public health is challenging because of the complexities described above; it has been complicated by shifts in public policy, public interests, and funding. There has not been a national system of public health workforce studies for at least twenty years, yet other national policies have a large impact on the workforce. There are no long-term recruitment and education strategies to fill the workforce pipeline under even routine conditions. For example, federal legislation enacted in response to the threat of bioterrorism has resulted in approximately 2,300 new jobs in public health at the state level and additional positions in local agencies, with no specific funds to increase the overall pool of prepared workers. At the same time, an economic downturn has lowered tax revenues, leading to cuts in agency budgets and associated staff reductions.

In 2000, thirty-two U.S. schools of public health graduated approximately 16,000 individuals. In addition, fourteen accredited graduate programs of community health education and thirty-five accredited graduate programs of community health/preventive medicine supplied approximately 800 more graduates with a master of public health, health administration, or health educator degree. Most of these graduates find employment outside governmental public health. For example, Columbia University documents that among public health graduates of the past three years, fewer than half have found employment in public health agencies (Exhibit 2). Also, the routine turnover associated with retirement, family relocations, and career changes in all sectors of public health will absorb many graduates, with no increase in overall capacity.

One policy challenge is setting human resources/personnel practices that support adequate staffing of health departments. Within the public health community there is advocacy for development of a competency-based personnel system and reform of civil service systems, hiring practices, and related salary structures.
These were effective in increasing professionalism when they were created but today are unable to react quickly to change and conspire to permit hiring of incompletely qualified persons, paying them less than earned in positions of comparable responsibility in other sectors.

Public Health Knowledge

Core areas of public health. The core areas of public health required in graduate public health degree programs are health services administration, biostatistics, epidemiology, behavioral sciences, and environmental health sciences. These core areas may be the entire focus of study, or another area such as international/global health, public health dentistry, laboratory practice, nutrition, public health practice and program management, maternal and child health, or occupational safety and health may be added. The Public Health Workforce Collaborative, representing federal public health agencies, state and local public health agencies, and academic public health associations, has affirmed that the sciences on which public health is based have expanded to include genomics and informatics, with an increased focus on risk communication and community leadership in environmental and behavioral sciences.

Effective public health practice requires attainment of additional analytic, communication, and cultural skills. Those with more organizational responsibility also need facility in management and financial planning. Some of this knowledge may be part of a professional curriculum, meaning that even a nonspecialized practitioner has rudimentary skills and knowledge. However, only advanced study can lead to mastery of the full range of public health. Those entering a school of public health without a health-related education may need additional basic education in these subjects.

Disparities in worker qualifications raise policy issues in preparation, continuing education, recruitment, and retention. A National Strategic Plan for the Development of the Public Health Workforce has been developed with support from the Centers for Disease Control and Prevention (CDC) and the active participa-
“Public health workers lacking adequate training can cause immense harm that will be measured in illness or death years later.”

Continuing education and distance learning. Even for individuals with the current skills today, continuing education is essential as the field changes. The dispersion of a large proportion of public health workers in small organizations with little backup and limited budgets makes it challenging for these workers to remain current. Expanded availability of distance-learning approaches, including Web-based learning, satellite downlink broadcasts, CD-ROM learning modules, and telephone conference-call courses, eases some of these problems. The Public Health Practice Program Office at the CDC and the Bureau of Health Professions at the Health Resources and Services Administration (HRSA) have funded workforce development and preparedness training centers in close to thirty academic centers, with a strong evaluation component poised to address many of the challenges described here. Individuals must accept responsibility to take advantage of what is offered, and employers must support regular access to these resources.

Credentialing and certification. For the past five years public health leaders have explored the question of whether there should be certification for public health practice. Some states have already moved in this direction. New Jersey requires licensure as a public health administrator for anyone employed to run a local health department; Illinois is moving to certify directors of local health departments. Many states stipulate credentials for state health officials, such as a medical license, or specialized training in preventive medicine or public health. Confusion exists even among those health professionals who are credentialed, because many physicians who are active and effective in public health may have board certification in preventive medicine, but others may come from other specialty areas.

If professional certification were based on having a master of public health (MPH) degree, a majority of today’s workforce would not qualify, and recruitment would be impossible in many areas. Certification by examination or experience beyond the MPH or other professional degree might be redundant for professionals who have specialty certification such as preventive medicine or a graduate degree in public health nursing. National certification for health educators and sanitarians already exists. The number of unresolved issues suggests that it will be some time before there is a well-developed national program.

Competency development. At the same time, the increasing clarity about the competencies needed to practice public health means that desired outcomes can be stated and incorporated into position descriptions or program specifications. The
Council on Linkages between Public Health Practice and Academia has provided an excellent framework of core competencies for front-line professionals, advanced practitioners, and leaders in public health. Grouped in eight domains, these competencies provide a foundation from which more-specific competencies such as those in emergency preparedness and genomics have been built. The eight domains are analytic assessment, policy development/program planning, communication, cultural competency, community dimensions of practice, basic public health sciences, financial planning and management, and leadership and systems thinking. Additional competency sets identify needed capacities in genomics, emergency response, bioterrorism readiness, law, and informatics.

**Integrating public health into all health education.** Accompanying the movement toward better preparation of the public health workforce is an interest in assuring that all health professionals learn rudimentary public health skills. This work includes such activities as expected public health competencies for baccalaureate nursing graduates and the development of basic public health curriculum units suitable for use in any baccalaureate or graduate health professional program. If effectively done, this activity would mean that when those in public health organizations reach out for collaboration, they find a larger pool of partners.

**Challenges To Workforce Development**

Public health has both a day-to-day sustaining role and a pivotal emergency role in every community; this role can only be assured when the workforce has proper resources, allowing official health agencies to partner with the wider circle of public health workers. Thus, the nation faces a basic public policy challenge: to balance this investment with the other high priorities in today’s faltering economy and in the face of the imminent dangers in a terrorized world.

The improvements cannot wait; they must be made without all the answers. The gaps in our knowledge base require a vigorous, comprehensive, and immediate research agenda to support policy decisions. That so many questions remain unanswered, when systems research is already seen as an essential service of public health, only provides further testimony to a long-term lack of resources.

Among the unanswered questions are (1) What is the “right” balance of partnership efforts between governmental public health and other professionals or volunteers? (2) How do the core public health competencies translate into effective professional output? (3) What should be tested, how, and on whom before a credential is issued? (4) What evidence relates the MPH or other degree to productivity in the workplace?

The Academy for Health Services Research and Health Policy has created a new public health systems research focus, which convened for the first time in 2002. This will provide a platform for the dissemination and encouragement of needed public health workforce studies. The nation has made education in other professions a matter of national priority, with standards, targets, and funding. The fund-
ing of public health traineeships and support for educational programs and institutions is equally important.

The public health workforce is a complex mixture of health professionals and others. While the core of this workforce is relatively easy to identify, the edges merge with many other groups having overlapping or congruent missions. For policy purposes, more important than crisply defining the limits of the workforce is the need for continuing development of a knowledge base for defining competency, and for establishing the workforce contribution to an effective public health infrastructure. More important yet is the need to staff each local and state public health agency and partner organization in the community with competent, dedicated public health professionals. Without a competent workforce, a public health agency is as useless as a new hospital with no physicians, nurses, or technicians. Indeed, public health workers lacking adequate training or preparation and regular upgrading of skills have the potential to cause immense harm that will only be measured in illness or death many years later.

The authors acknowledge the members of the Public Health Workforce Collaborative for their seminal work.

NOTES

2. IOM, Committee on Public Health for the Twenty-first Century, unpublished committee proceedings.
14. Ibid.
15. E. Spratley et al., The Registered Nurse Population: Findings from the National Sample Survey of Registered Nurses (Rockville, Md.: HRSA, Bureau of Health Professions, Division of Nursing, 2000); and U.S. Department of


19. Ibid.


22. Sheila Smythe, dean of graduate studies, New York Medical College School of Public Health, personal communication, April 2002.


34. See Council on Linkages, “Core Competencies.”


