Available online at www.sciencedirect.com
ScienceDirect
Nurs Outlook 64 (2016) 557–565
Nursing Outlook
www.nursingoutlook.org

Assuring a strong foundation for our nation's public health systems

Betty Bekemeier, PhD, MPH, RN[a,*], Susan J. Zahner, DrPH, MPH, RN, FAAN[b], Pamela Kulbok, DNSc, RN, APHN-BC, FAAN[c], Jacqueline Merrill, PhD, MPH, RN, FAAN, FACMI[d], Joan Kub, MA, PHCNS, BC, FAAN[e]

[a] Department of Psychosocial and Community Health, University of Washington School of Nursing, Seattle, WA
[b] University of Wisconsin-Madison, School of Nursing, Madison, WI
[c] University of Virginia, School of Nursing, Charlottesville, VA
[d] Biomedical Informatics at Columbia University Medical Center, New York, NY
[e] Department of Community-Public Health, Johns Hopkins University School of Nursing, Baltimore, MD

ARTICLE INFO

Article history:
Received 6 March 2016
Revised 3 May 2016
Accepted 20 May 2016
Available online July 1, 2016.

Keywords:
Public health systems
Affordable Care Act
Prevention systems
Public health policy

ABSTRACT

Background: A strong public health infrastructure is necessary to assure that every community is capable of carrying out core public health functions (assessment of population health, assurance of accessible and equitable health resources, and development of policies to address population health) to create healthy conditions. Yet, due to budget cuts and inconsistent approaches to base funding, communities are losing critical prevention and health promotion services and staff that deliver them.

Purpose: This article describes key components of and current threats to our public health infrastructure and suggests actions necessary to strengthen public health systems and improve population health.

Discussion: National nursing and public health organizations have a duty to advocate for policies supporting strong prevention systems, which are crucial for well-functioning health care systems and are fundamental goals of the nursing profession.

Conclusion: We propose strengthening alliances between nursing organizations and public health systems to assure that promises of a reformed health system are achieved.

Cite this article: Bekemeier, B., Zahner, S. J., Kulbok, P., Merrill, J., & Kub, J. (2016, DECEMBER). Assuring a strong foundation for our nation's public health systems. Nursing Outlook, 64(6), 557-565. http://dx.doi.org/10.1016/j.outlook.2016.05.013.

Introduction

The 20th century was a time of unprecedented decline in morbidity and mortality rates and of steady increases in healthier years of life in the United States (Centers for Disease Control and Prevention [CDC], 2011, p. 9). While population health improvements have continued into the 21st century, key health outcomes such as life

* *Corresponding author:* Betty Bekemeier, Northwest Center for Public Health Practice at the University of Washington School of Public Health and Department of Psychosocial and Community Health, University of Washington School of Nursing, Box 357263, Seattle, WA, 98195-7263.
E-mail address: bettybek@uw.edu (B. Bekemeier).

http://dx.doi.org/10.1016/j.outlook.2016.05.013

expectancy show that the United States has fallen behind comparable high-income nations (CDC, 2011; Institute of Medicine [IOM], 2012). Factors underlying this gap include the failure of the United States to fully implement proven public health practices related to disease prevention and health promotion in all communities and to address well-recognized social determinants that impact health (Wilensky, 2016). A comprehensive systems approach to obesity prevention, for example, requires policy and system reforms, changes in the built environment, and prevention funding. Yet, there is little support in terms of funding and strategic organizational partnerships for community-level prevention interventions (NACCHO, 2013). The recent Flint, Michigan drinking water crisis, largely due to an aging water system infrastructure and protections not implemented, is an example of a failure to sustain an effective prevention system effort to reduce childhood lead exposure (Hanna-Attisha, LaChance, Sadler, & Champney Schnepp, 2016). Likewise, inadequate public health funding in the aftermath of the 2008 financial crisis is eroding our workforce, data systems, organizational structures, and an overall capacity and commitment to prevention strategies (National Association of County & City Health Officials [NACCHO], 2013).

One goal of *Healthy People 2020* is "to ensure that Federal, State, Tribal, and local health agencies have the necessary infrastructure to effectively provide essential public health services" (United States Dept of Health and Human Services, 2010). These government-funded agencies make up the core of the nation's public health system and are vital to the prevention of disease and disability. Crucial infrastructure components necessary to deliver essential public health services include current data and information; a capable and qualified workforce of public health nurses, epidemiologists, sanitarians, and other professionals; and agencies with the financial capacity to assess and respond to public health needs (United States Dept of Health and Human Services, 2010). A strong public health infrastructure is also vital to meet the "triple aim" of health reform: better care, lower costs, and improved health in a population (Berwick, Nolan, & Whittington, 2008).

Despite national policy in support of prevention, many factors currently threaten the effectiveness and continued existence of a robust public health system, particularly in local communities. This article describes key components of and current threats to the public health infrastructure. We suggest ways of strengthening this infrastructure through alliances and funding that will assure public health services in every community, build workforce capacity, generate research evidence, and renew progress toward population health improvement.

The Nature of a Strong Public Health Infrastructure

A strong public health infrastructure is expected to be capable of carrying out the three core functions of assessment, assurance, and policy development through delivery of essential public health services (CDC, 2014). Public health departments are the backbone of this infrastructure. These governmental entities at state, regional, tribal, and local levels are tasked with assessment of community needs and strengths, and coordination of the public and private sectors to address inequalities in community health status. Public health departments assure that basic services exist, partner to develop policies to sustain environments in which people can be healthy, and respond to health threats in the jurisdictions they serve, such as food borne illness, infectious disease outbreaks, the presence of toxic chemical hazards, and a community's burden of chronic illness (Haberkorn, 2012; NACCHO, 2005).

Public health codes and laws reflect a general belief that communities should have the capacity to protect their residents from common and emerging public health threats. To then sustain this capacity public health agencies at the local-level need systems in place to detect and respond to gaps in service coordination, resource availability, and service quality, and to maximize conditions that support health for all. This concept was recently refined by the Institute of Medicine (IOM) in recommendations for a "minimum package" of public health services, which includes foundational capabilities and an array of basic programs no health department should be without (IOM, 2012). In response, public health leaders formulated a set of "foundational public health services" describing essential "cross-cutting" capabilities that are vital for public health departments everywhere, to make health promotion and prevention capacity available in every community (Beitsch et al., 2015). Foundational public health capabilities include capacity for monitoring the health of communities (e.g., public health surveillance); policy development to protect and promote health; effective communication with individuals, groups, and the clinical care community; and management competencies to run a high-performing organization (Figure 1). Inherent in these capabilities is the need for a reliably prepared public health workforce able to function effectively across these capabilities and to respond to varied and emerging community needs.

Effective public health systems also focus on prevention and partnership. In response to the poor performance on key health indicators by the United States in comparison to other industrialized countries (IOM, 2012), the U.S. Surgeon General and the director of the Centers for Disease Control and Prevention (CDC)

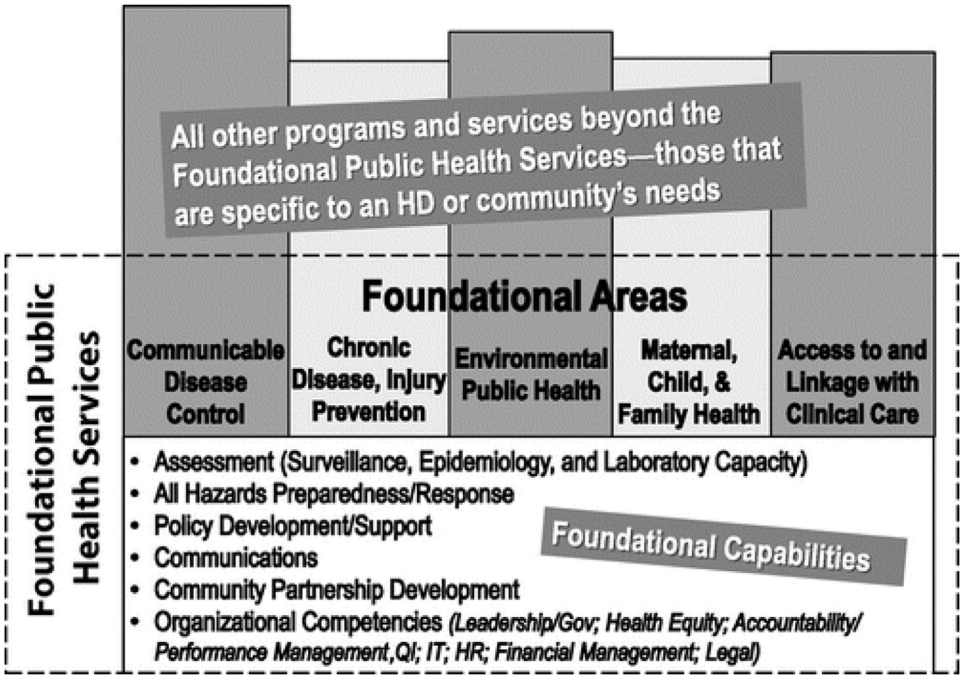

Figure 1 – Foundational public health services (Beitsch et al., 2015). HD, health department; IT, information technology; QI, quality improvement; HR, human resources.

recently encouraged health department officials "to refocus the American healthcare system on preventing illness and injuries—not just treating them" (NACCHO, 2015b). Evidence supporting their call to action indicates that the most effective public health interventions are those that focus "upstream" and partner across sectors to address or prevent multiple underlying root causes of disease and disability including economic, physical, and social determinants of health (Carey, Crammond, & Keast, 2014; Chokshi & Farley, 2012). To focus "upstream," it is essential to build prevention-oriented alliances with nontraditional partners, in areas such as housing, transportation, and industry at the local, state, and national levels.

Historically, the impact of prevention services and public health infrastructure capacity on health outcomes has been challenging to demonstrate. Outcomes are necessarily "dispersed and delayed" and seldom generate the fanfare of a medical breakthrough (Mayes & Oliver, 2012, p. 186). This has opened the door to claims that preventive measures do not save money. Critics of screening programs, for example, claim that screening healthy people for disease outweighs the cost of treating disease that would otherwise have been prevented (Carmichael, 2008; Goetzel, 2009). Despite such claims, it is generally well accepted that prevention costs less than treatment (CDC, 2011; Goetzel, 2009; IOM Roundtable on Evidence-Based Medicine, 2010; Trust for America's Health, 2008), and research is increasingly documenting the difficult-to-detect impact of prevention and public health capacities (Alami et al., 2013; Bekemeier, Grembowski, Yang, & Herting, 2012; Bekemeier, Grembowski, Yang, & Herting, 2014a; Bekemeier, Yang, Dunbar, Pantazis, & Grembowski, 2014b; Bekemeier, Yip, Dunbar, Whitman, & Kwan-Gett, 2015b; Brown, 2014; Keeling, Pryde, & Merrill, 2013; Kwait, Valente, & Celentano, 2001; Mays & Smith, 2011). The emergence of Public Health Practice–Based Research Networks; more reliable, complete, and accessible data; and advanced statistical and computational methods for investigating causal pathways are making it possible to establish empirical links between service capacity and health outcomes (Bekemeier et al., 2014b; Bekemeier et al., 2015b; Brown, 2014; Keeling et al., 2013; Kwait et al., 2001; Mays & Smith, 2011).

Current national plans to improve the public health system include voluntary accreditation of public health agencies (Riley et al., 2012). Although a mainstay for hospitals and health care systems, organizational accreditation is new for public health systems. It is, nonetheless, "one of the most important initiatives" currently underway to "ensure accountability, consistency, and uniformity" in public health systems to improve the public's health (Riley et al., 2012, p. 263). In addition, measurement of the effectiveness of public health organizations and service delivery is now among the research priorities of academic health services researchers, in partnership with public health practitioners (Mays & Hogg, 2012).

The Erosion of the Public Health Infrastructure

Even as national groups release recommendations about the importance of improving the public health infrastructure, and practice and research advances are made, our nation's public health systems are rapidly eroding. We bring attention to three key and related issues.

The first issue is insufficient, stable funding and human resources for the public health system to be effective in protecting health and preventing disease (IOM, 2012). Only an estimated 3% of the total U.S. health expenditures support our public health infrastructure, and only 2% support public health research (Hartman et al., 2013). In addition, annual budget cuts to health departments since 2008 have continued despite economic recovery (Erwin, Shah, & Mays, 2014; NACCHO, 2013; Willard, Shah, Leep, & Ku, 2012). In conducting interviews with 50 leaders from state and local health departments, Leider et al. (2015) found that few public health leaders indicated that current funding was sufficient to support implementing a minimal level of "foundational capabilities."

The size of the public health workforce has been declining for decades. For example, in 1980 to 1982, the national government–employed public health workforce was estimated at 500,000 personnel (US Department of Health and Human Services & Health Resources Administration, 1982). By 2000, despite significant population growth, that estimate decreased to 448,254 personnel (Gebbie, Merrill, Hwang, Gebbie, & Gupta, 2003; Montes & Webb, 2015; U.S. Department of Health and Human Services, Health Resources and Services Administration, 2000). More recent estimates indicate a sharply reduced national workforce of 290,988 public health personnel (Beck, Boulton, & Coronado, 2014), with the most significant declines at the state and local (county or city) levels (Beck & Boulton, 2015). The size of the local workforce declined by approximately 12% between 2008 and 2014 (NACCHO, 2014; 2015a). Since 2008, local health departments in the United States collectively lost 51,700 jobs, including health educators, epidemiologists, biostatisticians, and environmental health workers (NACCHO, 2015a). The decline in the number of public health nurses in state and local health departments between 2000 and 2013 is estimated to be >20,000 (NACCHO, 2014; Spratley, Sochalski, Fritz, & Spencer, 2000; U.S. Department of Health and Human Services, 2010). This is particularly troubling since, as the largest component of the professional public health workforce, public health nurses provide many core public health services (Beck et al., 2014). Perhaps related to workforce declines, public health nurses and other public health workers have often been referred to as members of the "invisible profession" whose successes in preventing disease and disability are often unrecognized or "undervalued" (IOM, 2012; Kilpatrick & Johnson, 1999; LeBron & Yen, 2013).

A shrinking public health workforce is associated with threats to the public's health. For example, higher local health department staffing was associated with greater service provision to women and children and lower infant death rates in North Carolina (Schenck, Meyer, Kuo, & Cilenti, 2015). Similarly, in a national study, cuts to maternal and child health program funding by local health departments, most of which pays for related staffing, were linked to increased rates of low birth weight (Bekemeier et al., 2014b).

A second key issue is dysfunction in how the public health infrastructure is funded, equipped, and organized to use its resources (IOM, 2012). Funding is typically appropriated for a specific program and can only be legally used for that distinct purpose, which hampers efforts to respond to locally identified needs or community goals (Bekemeier, Chen, Kawakyu, & Yang, 2013; Turnock, 2016). More flexibility in the use of state and local funds could reduce the phenomenon of programmatic "silos" that target activities which may be of lower priority locally (IOM, 2012).

When the *Public Health and Prevention Fund* (*Prevention Fund*) was established in 2010 under the Patient Protection and Affordable Care Act (ACA), it was heralded as the largest single prevention investment authorized in U.S. history (Haberkorn, 2012). It was intended to create long-term, stable funding for population-level health protection and disease prevention, a critical mechanism to drive spending toward wellness and health improvement as a means to restrain health care costs (Haberkorn, 2012). The $15 billion originally earmarked for the *Prevention Fund* has proved a "tempting target" for federal lawmakers (Haberkorn, 2012, p. 3) with congressional officials targeting the *Prevention Fund* in 2012 for cuts or elimination. They argued it was unnecessary, potentially wasteful and would accomplish little on top of existing disease prevention and health promotion programs (Haberkorn, 2012). In 2013, legislation to avoid deep cuts to physician Medicare payments was paid for using $6.5 billion from the *Prevention Fund* (AcademyHealth, 2015). At least as concerning is that the *Prevention Fund* has been used to "supplant funding" for core public health functions—core funding that was formerly supported through federal- and state-level sources (AcademyHealth, 2015). The dispersed and delayed impacts that characterize prevention have made it difficult to secure a political constituency to support the infrastructure development goals of the *Prevention Fund* (Mayes & Oliver, 2012).

A third key issue relates to workforce competency. Workforce challenges result from factors that include noncompetitive salaries, an exodus of retirees, gaps in knowledge and skills due to technology changes and health care reform, lack of formal training in public health, inadequate workforce diversity, and limited

training opportunities for leadership and research (Drehobl, Stover, & Koo, 2014; Issel, Lurie & Bekemeier, 2015). Core competencies for public health practice at basic and advanced levels are defined (Council of Linkages Between Academia and Public Health Practice, 2014), but the academic preparation of the workforce and opportunities for continued training and certification remains problematic. The skill level for nurses needed in public health, for example, is increasing (Bekemeier, Walker Linderman, Kneipp, & Zahner, 2015a), even as 31% of a sample of nurses working in local public health practice in 2013 did so with an associate degree and only 10% had graduate degrees (Boulton & Beck, 2013). Changes in graduate level academic nursing programs have limited access to MSN- and DNP-level education in community and public health (Canales & Drevdahl, 2014). In 2012 to 2013, only 53 graduate programs reported a focus on community and public health nursing (C/PHN) to the American Association of Colleges of Nursing, representing a 12% decrease from 2010 to 2011 (M. Patterson, personal communication, February 18, 2014). The growth in PhD research training programs in schools of nursing substantially lags behind that of DNP programs (Henly et al., 2015), contributing to a lack of teaching and research faculty with public health expertise and research interests. The number and capacity of accredited graduate schools and programs in public health and inadequate federal financial support for public health professional education challenge access to those programs (Rosenstock et al., 2008). Perhaps most concerning are the substantial differences in racial and ethnic characteristics of the public health workforce compared with the U.S. population. For example, in a recent enumeration study, 88% of public health nurses were identified as white (compared with 77% of the U.S. population), and only 4% reported Hispanic or Latino ethnicity (compared with 17% of the U.S. population; Boulton & Beck, 2013; U.S. Census Bureau, 2016). This gap may be contributing to continued racial and ethnic health disparities (Sullivan Commission on Diversity in the Healthcare Workforce, 2004).

The impact of budget cuts and lack of a consistent funding base falls on communities in terms of lost prevention and health promotion services and the staff to deliver them (NACCHO, 2010, 2013). Communities lose capacity for tracking disease, assuring food and water safety, addressing health inequities, monitoring community health status, and being prepared for or responding to outbreaks and public health emergencies. Similarly, reduced federal support for public health-related education and workforce development limits opportunities for improving competencies for public health practice and research and for increasing the diversity of the workforce. These components of our public health system are essential to supporting health care reform goals and to transforming our health care system into one that supports and maintains health for all. Indeed, the ACA presents a strong evidence-based argument for the value of prevention, the foundation of public health practice. The law creates a unique and unprecedented environment and opportunity for nurses and their colleagues throughout the health professions to advocate for a well-supported public health infrastructure, which achieved the 20th century's greatest advancements in health improvement.

Approaches to Assuring a Strong Public Health System

To address the serious threats to the public health infrastructure described previously, concerted efforts and strong alliances are required. Well-functioning public health systems are the foundation for the health of all population groups, a key aim of a reformed health care system (Koh & Sebelius, 2010), and consistent with the core values of the nursing profession (Fowler, 2015). National nursing organizations such as the American Academy of Nursing and American Nurses Association are well-positioned to align with public health organizations and have a duty to be vocal advocates for increased funding and public health workforce development that improves prevention and health outcomes (Bekemeier & Butterfield, 2005; Fowler, 2015). We propose five approaches to leverage and expand alliances to strengthen the public health infrastructure and assure that the promises of health reform will be achieved.

Create a Political Constituency Focused on Public Health Systems

Intermittent backing for specific legislation or from proactive elected officials is not enough. Hard won (and lost) lessons learned in the passage of the ACA underscore the need for a consistent political constituency committed to the concept of "health in all policies" (World Health Organization, 2013), which recognizes that population health improvement and health equity require a breadth of stakeholders, a broad vision of health, and ongoing vigilance. The ACA mandates a minimum set of health care services for insured individuals, but there is no such mandate for public health. Instead, a "patchwork" of different, often unstable funding streams creates considerable variation among public health programs and services across states and communities (Beitsch et al., 2015). Losses and diversions from the *Prevention Fund* are evidence of a pressing need for a consistent, long-term political constituency that views health promotion, disease prevention, and health protection as priorities.

Clearly, public health advocates and organizations need help in creating this political constituency. Nurses and nursing organizations must join with the organizations that represent the public health professions as visible advocates for the public health infrastructure by coordinating policy and funding

advocacy efforts. National nursing organizations could also garner support from sectors such as housing, business, and industry and articulate links between our nation's prevention goals and its economic and physical health (Mayes & Oliver, 2012). Members of nursing organizations should be encouraged to include the issue of the public health infrastructure as they advocate for nursing and health with policy makers at all levels.

A consistent and convincing political constituency must be forged to focus on framing prevention, population health, and a strong public health infrastructure as vital to the health of our communities (Mayes & Oliver, 2012). Title IV of the ACA, *Preventing Chronic Disease and Improving Public Health*, provides a roadmap for a strong public health infrastructure (U.S. Dept. of Health and Human Services, 2012). It includes modernizing disease prevention and public health systems, increasing access to clinical preventive services, creating healthier communities, and supporting prevention and public health innovation. A political constituency of professional organizational partnerships co-created by and with leading nursing organizations can effectively advocate for appropriate use of the *Prevention Fund* and for research to optimize the delivery of prevention services.

Endorse a "Health in all Policies" Approach That Goes Beyond Traditional Public Health Agencies and Their Partners

A "health in all policies" approach emphasizes the consequences of policy making across all sectors of society on the determinants of health and focuses on development of sustainable, institutionalized systems, and practices that promote health equity (World Health Organization, 2013). This paradigm necessitates "participation beyond the confines of traditional public health agencies and services" (Mayes & Oliver, 2012, p. 181), and affirms the essential roles of nursing and the public health professions in addressing all factors that affect health. Advocacy in support of stronger public health systems means nurses, and others must engage in active collaboration across multiple public and private sectors and across all levels and types of government to widen public sector engagement and investment in healthy public policy (Mayes & Oliver, 2012).

Accountable Care Communities (ACC) are examples of innovative collaborations underway that pose opportunities for public health leaders to implement healthy policy and prevention approaches in communities around the United States. These multisector partnerships are leveraged by the ACA and intentionally bring together public health; health care industry; and representatives from schools, libraries, and local business to use an integrated and collective impact approach to improving population-level health outcomes in a community. Early results from ACC indicate that they are helping put healthy local policies in place and expanding local capacity to meet community health needs through coordination and better cooperation (National Association of Counties, 2014).

Promote Universal Adoption and Funding of Foundational Public Health Services

The IOM has decried the community-level inequities in core capacity for health promotion and protection that all populations should expect and draws attention to public health service delivery inconsistencies (IOM, 2012). Embracing a core set of Foundational Public Health Services (Figure 1) would establish an equitable standard for public health prevention and responsiveness (IOM, 2012). This core set of services promotes a consistent infrastructure and service package for governmental public health systems and substantiates the investments that are needed. Colorado, for example, demonstrated significant increases in environmental health services, communicable disease control, and prevention and health promotion activity after the state legislature mandated the adoption of a minimum set of public health services across the state (Lampe, Atherly, VanRaemdonck, Matthews, & Marshall, 2015).

Work has begun nationally and in individual states to further define and estimate the costs of Foundational Public Health Services (Beitsch et al., 2015). This effort offers important opportunities for nurses to advocate for, initiate, and lead discussions at local, state, and national levels regarding what is needed to achieve a foundation of surveillance, communications, policy development, and other capabilities for assuring healthy communities. The results are expected to change how "the nation invests its health funding" and could include strategies such as a tax on medical care transactions, a doubling of the current federal appropriations, and "periodic [financial] adjustments" to assure a consistent "minimum package of public health services" in every community (IOM, 2012, p. 9). As the work to establish this framework in all communities continues, nursing schools need to incorporate education about these Foundational Public Health Services into their C/PHN curricula and assure that knowledge and skill development for practice in this framework is also supported. Nursing organizations need to reinforce the need for Foundational Public Health Services through publication of policy papers and legislative advocacy activities.

Enhance Investment in the Public Health Workforce

Public health practice is changing. This is evident in the transition of public health agencies from information users to those that broker and provide information (LaVenture, Brand, Ross, & Baker, 2014; Merrill & Keeling, 2014) as the community's "chief health strategist" (Robbio & Papa, 2014). It is also evident in evolving workforce development priorities and competencies that include systems thinking, persuasive communication, change management, information and

analytics, problem-solving, and working with diverse populations (Kaufman et al., 2014). Long-standing strategies for funding workforce development through narrow professional disciplinary grants are not likely to produce an interdisciplinary workforce with the cross-cutting skill-set needed for the future (Kaufman et al., 2014). It will require planning and investment to assure high-quality training and academic programs for the range of public health occupations and must include recruitment and educational support for racially and ethnically diverse students. In strategic guidance for a stronger public health workforce, the CDC outlines the challenges and strategies necessary to improve the public's health (Drehobl et al., 2014). Regional Public Health Training Centers located around the United States and supported by the Health Resources and Services Administration are among those resources essential to supporting public health professionals and their partners in mastering "new information and approaches" in a rapidly changing prevention landscape (Bigley, 2016). Many opportunities exist for schools of nursing and nursing action coalitions to collaborate with their regional Public Health Training Centers and other workforce development efforts. Successful examples of such collaborations could be highlighted and promoted by nursing organizations.

Invest in Population Health and Public Health Systems Research

Finally, improving the public health infrastructure requires evidence on the effectiveness of interventions aimed at improving population health outcomes, the impact of a competent public health workforce on population health outcomes, and what system and service changes result in greater value for expenditures. The research agenda developed to guide public health infrastructure improvements is extensive, and the methods required are complex and evolving (Stoto, 2013). This undersupported research domain needs a range of funders willing and able to advance the generation of this important evidence well into the future.

Conclusion

The nation's health depends on full and equitable access to prevention and health promotion services in every community delivered via a strong public health infrastructure. Due to their professional capacity for understanding and communicating what is at stake, it is critical that nurses join together with health care providers, public health professionals, and public policy makers to advocate for investment in our nation's public health systems by supporting an equitable set of Foundational Public Health Services and sustained funding to address epidemics of chronic diseases, emerging infectious diseases, and environmental conditions contributing to poor health. A strong public health infrastructure is the bedrock of a reformed health system that provides better care and disease prevention, reduces costs, and leads to healthier populations (Berwick et al., 2008). Prevention-focused reform that assures equitable conditions in which all people can be healthy (IOM, 2003) has the potential to make the public health achievements of this century even more impressive than those of the last.

Acknowledgments

The authors thank the members of the Environmental and Public Health Expert Panel of the American Academy of Nurses who encouraged and helped review the development of this article. Bobbie Berkowitz, Betty Dennis, Luba Ivanov, Irene Sanvold, and Lynn Slepski provided particular support and input.

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