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The Public Health Workforce Shortage: Left Unchecked, Will We Be Protected?

Courtney M. Perlino, MPP, Health Policy Analyst, APHA

EXECUTIVE SUMMARY

Public health protects individuals, families and communities from serious health threats—ranging from diabetes to bird flu—that are oftentimes preventable. Despite the importance of public health to the health of our society, this workforce is facing critical challenges, namely a precipitous decline in numbers and resources. The most severe shortages are found in the epidemiology, nursing, laboratory science and environmental health fields—the professions that are essential if we are to successfully track the spread of flu and mumps, provide immunizations and needed community education, protect our air and water supply and detect health problems in newborns.

Left unresolved, the workforce challenges will undermine the ability of this important and dedicated workforce to protect the public's health. Rural and underserved areas will not obtain the health services they need, communities will be unprepared to face disasters like Hurricane Katrina and families will not know what they need to do to protect themselves should an emerging infectious disease, such as pandemic flu or mumps or severe acute respiratory syndrome (SARS), become rampant in the United States.

The workforce shortage can and should be reversed. There are evidence-based solutions to address public health workforce shortages in recruitment, retention and diversity. The following policy and legislative solutions must be implemented at this critical time in history to avert a major public health workforce crisis:

- Establish federally funded public health workforce scholarship and loan repayment programs. Such programs should be modeled after those outlined in the Public Health Preparedness Workforce Development Act, introduced by Senators Hagel and Durbin.
- After years of reduced or level funding, make a renewed investment in programs under the auspices of the Health Resources and Services Administration (HRSA) that fulfill the objectives of Titles VII and VIII of the Public Health Service Act. Such programs would rebuild, strengthen and diversify such professions as epidemiology, environmental health, maternal and child health and nursing.
- Increase core financial support for the public health infrastructure.
- Enhance leadership development programs for the public health workforce.
- Expand internship and fellowship programs in the public health professions, in such agencies as the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH).

What Is Public Health?

"Public health is what we, as a society, do collectively to assure the conditions in which people can be healthy."

Institute of Medicine, *The Future of Public Health,* 1988

Introduction

There is a growing public health workforce shortage at the local, state and federal levels. The number of public health workers declined to 158 workers per 100,000 Americans in 2000, as compared to 220 workers per 100,000 Americans in 1980.[1] Within the next few years, state and federal public health agencies could lose up to half of their workforce to retirement, the private sector and other opportunities.[2, 12] Compounding this problem is the fact that some four out of five public health employees lack formal public health training.[3] Due to local and state budget crises and federal budget cuts targeted at health programs, the potential for a shortage of highly skilled public health professionals has become more immediate and severe in scope.

Ironically, the public health workforce shortage is emerging at a time when public health must take on more responsibility in addition to the ongoing role of preventing disease and promoting health. While resources dedicated to public health are declining, the public health workforce is expected to be fully prepared for new and emerging health problems and large-scale public health emergencies, ranging from pandemic influenza to bioterrorism. However, there are inadequate numbers of public health personnel and students in training even to respond to the current demand. Also, individuals trained in public health tend to be employed in settings other than traditional public health agencies. Health professions that are repeatedly mentioned as experiencing shortages: epidemiologists, biostatisticians, health educators, environmental health workers, public health laboratory workers, public health nurses and physicians.[2,4,5,6]

Ultimately, if recruitment and retention rates of public health professions do not improve, vacancies resulting from retirement, turnover and other reasons will not be filled. States and counties, and federal agencies such as the CDC, for example, will not have enough epidemiologists to track the disease spread of bird or pandemic flu, chronic diseases or other emerging health threats. Public health will not be able to adequately respond to future natural and man-made disasters. And, despite, the aim of the President's Health Care Expansion Initiative to expand or create 1,200 health centers in underserved areas,[7] there will not be the trained workforce necessary to staff these centers.[8]

Photo courtesy of James Gathany, CDC

The Many Faces of Public Health

Public health workers—working in public, private and non-profit entities—deliver essential public services.[9] Essential public health services include diagnosing and investigating health problems and hazards in the community, educating people about health issues and behavior change and promoting and enforcing laws and regulations that protect health and ensure safety.[10]

Examples include:

- A public health nurse administering immunizations to children and adults, investigating a communicable disease outbreak, or educating about prenatal care in the community or at a clinic;
- An epidemiologist who tracks disease outbreaks, ranging from influenza to food–borne illness, and develops ways to prevent and control the continued spread;
- An occupational safety and health specialist who designs programs to prevent and control risks and injuries to workers, ranging from environmental to ergonomic;
- A sanitarian who controls and eliminates environmental health hazards in the water supply;
- An individual conducting restaurant and food service inspections to ensure the safety of the food supply;
- A health educator who works with community members, coalitions and other stakeholders to design, implement and evaluate health education and health promotion programs;
- A community nutritionist who educates individuals, families and communities about nutrition and provides one-on-one counseling to individuals, including pregnant women, on proper nutrition habits;
- A public health physician who plans, provides and administers public health services in a community clinic; and
- A wide range of individuals working with communities: educators, community planners and emergency responders.[11]

By The Numbers

46.6	Average age of a member of the state public health workforce.[2]
45-50	Maximum percentage of workforce of federal and some state public health agencies eligible for retirement within the next few years.[2,12]
20	Perentage vacancy rate in several state public health systems.[2]
14	Percent annual turnover rate on the state level.[2]
500,000	Minimum number of individuals in the public health workforce (does not include those working for the private sector, non-profit entities and unions, and those who work for the public sector in nontraditional public health professions, ranging from transportation planning to housing development to hospital health educators and nutritionists).[11]
6,399	Individuals who graduated from the 36 U.S. accredited schools of public health in 2004,[13] most of whom initially work somewhere other than local, state or federal public health agencies.[11]
19	Percent of public health workforce that works for federal agencies.[6]
33	Percent of public health workforce employed in state agencies.[6]
34	Percent of public health workforce employed in local public health agencies.[6]
14	Percentage that works in other settings, including teaching and research.[6]

Public health professionals have specialized knowledge and skills in dealing with disease prevention, health promotion and treatment. Currently, there are 36 accredited schools of public health and 65 accredited programs in public health offering MPH or other advanced training in public health in the United States and Canada.

The Public Health Workforce in Crisis

As a result of federal and state budget cuts to public health, a large number of vacancies resulting from retirement or turnover have been frozen or not filled with new personnel.[14] Public sector salaries are also a significant factor as the private sector, which employs public health professionals in hospitals, private labs and health plans, is able to offer more competitive salaries and benefits. Although the public health workforce shortage affects all professions, including health education, biostatistics and medicine, health agencies at the local and state levels have reported that the shortage is most severe in the nursing, epidemiology, laboratory science and environmental health fields.[15] These findings from a 2003 Institute of Medicine report *The Future of the Public's Health in the 21st Century* were confirmed by the results of a survey conducted by the Association of State and Territorial Health Officials (ASTHO), the Council of State Governments (CSG) and the National Association of State Personnel Executives (NASPE).[2]

Photo courtesy of Greg Knobloch, CDC

"There are critical public health workforce shortages in federal, state, and local public health agencies. The ability of the public health system to respond to emerging infectious diseases like West Nile Virus, food-borne illnesses, or bioterrorism relies on a well-trained, adequately staffed public health network at all levels. It is important that we address this problem before it becomes a crisis." – *U.S. Senator Chuck Hagel (R-Neb.)*

Photo courtesy of James Gathany, CDC

PUBLIC HEALTH NURSING

Public health nurses play an essential role in many communities, especially rural areas. Public health nurses: provide health education about preventive care and nutrition; deliver essential services to members of a community, including families affected by HIV/AIDS; arrange for immunizations; and work with community members to develop disease prevention programs targeted at high-risk populations.[2] Public health nurses comprise the largest group of professionals in public health, 10 percent of the total workforce.[11] Yet this profession also shows the greatest demand for additional workers; public health nurses decreased from 39 percent in 1980 to 17.6 percent in 2000.[2,16] Thirty of 37 states participating in a recent survey conducted by ASTHO/CSG/NASPE reported public health nursing as the profession to be most affected by future workforce shortages in their state.[2] Some of the issues influencing the shortage of public health nurses are non-competitive salaries in comparison to other nursing workforce areas and in light of the current worldwide nursing shortage, lack of qualified candidates, and structural changes in many health departments. Public health nurses often face lengthy hiring processes, insufficient opportunities to advance and lack of flexible schedules. In addition, as public health agencies move from individual to more population-focused services, nursing positions narrowly viewed as clinical may be eliminated, further limiting public health capacity.[17,18]

EPIDEMIOLOGY

Epidemiologists are responsible for determining the causes of disease, disability and other health outcomes and tracking their incidence and spread, and developing ways to prevent, contain and control them.[9] Their role in the field of public health has become especially important in light of new and reemerging diseases including avian influenza, West Nile Virus, drug-resistant tuberculosis and SARS. There are approximately 2,580 epidemiologists working in state and territorial health departments.[19] However, states have reported needing approximately 47 percent more epidemiologists to be able to sufficiently perform in this area.[20] Half of the 37 states responding to an ASTHO/CSG/NASPE survey noted that there was a shortage of epidemiologists in their state due to increased demand and insufficient supply.[2] Public sector salaries are also an issue, due to the fact that most epidemiologists in the field either have a PhD or a master's degree, which necessitates higher pay.[2]

LABORATORY SCIENCE

Laboratory scientists and technicians work in public health laboratories and conduct diagnostic testing, disease surveillance, research and training. These professionals are vital in confirming cases of new and reemerging infectious diseases, testing drinking water and soil for toxic substances and screening newborns for metabolic and genetic disorders. There are approximately 20,000 public health laboratory technicians and professionals, or 3.1 percent of the total public health workforce.[6] Eleven of the 37 states participating in the 2003 ASTHO/CSG/NASPE survey reported this profession as one to be most affected by future workforce shortages in their state.[2] There is a huge demand for laboratory scientists and technicians in the private sector due to clinical specialization and increasing numbers of tests performed.

ENVIRONMENTAL HEALTH

Environmental public health professionals include those who monitor air quality, water and noise pollution, control for toxic substances and pesticides, conduct restaurant inspections and promote healthy land use and housing. Those who work in the field include sanitarians, engineers and industrial hygienists. Environmental public health practitioners are the second most common of the public health professions, roughly 4.5 percent of the nation's public health workforce,[21] with governmental public health agencies employing more than 20,000 in 1999.[6] However, many environmental public health practitioners work in the private and non-profit sectors, so the true size of the workforce is much larger. For example in 2002, the Bureau of Labor Statistics of the Department of Labor, through its National Industry-Occupation Employment Matrix, reported 158,859 workers in occupations related to environmental engineering and science.[22] Eleven of 37 states participating in the 2003 ASTHO/CSG survey see this profession as being one of the most affected by future workforce shortages.[2]

"As our country becomes increasingly diverse, our health care system has a greater need to diversify its health care work force. Title VII encompasses critical programs that foster minority representation in health professions and help make possible the culturally and linguistically appropriate care that our communities deserve." – *U.S. Representative Hilda L. Solis (D-Calif.)*

The Lack of Diversity

In addition to the overall worker shortage, of special concern is the lack of diversity in the public health professions. Twenty-five percent of the U.S. population is composed of underrepresented groups, yet they represent only 10 percent of the health professions and are growing very modestly.[23] Hispanics account for 12 percent of the U.S. population, but only 2 percent of nurses and 3.5 percent of physicians.[23] Less than one in 20 African Americans are doctors or dentists, even though one in eight persons in the United States are African American. [23,24] To increase the minority nurse population by 1 percent, it is estimated that an additional 20,000 minority nurses must be recruited.[23]

By increasing the number of underrepresented groups in the health professions, many existing health disparities may be better reduced or eliminated by being able to better respond to the needs of minority and underserved populations. Although the diversity of the public health workforce has improved over the last 30 years, there remains a need to continue recruitment efforts to attract students and professionals to the public health fields. In 2002–2003, 11.2 percent of public health graduates were African American, equal to the percent of the U.S. population over age 18 that was African American, according to the 2000 U.S. Census.[25] However, the percentage of public health graduates from Hispanic or Latino backgrounds—7 percent—fell short of the proportion of the U.S. population over age 18 from these backgrounds—11 percent.[25] On the other end of the spectrum, Asians in 2002–2003 were overrepresented in the public health graduate pool, comprising 13.9 percent of such graduates, even as Asians made up only 3.7 percent of the U.S. population over age 18.[25]

Underrepresented populations within the health professions will allow for decisions to be made about health care that will reflect the values and beliefs of the entire population, and heighten the cultural sensitivity of services delivered. Lastly, health professionals are often seen as leaders in the community.[24] Underrepresented groups in the health professions will better represent the diversity of the total population, and because of these leadership positions, students may be further motivated to choose a career in public health.

Photo courtesy of Aaron Sussell, CDC

What is a Health Professional Shortage Area?

A Health Professional Shortage Area is an area or group that the U.S. Department of Health and Human Services designates as having an inadequate supply of health care providers, ranging from physicians to mental health providers to dentists. The shortages may be in urban or rural areas, population groups or public or nonprofit private medical facilities.[29]

The evidence is strong that financial assistance programs—including scholarships, loan repayment and traineeships—improve the diversity, recruitment and retention of public health students and professionals.

The Problem in Underserved Areas

Public health also has the responsibility to assure the availability of quality health services. This role is especially vital in underserved areas, where care is mainly available through public clinics, mobile health clinics, telemedicine and school-based clinics. In these areas, the workforce shortage is more serious due to the difficulties associated with attracting public health practitioners and medical providers to rural areas and blighted urban areas. Low salaries only add to the problem. For example, the ratio of physicians per capita in urban counties is 136 percent higher than that in rural counties. Likewise, the ratio of dentists per capita is 150 percent higher in urban areas than in rural areas.[26]

The ratio of health provider to patient in underserved areas is especially concerning, as limited access to care not only affects an individual's health, but the health of the community at large. One in five Americans lives in a primary medical care Health Professional Shortage Area (HPSA).[27] Also, approximately 25 million individuals reside in dental health professional shortage areas and have limited access to quality health care. Members of racial/ethnic minority groups represent a disproportionate number of these 25 million individuals.[28] The shortage of health professionals in rural areas, including physicians and dentists, only contributes to the racial/ethnic and rural/urban health disparity gaps.

Barriers to Recruitment and Retention

The largest barrier to adequate staffing of governmental public health agencies is the budget.[4] Budget constraints result in both limited numbers of positions, and staff receiving non-competitive salaries for high levels of responsibility and large caseloads. These factors often push workers to the private sector, which often offers higher salaries and benefits, and less overall responsibility. Barriers to recruitment are quite similar; difficulties result from shortages of workers within an occupation, noncompetitive salaries and lengthy hiring processes.[4] Additionally, public health is not always readily apparent or visible in the community, unless an outbreak or health crisis occurs. When public health accomplishes its mission successfully, disease and injury are not noticed by the community.

Solutions to Rebuild the Public Health Workforce

Fortunately, there are a variety of evidence-based solutions to address public health workforce shortages in recruitment, retention and diversity. Multiple approaches and solutions must be adopted to avert a major public health workforce crisis this decade.

Create a Federal Student Loan Repayment and Scholarship Program

Scholarships and student loan repayment would serve as incentives for recruitment and retention. Although state loan repayment and direct financial incentive programs have resulted in some gains of public health practitioners and improving retention rates,[30,31] a concerted effort must be taken on the federal level.

Student loan repayment and scholarship programs, despite being very limited in nature, have also been shown to be effective in distributing health professionals to underserved communities. These programs are primarily targeted at clinical versus public health professions, such as dentists or doctors. Approximately 14.5 percent of the physicians and 22.6 percent of the dentists working at community health centers are there as a result of federal or state student loan repayment programs. In rural community health centers, 44.6 percent of physicians and 32.6 percent of dentists receive student loan repayment. [8] National Health Service Corps and state loan repayment programs have been effective in redistributing dentists to underserved communities.[32]

To increase federal efforts to recruit and retain public health professionals, Senators Hagel and Durbin have introduced the Public Health Preparedness Workforce Development Act. The legislation, if enacted into law, would require the

"We can't afford to put off efforts to ensure our nation has an adequate number of public health professionals. The scholarships and student loan repayment programs in this bill are a needed incentive to recruit and retain highly qualified professionals to our nation's public health workforce." – *U.S. Senator Dick Durbin (D-Ill.)*

Secretary of Health and Human Services to establish the Public Health Workforce Scholarship Program that would offer four-year scholarships to students in return for their commitment to be employed in federal, state, local or tribal public health agencies. A Public Health Workforce Loan Repayment Program would be established, which would provide for the repayment of student loans for individuals who work at such agencies for at least three years.

Increase Funding for HRSA Health Professions Programs

HRSA programs that fall under Title VII of the Public Health Service Act support physician, dentist and public health professions training, with most of the funding dedicated to training in primary care medicine and dentistry and increasing medical student diversity. Programs funded under Title VIII of the Public Health Service Act are targeted towards advanced and basic nursing education and nursing workforce diversity, including nursing student loan repayment. However, the lack of federal resources directed to these programs have limited their potential and reach, which means very limited training and loan repayment opportunities.

Title VII and Title VIII grantees assist states and localities in improving the supply of health professionals serving in underserved areas. Grantees,which are usually university programs, focus on education and training of health professionals, geographic distribution of health professionals and education and training of such professionals to serve medically and dentally underserved populations and high-risk groups.

Photo courtesy of Leah-Anne Thompson, iStockphoto

Title VII HRSA Health Professions Programs

"Title VII funds vital traineeships and residencies for disadvantaged students and enhances minority representation in the health workforce. These programs allow health professions schools to train a first rate health workforce that is both diverse and committed to serving individuals in medically underserved areas throughout the nation."

U.S. Senator Jack Reed (D-R.I.)

PUBLIC HEALTH WORKFORCE DEVELOPMENT PROGRAMS

Under Title VII of the Public Health Service Act, HRSA provides grants to support training programs for the public health workforce. HRSA grants support traineeships for individuals in fields where there is a severe shortage, including epidemiology, environmental health, biostatistics, toxicology, nutrition and maternal and child health. The goal of these programs is to increase the number of graduates who serve in underserved areas and underrepresented minorities in selected public health professions.[33] In particular, HRSA's Bureau of Health Professions funds the following grant programs to support the development of the public health workforce:

- Public health traineeships, which train individuals in public health professions experiencing critical shortages;
- Preventive medicine residencies;
- Health administration traineeships; and
- Public health training centers.[33]

In addition to the shortages of epidemiologists, environmental public health practitioners, laboratory scientists and public health nurses already discussed, a shortage of preventive medicine physicians, especially those in public health, is anticipated.[34] Without adequate funding for Title VII programs, this decline will continue. Funding for Title VII programs has been in jeopardy in the past years, receiving major cuts in programs if programs are not zeroed out in their entirety.

"All our citizens deserve access to the health professionals they need. But for folks living in urban and rural areas, it's not always a guarantee. That's why Title VII funding is so important—it gets people from those communities trained to be the next generation of primary care physicians, dentists and other health professionals and back in those underserved communities. Now, we definitely need to take immediate action to balance the federal budget, but not at the expense of cutting the number of healthcare professionals available in our most medically underserved communities. This approach may save a dollar this year, but at the expense of costing us ten down the road. That's not a smart way to attack the deficit." – *U.S. Representative Charlie Norwood (R-Ga.)*

PRIMARY CARE MEDICINE AND DENTISTRY

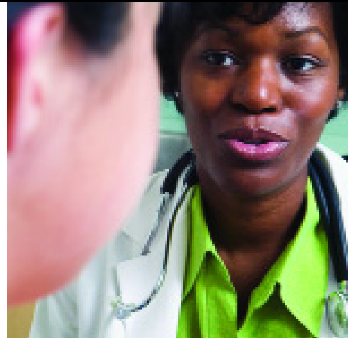
Millions of Americans currently reside in areas with shortages of health professionals and dentists. A growing and aging U.S. population exacerbates this already existing shortage of primary medical and dental care. This demand must be met with increased supply to ensure Americans' access to care, which directly affects population-based health. Assuring access to health services, especially preventive services, is one of ten essential services of public health.[10] However, studies show that the current supply of medical and dental students is not sufficient to meet the increased demand for providers of primary care.[35, 36, 37] There continues to be an under-representation of certain racial and ethnic minorities in medical, dental and physician assistant education and training programs.[24] Studies have shown that minority health care professionals are more likely to work in underserved areas.[38,39] Moreover, the shortage of minority health professionals is an issue as the U.S. minority population is growing and therefore increasing the demand for health and dental services that are culturally sensitive.[40]

Spotlight on University of Colorado Preventive Medicine Residency Program

The preventive medicine residency program at the University of Colorado has succeeded in meeting Title VII objectives by training under-represented minorities in preventive medicine and having participants in and graduates of the programs serve in underserved areas. Over the past four years:

- Two of the 11 residents trained have been from the Latino and Vietnamese communities;
- One resident has been from a rural disadvantaged background;
- One resident has been from an urban disadvantaged background;
- Half of its graduates have entered primary care positions, one of which was in a governor-designated HPSA; and
- One-quarter of its graduates are serving in local health departments.

Evidence Shows Success of Title VII-Funded Programs



Title VII–funded programs targeted at primary medical care and dentistry help develop high-quality primary care education and training programs and establish family medicine departments. Studies have shown that they have been effective in improving health care practitioner service in underserved areas and increasing minority entry into health professions. In particular:

- Title VII-funded programs decrease the time needed to eliminate HPSAs.[41]
- Primary care graduates of Title VII, section 747 programs are two to four times more likely than other graduates to serve minority and disadvantaged populations by practicing in medically underserved communities.[42]
- Title VII, section 747-supported programs graduate four to seven times more minority and disadvantaged students than other programs. On average, these programs annually support the development of more than 10,000 underrepresented minority graduates, residents and faculty.[43]
- Title VII funding of pediatric dentistry training programs meet the dental needs of the underserved and shape careers dedicated to serving the underserved and recruiting underrepresented minority dentists.[44]
- Alumni of Title VII-funded faculty development fellowships have a high service rate in areas of need.[45]
- Title VII funding positively correlates with higher rates of entry by physicians into family practice and practice in HPSAs.[46]

Primary Care Programs at the Pennsylvania State University/Penn State

Penn State receives pre-doctoral training, faculty development and residency grants in primary care from HRSA. Through the University's efforts funded by Title VII HRSA health professions programs, it was able to:

- Increase the number of students entering primary care to half of all program graduates;
- Place approximately 30 percent of its graduates into medically underserved areas, resulting from its rural rotations and required primary care clerkship;
- Train and retain 308 community preceptors that provide four weeks of family medicine and four weeks of primary care clerkship training to third year students; and
- Teach residents medical Spanish so they could provide better care for the Hispanic underserved population of Lebanon County.

Photo courtesy of Marvin Nauman, FEMA

Title VIII HRSA Health Professions Programs

NURSING

The enactment of the Nurse Reinvestment Act in 2002 provided a needed response to the nursing shortage by creating and strengthening scholarship and loan repayment programs for nursing students and nurses. Funding provided to grantees under Title VIII of the Public Service Act is targeted towards implementing this legislation through such activities as advanced nursing education, improving nursing workforce diversity and loan payment and scholarship programs.[47] These activities are targeted to prospective registered nurses, nurse practitioners, clinical nurse specialists, nurse midwives, nurse anesthetists, nurse educators, nurse administrators, public health nurses and other nurse specialties.

An end to the nursing shortage depends on future funding of Title VIII programs, as both potential nurses and nursing faculty will be turned away from schools if funding is insufficient. If there is no change in the status quo, HRSA projects that the supply of nurses in the United States will fall short of the level of demand for them—29 percent below what is needed by the year 2020.[48] Through 2014, the Bureau of Labor Statistics has estimated that there will be approximately 1.2 million job openings for registered nurses.[49] Without additional support for student loan repayment and scholarship programs, and advanced education, the nursing shortage will worsen and further impact patient care.

The impact of insufficient funding levels for Title VIII has already been seen. In fiscal year 2005, HRSA, due to budget constraints, did not accept 98 percent of the applicants for the Nursing Scholarship Program. This means that almost 9,000 students did not receive assistance through this program.[50] Also, 82 percent of the applicants for the Nurse Education Loan Repayment Program (NELRP) were not accepted. This translates into 3,662 registered nurses not receiving loan repayment assistance.[51]

Other Solutions

Creating federally funded scholarship and loan repayment programs and increasing support for HRSA health professions programs, although vital in ensuring a pipeline of public health professionals, will not completely address the public health workforce crisis. An investment in other areas, such as leadership development, training and the core public health infrastructure, is needed to ensure enough public health professionals to respond to the demands of the 21st Century and beyond.

INCREASE CORE FINANCIAL SUPPORT FOR THE PUBLIC HEALTH INFRASTRUCTURE

To correct for insufficient financial and salary support at the federal, state and local levels, a renewed federal investment is needed to ensure that public health is able to fulfill all of its responsibilities, ranging from the prevention of chronic disease to responding to natural and manmade disasters. Since Sept. 11, 2001, increases in federal funding have been primarily targeted towards bioterrorism preparedness and response efforts. This stream of funding is supporting key positions, ranging from infectious disease epidemiologists to public health laboratory workers, but they also need the flexibility to respond to everyday threats. In light of current state and local budget crises, a reduction in such funding would be devastating to the public health workforce, as these positions would be eliminated.[52]

Ultimately, there needs to be an increase in federal funding for all of public health, not just those issues capturing headlines today. Overall increases in federal funding directed at such agencies as the Centers for Disease Control and Prevention would ultimately lead to states and localities having increased support and the workforce to perform the wide range of public health functions required. It also would lead to public health constituting more than three cents for every dollar in the United States spent on health.[53]

ENHANCE THE WORKFORCE THROUGH LEADERSHIP DEVELOPMENT ACTIVITIES

In such professions as environmental public health, the impact of creating scholarship and student loan repayment programs for public health students and professionals would not be sufficient, as many in this profession focused their studies in environmental science or another discipline outside of public health and would therefore not be eligible for assistance. For professions such as this, a focus on leadership development is needed to encourage individuals with experience in the field to stay in or enter public health professions in the public sector.

There currently are existing federally funded programs that can serve as best practices. One such example is the National Environmental Public Health Leadership Institute (coordinated by the Louisville Metro Health Department and the CDC), which aims to groom leaders in the practice of environmental public health.[54] One of the goals of this initiative is to increase the leadership capacity and

skills of environmental public health personnel working in diverse settings.[54] By doing so, it is expected that the recipients of this specialized training would return to their workplaces and start to incorporate lessons learned from the Institute.[54]

EXPAND INTERNSHIP AND FELLOWSHIP PROGRAMS IN PUBLIC HEALTH PROFESSIONS

Federal agencies such as the CDC and NIH offer internships and fellowships to provide necessary training to individuals entering the public health arena or those who want to improve their skills in areas such as epidemiology that are experiencing critical shortages. The availability of such opportunities is ultimately tied to the federal funding available for training activities. Increased investment in such training initiatives would not only insure that incoming public health professionals garner real-world experience, but those in mid-career will stay in public sector professions and perhaps fill a needed void in professions in need of additional personnel.

Conclusion

If current public health workforce trends are not reversed, a major shortage is imminent. Responding to the shortage in the United States is not only a national problem; it becomes international when a domestic shortage leads to the recruitment of public health professionals from other countries, exacerbating their own shortages. However, this shortage can and should be reversed. We know what works, and we have data to support it. The size of the public health workforce will be cut in half over the next five years due to retirement and other issues, including salary disparities between the private and public sectors.

Ultimately, a comprehensive approach to the shortage is needed; it cannot and should not be implemented piecemeal. Implementing federally-funded student loan repayment and scholarships programs and increasing funding for HRSA health professions programs, coupled with additional investments in leadership development, training and core public health activities, would constitute a major and much–needed step in the right direction and can no longer be delayed.

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