



Public Health, Social Determinants of Health, and Public Policy

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The growing importance of public health is evidenced by its increasing responsibilities. Public health was historically known for its contribution towards reduction and control of infectious diseases through such efforts as environmental sanitation (by securing safe air and water), hygienic practices, the elimination of smallpox and polio (through immunization), and reduction of overcrowding. As chronic diseases replaced infectious diseases as the leading causes of death, public health shifted its focus towards health promotion programs such as lifestyle changes in diet, tobacco, and exercise, to prevent contemporary health threats including cardiovascular disease, type-2 diabetes, and obesity. In recent years, as a result of a series of natural calamities such as Hurricanes Katrina and Rita and the spread of severe acute respiratory syndrome (SARS), and human-created threats such as 9-11 attack and the possibility of terrorist attacks involving chemical, biological, radiological, or nuclear weapons, public health has again assumed center stage and been called upon to handle these emerging threats. However, little is known about how the public health system can be organized to effectively and efficiently handle the modern-day threats of infectious and chronic diseases, and environmental disruptions, both natural and human-created. Moreover, public health remains marginal in many countries' health care system, particularly the US where public policy has rarely emphasized public health. There remains a deep lack of appreciation of what public health can accomplish towards improving population health.

Key words: public health, health determinants, public policy, population health, public health research

INTRODUCTION

This concept paper addresses the relationships between public health on the one hand, and social determinants of health and public policy on the other. Sorting out these relationships will help clarify the role of public health in improving population health and identify key determinants of public health system performance including public policy. A broad understanding of these relationships will benefit prioritizing public health research and improv-

ing public health performance. The paper is not intended as a literature review. Rather, it serves to bring our attention to the importance of public health and the role public policy plays in advancing it.

The paper is organized into three parts. In Part 1, The Relationship between Public Health and Social Determinants of Health, we first summarize the major contributions of public health to population health (including the role of public health entities as preventative agents of and responders to health threats). Then, we illustrate the pathways (aspects of social determinants) through which public health influences population health. The purpose is to highlight the major contributions of public health practice to population health. In Part 2, The Relationship between Public Health and Public Policy, we summarize this relationship to point out the inter-connectedness of these areas and the apparent deficiencies within US. In Part 3, Advancing Public Health Research, we summarize what we know and don't know regarding these relationships, prioritize future public health research, and recommend a course of action to implement public health research. Table 1, Defining the Key Terms, provides a summary definition of

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the key terms used in this paper. These include population health, public health, social determinants of health, and public policy. Since the paper will use these terms extensively, a clear understanding of their meanings is essential.

The Relationship between Public Health and Social Determinants of Health

Figure 1 shows the relationship between public health, social determinants, and population health. As depicted, public health has both direct and indirect (through social determinants) impact on population health. In this section, we will summarize the major contributions of public health to population health and illustrate the pathways (i.e., aspects of social determinants) for these accomplishments. Table 1 summarizes the definitions of the key terms used in this report.

Table 1 Definitions of key terms related to public health systems research

- **Population Health** refers to the physical, mental, and social well-being of defined groups of individuals and the differences (disparities) in health between population groups.
- **Public Health** reflects society’s desire and effort to improve the health and well-being of the total population, by relying on the role of the government, the private sector, and the public, and by focusing on the determinants of population health.
- **Social Determinants of Health** represent non-medical factors that affect both the average and distribution of health within populations including distal determinants (political, legal, institutional, and cultural) and proximal determinants (socioeconomic status, physical environment, living and working conditions, family and social network, lifestyle or behavior, and demographics).
- **Public Policy** encompasses the intentional actions or inactions by government to address a problem affecting the public.

The Impact of Public Health on Population Health

At the turn of the new millennium, the Centers for Disease Control and Prevention (CDC) summarized ten major achievements of public health in the US since 1900¹. These include:

- Vaccination, which has resulted in the control or eradi-

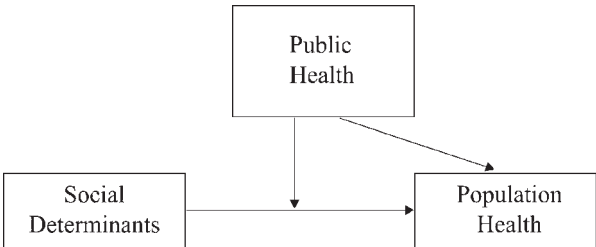


Fig.1 The Relationship between Public Health, Social Determinants and Population Health

- cation of smallpox, poliomyelitis, measles, rubella, tetanus, diphtheria, Haemophilus influenzae type b, and other infectious diseases;
- Motor-vehicle safety (through safer vehicles and highways, use of safety belts, child safety seats, and motorcycle helmets, and decreased drinking and driving), which has resulted in significant reductions in motor vehicle related deaths;
- Safer workplace (particularly in mining, manufacturing, construction, and transportation), which has resulted in significant reductions in fatal occupational injuries;
- Control of infectious diseases (from clean water and improved sanitation, and antimicrobial therapy), which has resulted in the reduction of typhoid, cholera, tuberculosis, and sexually transmitted diseases;
- Decline in deaths from coronary heart disease and stroke (through risk factor modification such as smoking cessation, blood pressure control, and early detection);
- Safer and healthier foods (from decreases in microbial contamination and increases in nutritional content), which has eliminated nutritional deficiency diseases such as rickets, goiter, and pellagra;
- Healthier mothers and babies (through better hygiene and nutrition), which has resulted in significant infant and maternal mortality reductions;
- Access to family planning and contraceptives, which has resulted in smaller family size, fewer infant, child, and maternal deaths, and fewer HIV and STDs;
- Fluoridation of drinking water, which has reduced tooth decay and tooth loss; and
- Recognition of tobacco use as a health hazard, which has reduced smoking related deaths.

From these achievements, it is clear that the major contribution of public health has been to prolong life. In the 20th century, public health efforts resulted in the reduction and prevention of mortality due to infectious diseases, infant and maternal mortality, accidents and injuries. Later, public health’s focus shifted to the reduction of mortality due to selected chronic diseases. The dramatic decline in

mortality from infectious diseases took place between 1850 and 1950, as life expectancy at birth improved from about 40 to 68 years. Between 1950 and 2000, when chronic diseases replaced infectious diseases as the leading causes of death, life expectancy further improved from 68 to 77 years.

The major public health strategy to control infectious diseases has been to improve the living environment through such activities as assuring the availability of clean water, nutritious food, adequate sewage disposal, and adequate housing with minimal crowding. The major public health strategies to lower infant and maternal mortality have included immunization, family planning, and provision of accessible perinatal care. The major public health strategy to reduce accidents and injuries has been legislation and regulations that reduce risks for occupational, home, and automobile injuries. The major public health strategy to contain chronic diseases has been population based prevention programs aimed at reducing risks such as reducing tobacco use, controlling blood pressure, reducing obesity and dietary fat, and preventive screening. The section below illustrates how public health has influenced social determinants of population health.

Public Health and Social Determinants of Population Health

As defined earlier, social determinants represent non-medical factors that affect both the average and distribution of health within populations. These determinants include the distal political, legal, institutional, and cultural factors, and the more proximate elements of socioeconomic status, physical environment, living and working conditions, family and social network, lifestyle or behavior, and demographics. In order to ultimately improve population health, public health interventions must take social determinants into consideration. Below we examine how this has transpired in the US.

Political consideration

Political will is a key determinant of a nation's public health orientation, and is reflected in a nation's public policy regarding population health. As will be seen in the next section on public policy, population health oriented public policy is more prevalent in other industrialized countries than in the US. In the US, political and policy consideration on population health has taken place only in recent years marked noticeably by the Healthy People 2010 (and 2020) initiative which acknowledges that macro social and economic forces are at play in shaping popula-

tion health and that a broader policy agenda is needed to successfully improve population health. However, strong political will remains lacking among elected officials and concrete policies have not been worked out.

Legal consideration

Properly construed, laws and regulations could have positive impacts on population health. Over the decades, there have been numerous instances where public health advocates have relied on laws and regulations to create conditions conducive to population health. For example, the formulation and enforcement of sanitation laws and regulations were critical in the reduction of agents causing infectious diseases. Through regulation, The Environmental Protection Agency (EPA) banned the addition of lead from gasoline in the mid-1970s, resulting in a significant decline in blood lead levels. Federal legislation such as requiring standard safety belts for all automobile occupants and the national highway safety program have been important strategies to reduce motor vehicle injuries. Public health advocates have also worked with the school system to establish immunization standards that all school age children must follow thus preventing many childhood diseases. They work with city councils to create ordinances regulating cigarettes sales to youth and to establish smoking bans in bars and restaurants.

Institutional consideration

Because of its multiple responsibilities, the public health system is complex and includes a variety of institutions. Although the Department of Health and Human Services (DHHS) and CDC are considered federal lead agencies on public health providing guidance to state and local health departments that carry out the essential public health services, many other agencies are involved. For example, the Department of Agriculture plays a significant role in meat and poultry inspection, food safety (along with the Food and Drug Administration or FDA), the school lunch program, and federal food stamp program. Other government involvement in public health includes: the US Department of Labor (on occupational health and safety matter), the Department of Energy (on nuclear waste clean-up), EPA (on water and air pollution), and the Department of Transportation (on highway safety). On the surface, these institutions appear to share a widespread agreement on the overall mission of public health. However, when it comes to action, there lacks consensus as to what constitutes necessary public health services and coordination both among and within agencies providing public health services. The results are that both the mix and the

intensity of public health services vary widely from place to place and neither providers nor beneficiaries know what to expect².

Cultural consideration

The US is a melting pot that includes populations from various cultural origins. Due to society's dominant Western cultural values, some "non-Western-origin" persons or groups may face additional health risks that contribute to the perpetuation of conditions such as marginalization, stigmatization, loss or devaluation of language and culture, and lack of access to culturally appropriate health care and services. The public health community increasingly recognizes this and incorporates cultural consideration in designing and delivering public health services. For example, the community health center program provides essential primary care services to vulnerable populations. Most community health center patients have low incomes and are racial or ethnic minorities. Community health centers have emphasized cultural and linguistic competency in rendering essential primary health care services.

Socioeconomic status consideration

An unfortunate truism in the US, and in nearly every developed country in the world, is that individuals with the greatest financial resources have the best health. Although socioeconomic status (SES) perhaps has the greatest impact on population health, in the US, there has been very limited public health effort that focuses on improving SES in general and reducing SES disparities in particular. For example, among racial/ethnic groups, in 2000, the median household income of Asians and whites reached \$55,500 and \$45,900 respectively, compared to \$33,500 and \$30,500 for Hispanic and black households respectively³. In 2002, 24.1 percent of blacks and 21.8 percent of Hispanics were living in poverty, compared to the 8.0 percent rate for whites. Likewise, educational attainment is not equally distributed across racial/ethnic groups. In 2002, 84.8 percent of whites and 87.4 percent of Asian-Americans completed high school or higher, but only 78.7 percent of blacks and 57.0 percent of Hispanics had done so⁴. Even greater disparities exist in college education, with rates of completion ranging from 47.2 percent for Asian-Americans and 27.2 percent for whites, to 17.0 percent for blacks and 11.1 percent for Hispanics⁵. As with income and education, there are differences in unemployment rates across racial/ethnic groups. In general, minorities have higher rates of unemployment than whites, and these disparities have remained relatively consistent over the years. In 2002, the rate of unemployment was 10.2 percent

for blacks, 7.4 percent for Hispanics, and only 5.1 percent for whites⁶.

Physical environment and living condition consideration

One of the major achievements of public health was in influencing the environmental determinant of population health by preventing or controlling disease and death resulting from interactions between people and their environment. The sanitary revolution launched in the 1850s addressed overcrowded housing, inadequate sewage and solid waste disposal, lack of safe water, and insufficient and unsafe food. These factors contributed to high total and infant mortality particularly due to infectious diseases. Specific public health interventions included housing improvement, sewage system construction, garbage collection, chlorinated water supply, pasteurized milk, and access to vaccines and antitoxins. Environmental intervention has largely contributed to the control of infectious diseases as leading causes of death in the US. Today, public health professionals at all levels are continually working on such environmental issues as indoor and outdoor air quality (and thus addressing related health issues such as asthma, allergies, carbon monoxide poisoning, chronic obstructive pulmonary disease, tobacco/smoking, asbestos, and mold), bioterrorism agents, chemical agents, environmental hazards and exposure, food safety, hazardous substances, hazardous waste sites, herbicides, hydrocarbons, lead, natural disasters, pesticides, smoking and tobacco use, urban planning for healthy places, vessel sanitation and health, and water quality.

Working condition consideration

Not only is unemployment related to health, conditions at work (both physical and psychosocial) can have a profound effect on people's health and emotional well-being. The physical and psychosocial effects of work conditions on health are manifest in the National Institute for Occupational Safety and Health's (NIOSH) Worker Health Chartbook⁷. The NIOSH chartbook presents data on workplace injury and illness caused by exposure to toxins and other sources of physical harm, but it also pays close attention to morbidity and mortality caused by work-induced anxiety, stress, and neurotic disorders. NIOSH found workers affected by anxiety, stress, and neurotic disorders experienced a much greater work loss (i.e., a median of 25 days away from work in 2001) than those with all nonfatal injuries or illnesses (i.e., a median of 6 days away from work in 2001). People who have more control over their work circumstances and fewer stress related demands of the job are healthier and often live

longer than those in more stressful or riskier work and activities. NIOSH interventions to reduce stress and increase safety and well-being in the workplace range from improving safety and evacuation training for coal miners to improving the ergonomics of the desks and computers of office workers⁸. Another recent public health campaign to improve workplace conditions has been the joint effort of federal and state governments and maternal and child health advocates to establish progressive breastfeeding policies for new mothers in the workforce⁹.

Family and social network consideration

Support from families and relatives is associated with better health. The caring and respect that occurs in familial relationships, and the resulting sense of satisfaction and well-being, seem to act as a buffer against health problems. Adequate family support could be very important in helping people solve problems and deal with adversity, as well as in maintaining a sense of mastery and control over life circumstances. On the other hand, family violence has a devastating effect on the health of women and children in both the short and long term. Women who are assaulted often suffer severe physical and psychological health problems. The importance of social support also extends to the broader community. Civic vitality refers to the strength of social networks within a community, region, province or country. It is reflected in the institutions, organizations and informal giving practices that people create to share resources and build attachments with others. In the US, high levels of trust and group membership have been found to be associated with reduced mortality rates. Both family and community support can add resources to an individual's repertoire of strategies to cope with changes and foster health. Recognizing the importance of family and community support in promoting health, the American Cancer Society sponsors several types of support groups for people with cancer, their families and friends¹⁰. Groups such as the Family Caregiver Alliance advocate for support for those caring for an ailing family member or friend. Caregivers often suffer an increased burden of stress and illness, but may benefit from support from other caregivers, their families, and their communities¹¹. Some communities are mobilized and coalitions built that change a community's tolerance for adults giving alcohol to minors. Media campaign is organized in support of screening school age children for vision and hearing.

Lifestyle or behavior consideration

Influencing the behavioral determinant of health has been another major achievement of public health. The risk

reduction campaign launched with the Healthy People initiative was in response to the growing importance of chronic diseases as leading causes of death and the prevalence of such behavioral risks as tobacco use, alcohol abuse, high-fat diets, and sedentary lifestyles. Specific public health interventions include lifestyle and related behavioral change such as smoking cessation, alcohol consumption reduction, drug abuse control, and use of screening or preventive services. These ongoing interventions have been attributed to delaying the onset of disease, early detection and treatment of disease, and prolonging life to the general public. As nutrition is fast becoming a major modifiable determinant of chronic disease, public health professionals are working on strategies that reduce nutrition-related risk factors (e.g., high total blood cholesterol, high systolic blood pressure, high body mass index, and inadequate vegetable and fruit intake) and bring dietary adjustments which may reduce such diseases as cancer, cardiovascular disease and diabetes.

Demographics consideration

Demographic determinants of population health include consideration of individual biology, gender, age, and race/ethnicity. The basic biology and organic make-up of the human body are fundamental determinants of health. For example, genetic endowment appears to predispose certain individuals to particular diseases or health problems. While men are more likely to die prematurely than women, largely as a result of heart disease, fatal unintentional injuries, cancer and suicide, women are more likely to suffer depression, stress overload (often due to efforts to balance work and family life), chronic conditions such as arthritis and allergies, and injuries and death resulting from family violence. People of younger or older age are particularly vulnerable to health risks. Infants and children who are neglected or abused are at higher risk for injuries, a number of behavioral, social and cognitive problems later in life, and death. A low weight at birth is linked with problems not just during childhood, but also in adulthood. At the other end of the lifespan, the elderly experience greater chronic health problems and disabilities. Finally, racial and ethnic disparities in health have been well-documented. Public health interventions targeting special populations include the US Department of Agriculture's Women, Infants, and Children (WIC) program, which provides nutritious foods, nutrition education and counseling, and screening and referrals to other health, welfare and social services to low-income pregnant and post-partum women, infants, and children. Forty-five percent of all infants born in the US are served by WIC¹². The

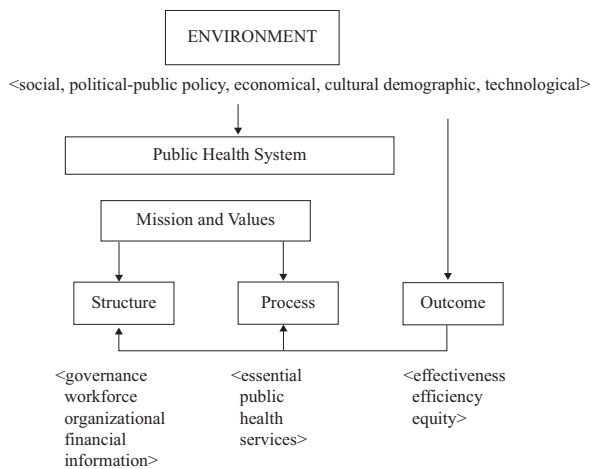


Fig. 2 A framework of public health system

federal government supports the health of the elderly population through its comprehensive Senior Citizens' Resources website, which includes links to numerous programs and resources to help seniors facing issues with health, housing, and end of life concerns¹³. Racial and ethnic minorities are another special population in the US. Public health interventions targeting disparities in health include the Health Disparities Collaborative, an initiative of the Health Resources and Services Administration (HRSA)'s Bureau of Primary Health Care. The Health Disparities Collaborative seeks to eliminate racial and ethnic disparities in chronic illness care by improving systems of care in community health centers¹⁴.

THE RELATIONSHIP BETWEEN PUBLIC HEALTH AND PUBLIC POLICY

This section summarizes the relationship between public health and public policy. Figure 2 presents a framework of the public health system as adapted from Handler et al. and described earlier¹⁵. The outcome or performance of the system can be measured in terms of effectiveness (e.g., improving population health status), efficiency (i.e., cost-beneficial), and ability to achieve equity (e.g., reducing disparities) between populations. As underlined, public policy, an environmental component, exerts direct impact on both the configuration of public health system and on outcome. Knowledge of the inter-connections between public health performance and public policy will help guide future improvement and research directions.

Public Health System Performance and Public Policy

The development of public policy is influenced by the political, economic, and social environments within which public policy and public health activities operate. The interplay of these environments dictates the type of health model espoused and the ensuing public policy that reflects this belief. If the dominant health model values an individualized approach and focuses on biological dispositions and the effects of risk factors, the ensuing public policy will likely direct efforts to managing risk factors and treating illness on an individual basis. If the dominant health model values a collective approach and focuses on structural factors such as organization of society and how society distributes resources, the corresponding public policy will likely be directed at the social determinants of health such as income, education, employment, housing, and health care services.

Among industrialized countries, the broad public policy goal of improving population health seems to be the rule rather than exception. In Europe, for example, many countries consider improving population health to depend on addressing "basic determinants" and root causes of socioeconomic inequities¹⁶. Sweden has perhaps the most comprehensive and upstream public policies related to population health. The National Institute of Public Health has the role of monitoring Sweden's national objectives for public health activities which contain the determinants deemed most important by the Swedish government. Examples of these objectives include: participation and influence in society, economic and social security, secure and favorable conditions during childhood and adolescence, healthier working life, healthy and safe environments and products, and health and medical care that more actively promotes good health¹⁷. The overarching public policy aim is to create the conditions for good health on equal terms for the entire population.

Great Britain also follows a population-oriented public policy with the ultimate aim of improving the health and wellbeing of people in England. The nation's top objectives of public health reflect this orientation: to lead sustained improvements in public health and well being, with specific attention to the needs of disadvantaged and vulnerable people; to enhance the quality and safety of health and social care services, providing faster access and better patient and user choice and control; and to improve the capacity, capability, and efficiency of the health and social care system¹⁸.

Outside Europe, Canada has long embraced a population health perspective. This is evidenced in a series of noteworthy policy documents including the Lalonde report that recognizes the importance of social, political, and

physical environments in improving population health¹⁹, the Ottawa Charter for Health Promotion which focuses on social and economic determinants of health such as income and education, the report by the Federal, Provincial, and Territorial Advisory Committee on Population Health of 1974 that demonstrates a national commitment to population health and provides a framework to guide population health efforts. The public policy goal is to promote and protect the health of Canadians through leadership, partnership, innovation and action in public health. Core values include leadership, healthy work environment, ethical behavior, commitment to excellence, and dedication to service²⁰. Guided by these principles, the public health system's programs, services, and institutions emphasize the prevention of disease, the promotion of health, and the health needs of the population as a whole. The public health and health care systems share the same goal of maximizing the health of Canadians, and it is just as critical to have a well functioning public health system, as it is to have a strengthened health care system. Furthermore, both systems much work well together in responding to threats to the public's health²¹.

Current public health practice in Australia also reflects an upstream, population health focused public policy. Basic to the current public health practice is an understanding that many of the determinants of health lie outside the health care system itself. There is also a commitment to meeting the health needs of the community through policy and programs which combine a "top down" philosophy with a process which encourages community consultation and input²². Government plays an instrumental role in public health. The Australian national government is an important source of policy initiatives and funds a large portion of public health throughout the continent. State government has typically been the main source of population-based preventive services and health service delivery. The resources available to governments in achieving public health objectives are considerable and include universities, non-government and community organizations, and the workforce, and programs and institutions of the primary health care system²². Successful public health activities are carried out through multi-disciplinary teams, often with highly specialized expertise, using the range of regulatory powers available to the State with cooperation of the national level agencies.

The situation in the US is altogether a different story. For the most part, the US has not truly embraced a population health perspective. There is lack of a clear and consistent vision for government public health. Rather, health is fundamentally seen as the absence of disease and illness

and an individual responsibility. This is evidenced by the conspicuous lack of a coherent public policy that focuses on population health. The US spends the bulk of its resources on treating people who are already sick. The spending of state and local public health agencies constituted 2.37 percent of all US health spending for 2004 and 2.32 percent for 2005²³⁻²⁴. Most developed countries have national health insurance programs run by the government and financed through general taxes. Almost all the citizens in such countries are entitled to receive health care services. Such is not the case in the US, where not all Americans are automatically covered by health insurance.

In the US, the public sector assumes a secondary role. The market-oriented economy in the US attracts a variety of private entrepreneurs who are driven by the pursuit of profits in carrying out the key functions of health care delivery. There is little standardization in a system that is functionally fragmented. Such a system is not subject to overall planning, direction, and coordination from a central agency, such as the government. Due to the missing dimension of systemwide planning, direction, and coordination, there is duplication, overlap, inadequacy, inconsistency, and waste, which lead to complexity and inefficiency.

Changes in public policy occurred with the advent of the Healthy People initiative. Since 1980, the US has undertaken 10-year plans outlining certain key national health objectives to be accomplished during each of the 10-year periods. These initiatives have been founded on the integration of medical care with preventive services, health promotion, and education; integration of personal and community health care; and increased access to integrated services. Accordingly, the objectives are developed by a consortium of national and state organizations, under the leadership of the US Surgeon General. The first of these programs, with objectives for 1990, provided national goals for reducing premature deaths and for preserving the independence of older adults. Next, Healthy People 2000: National Health Promotion and Disease Prevention Objectives, released in 1990, identified health improvement goals and objectives to be reached by the year 2000. As part of this process, standardized Health Status Indicators (HSIs) were developed to facilitate the comparison of health status measures at national, state, and local levels over time. According to the final review published by the National Center for Health Statistics, the major accomplishments of Healthy People 2000 included surpassing the targets for reducing deaths from coronary heart disease and cancer; meeting the targets for incidence rates for AIDS and syphilis, mammography exams, violent deaths,

and tobacco-related deaths; nearly meeting the targets for infant mortality and number of children with elevated levels of lead in blood; and making progress in reducing health disparities among special populations²⁵.

Healthy People 2010: Healthy People in Healthy Communities, launched in January 2000, continues in the earlier traditions as an instrument to improve the health of the American people in the first decade of the 21st century. The context in which national objectives for Healthy People 2010 have been developed differs from that in which Healthy People 2000 was framed. Advanced preventive therapies, vaccines and pharmaceuticals, and improved surveillance and data systems are now available. Demographic changes in the US reflect an older and more racially and ethnically diverse population. Global forces, such as food supplies, emerging infectious diseases, and environmental interdependence present new public health challenges. The objectives also define new relationships between public health departments and health care delivery organizations²⁶. Healthy People 2010 specifically emphasizes the role of community partners-such as businesses, local governments, and civic, professional, and religious organizations-as effective agents for improving health in their local communities. Also, the objectives for 2010 specifically focus on the determinants of health discussed earlier.

Healthy People 2010 is designed to achieve two overarching goals²⁷. Increase Quality and Years of Healthy Life and Eliminate Health Disparities. The first goal is to help individuals of all ages increase life expectancy and improve their quality of life. The second goal of Healthy People 2010 is to eliminate health disparities among different segments of the population. These include differences that occur by gender, race or ethnicity, education, income, disability, living in rural localities, and sexual orientation.

Using data gathered through January 2005, DHHS released a Midcourse Review of progress towards achieving the Healthy People 2010 goals. With regard to the initiative's first overarching goal (Increase Quality and Years of Healthy Life), the Midcourse Review reported life expectancy continues to increase, but significant gender and racial/ethnic differences remain. In addition, the US continues to have lower life expectancy than many other developed nations. Two quality of life measures (i.e., expected years in good or better health and expected years free of activity limitations) improved slightly, while a third quality of life measure (i.e., expected years free of selected chronic diseases) declined slightly²⁸.

With regard to the second overarching goal of Healthy People 2010 (Eliminate Health Disparities), the Midcourse

Review reported very little progress has been made. While there were reductions in several health areas with disparities, there were increases in disparities in other health areas. The Midcourse Review noted that the lack of data on education, income, and other socioeconomic factors for many Healthy People 2010 objectives has limited the capabilities to plan programs that are effective in reducing and eliminating disparities²⁸.

One of the reasons for the slow progress in meeting these goals might be the lack of evidence-based strategies that improve population health, especially in a market dominated society that still considers health and health care primarily as an individual responsibility. Indeed, the Healthy People documents are typically strong on goals and objectives but weak on solutions and strategies.

Public Health System Performance and Governance Structure

Although the US DHHS and CDC provide guidance and major funding to state (and sometimes local) health departments, the authority for public health matters constitutionally resides with state governments. State health departments craft policy and entrust the operational component to local health departments.

Based on a 2005 survey conducted by the Association of State and Territorial Health Officials (ASTHO) and another 2005 survey by the National Association of County and City Health Officials (NACCHO), total per capita state and local public health spending for 2004-05 from all sources was \$149²³. Another estimate put the public health annual per capita spending to be about \$37-\$102 among local agencies and \$86-\$232 in state agencies. On average, state public health agencies employed 1,924 full-time-equivalent (FTE) workers (median of 1,145) whereas local public health agencies 66 FTE workers (median of 16).

At the state level, 58 percent of state public health agencies were free-standing, independent departments and 42 percent were part of an umbrella agency²³. In terms of form of organizational control between state and local public health agencies, the decentralized configuration was most common (42%), followed by mixed/shared (32%), and centralized (26%). State boards or councils existed in 48 percent of the states and had public health policy making and regulation power in 75 percent of the states with their presence. The state health officer was appointed by the governor in 66 percent of the states and by the secretary of health and human services 24 percent of the time.

The top programs and functions of state public health

agencies included preparedness (100%), vital statistics (98%), tobacco prevention and control (96%), public health laboratories (96%), women, infants, and children (WIC) program (96%), environmental health (92%), food safety (92%), health facility regulation (90%), drinking water regulation (80%), environmental regulation (74%), health professional licensing (70%), substance abuse prevention (52%), medical error reporting (50%), mental health (34%), and Medicaid (32%).

At the local level, county was the most predominant jurisdiction providing public health services (59%), followed by city/county (14%), district (10%), township (8.8%), and city (7.1%). Local boards of health were present in 74.4 percent of all local jurisdictions and served the role of governing (55%), policy making (58%), and advising (62%).

The top programs and functions of local public health agencies included: adult immunization (88%), communicable disease epidemiology (87%), child immunization (87%), Tuberculosis screening (83%), food service inspection (74%), tobacco control (67%), WIC program (64%), septic tanks (64%), HIV/AIDS screening (59%), STD treatment (57%), obesity (55%), family planning (55%), early and periodic screening, diagnosis, and treatment (EPSDT) (44%), school health (40%), injury prevention (39%), prenatal care (37%), syndromic surveillance (33%), public water supply monitoring (29%), oral health (27%), home health (25%), hazardous materials handling (19%), primary care (12%), and mental health (10%).

Recent literature (see, for example, 23; 29-30) identifies a series of challenges facing the nation's public health system infrastructure as summarized below.

Discrepancies between missions and funding level

In the wake of the 9-11 terrorist attack and hurricane Katrina, public health assumed the new responsibility of preparing for and responding to bioterrorism and natural disasters. At the same time, the old responsibilities of health protection, health promotion, and disease prevention remain. Meanwhile, population based core public health activities such as disease monitoring, surveillance, outbreak investigation, and response receive little funding. Funding for public health remains dismally low at less than \$150 per capita (less than 2.5% of the overall health care spending), causing severe resource constraints. In contrast, Canada spent 5.5 percent of its total health expenditure on public health³¹. In the US, public health is an undervalued sector: little investment is made in technology, workforce training and recruitment, facility build-out or renovation.

Within the US, spending on public health also varies

widely across communities, raising concerns about how these differences may affect the availability of essential public health services. May and colleagues examined the association between public health spending and the performance of essential public health services and noted that performance of essential public health services is significantly associated with public health spending levels (particularly local funds), even after controlling for system and community characteristics³².

Categorical funding

In addition to inadequate funding, the categorical nature of public health funding also presents a challenge. Public health funding is typically based on categorical programs and must be spent in specific ways, thereby reducing flexibility and efficiency. Categorical funding at the federal and state levels may limit the ability of local agencies to maintain core public health infrastructure and activities that fall outside of these categories.

Lack of leadership and shared vision

In the US, there is no single entity that has overall authority and responsibility for creation, maintenance, and oversight of the nation's public health infrastructure. Policymakers across jurisdictions and levels of government have not developed a shared, realistic vision of what public health should accomplish and who in the public health hierarchy should be held accountable.

This is not the case in other industrialized countries. For example, in Sweden, the National Institute of Public Health has the role of monitoring Sweden's national objectives for public health activities, formulating interim targets, and developing indicators of how well objectives are being met¹⁷.

In Canada, the creation of the Public Health Agency of Canada (PHAC) marks the beginning of a new approach to federal leadership and collaboration with provinces and territories on efforts to renew the public health system in Canada and support a sustainable health care system. Focusing on more effective efforts to prevent chronic diseases and injuries, and respond to public health emergencies and infectious disease outbreaks, PHAC works closely with provinces and territories to keep Canadians healthy and help reduce pressures on the health care system³³. PHAC serves as the nerve center for Canada's expertise and research in public health, effectively coordinating efforts with other partners to identify, reduce, and respond to public health risks and threats³⁴.

Discrepancies between expanding roles and old infrastructure

The organizational infrastructure that supports public health services is largely a remnant of the previous century when infectious diseases were the main target. Systematic failure of this infrastructure due to conflicting priorities, diffuse responsibilities, and inadequate resources are made readily apparent in numerous live tests of public health capabilities (such as Hurricane Katrina, the outbreak of SARS, and the anthrax attacks). Even though recent preparedness funding may be used to update and strengthen certain aspects of public health infrastructure, the funding is widely believed to be inadequate. In addition to the expanded preparedness role, public health, especially at the local levels, has been increasingly depended on as a medical provider of last resort. Serving as a safety net for medical services otherwise unobtainable by some populations (particularly the medically disenfranchised) has been a major impediment to investing in a stronger public health protection role.

Structural variability

There are significant variations in the structure of health departments across the country. State health departments craft policy and entrust the operational component to local health departments. The result is a nationally fragmented public health enterprise characterized by diverse practices across about 3,000 local agencies charged with meeting varying missions under fifty state health departments. The absence of nationally consistent systems leads to profound operational disconnects across public health authorities and hampers the public health effort to coordinate with other responder sectors, especially during disasters that cross geopolitical borders.

Inadequate workforce

The public health workforce is faced with a shortage and competence challenge. On the one hand, there is a shortage of public health workforce. The ratio of public health workers to US residents fell from 1:457 to 1:635 between 1970 and 2000²⁹. A recent survey by ASTHO revealed a rapidly aging state agency workforce, high retirement eligibility rates, high vacancy rates, and high annual staff turnover rates³⁵. The average tenure of a state health department's chief executive is two years. Nurses represent the largest professional group among public health workers, but they are rapidly retiring and in short supply. Given the rising challenge of chronic diseases and emerging threats, the decline in workforce represents a serious erosion of public health system capacity.

On the other hand, the current public health workforce may not have the competency to handle today's challenges that require new expertise for preparedness such as informatics, epidemiology, logistics, and risk communications³⁵. Self-assessment of public health competency by public health workers consistently shows gaps between mastery and what is needed for effective practice. Only 44 percent of public health workers had any formal, academic training in public health. Moreover, a sizable proportion of current public health workforce who have learned primarily on the job obtain higher-paying positions in hospitals, private laboratories, industry, and academia. The graduates of schools and programs of public health tend to find employment in academic and research careers, rather than in relatively low-paying state and local public health agencies. The compensation packages for public health cannot ensure the hiring of the brightest and best-trained workforce.

Inconsistent information technology

Throughout the country, there lacks a comprehensive electronic health intelligence and information system, to detect unusual disease events, trace vulnerable populations, monitor cases of diseases, catalog adverse event reports, track the course of outbreaks, resupply critical resources, deploy personnel during an epidemic, and scrutinize spending.

Across states, the infrastructure for information and data systems is inconsistent. Many public health surveillance systems have been late to replace the paper-based or telephone-based reporting system. In a survey conducted by CDC²⁹, only 45 percent of local health departments had the capacity to broadcast alerts via facsimile to labs, physicians, state health agencies; fewer than half had high speed continuous internet access; and 20 percent lacked e-mail capability.

ADVANCING PUBLIC HEALTH SYSTEMS RESEARCH

This section summarizes what is known or unknown regarding the relationship between public health systems performance and such core areas as social determinants of population health and public policy. For the areas in which there is a lack of knowledge, topics for further research will be identified. Finally, a course of action is recommended to implement public health systems research.

Knowledge Gaps and Research Priorities

Below we summarize the current knowledge and identify further research priorities regarding social determinants of population health, the role of public health in influencing population health determinants, the relationship between public policy and public health, relationship between public health performance and governance structure, and relationship between public health performance and preparedness.

Social determinants of population health

There has been extensive literature on social determinants of population health. There are a variety of frameworks of population health determinants. These determinants include distal factors (political, legal, institutional, and cultural) and proximal factors (socioeconomic status, physical environment, living and working conditions, family and social network, lifestyle or behavior, and demographics). There are also models that depict the trajectories or pathways through which these determinants affect population health.

However, there is a general lack of knowledge about the relative magnitude or effect of these determinants on population health. Knowledge of the relative effects could help us focus on key determinants and streamline funding priorities, given limited resources. The overriding population health determinants question is: what is the optimal balance of investments (e.g., dollars, time, policies) in the multiple determinants of health (e.g., behavior, environment, SES, medical care, genetics) that will maximize overall health outcomes and minimize health inequities at the population level?

Furthermore, little is known about how these determinants affect population health disparities although such knowledge is a prerequisite to developing strategies that eventually overcome health disparities. General population health is influenced by population health disparities; therefore, to ultimately improve population health, reducing and eliminating population health disparities is crucial.

Public health and population health determinants

In the US, public health has been most influential in shaping the environmental and behavioral determinants of population health. Through environmental interventions, public health has contributed to the reduction and elimination of diseases or deaths that result from interactions between people and their environment, in particular infectious diseases. Through behavioral interventions, public health has contributed to the prevention and reduction of risk factors that are connected to chronic diseases, the present-day leading causes of death.

However, public health, at least in the US, is not successful in addressing the socioeconomic determinants of health. Public health in the US does not have a broad mandate that addresses major determinants such as income, education, and employment. Current resources do not even pay adequate attention to traditional and emerging public health functions. The importance of SES to health has been recognized in Europe since the early 1900s when mortality statistics were first reported according to occupation. The US, however, has been slower to adopt this practice. In 1976, the US DHHS released its inaugural report of the nation's health, revealing substantial differences in mortality and morbidity according to SES³⁶. Further research is needed to summarize the successful experience of other industrialized countries and explore how public health strategies can be developed in the US to influence socioeconomic determinants of population health.

Likewise, studies are needed to examine how policies and strategies can be developed to reduce SES disparities among subpopulations. The US has much greater income inequality than most developed countries. Of the 20 countries ranked highest in human development in the 2002 Human Development Report published by the United Nations, the US had the greatest inequality (a Gini Index coefficient of 0.41). The UK had the second greatest inequality (0.368) followed by Ireland with a Gini coefficient of 0.36. Denmark and Japan had the lowest levels of inequality with Gini coefficients of 0.25 for both³⁷.

Public policy and public health

The significant connection between public policy and public health is well-known. Countries with a broad public policy goal of improving population health are likely to direct their public health effort at the social determinants of health including income, education, employment, housing, and health care services. Countries with a narrow public policy goal of treating individuals' illness are likely to direct their public health effort at medicalizing social problems and targeting risk factors.

However, we lack research that systematically summarizes why and how certain countries embrace a broad public policy goal and others a narrow one. What are the facilitators and barriers shaping decisions to adopt a broad public policy goal and how can strategies be developed to enhance the facilitators and reduce the barriers? Cross-country comparisons seem necessary for this type of inquiry. Case studies of other countries can provide valuable lessons for the US as it attempts to broaden its public policy to focus on population health.

Public health performance and governance structure

There is a clear agreement that public health performance is related to the governance structure. However, it is less clear how that relationship works. The public health systems literature tends to focus on the deficiencies of the current US public health system including discrepancies between missions and funding level, categorical funding, lack of leadership and shared vision, discrepancies between expanding roles and old infrastructure, structural variability, inadequate workforce, and inconsistent information technology.

Further studies are needed to examine how the public health system (including its structure, process, and performance) can be designed to fulfill the mission of improving population health and reducing health disparities at the national, regional, state, and local levels. Specifically, studies need to develop indicators that measure achievements in the improvement of population health and the reduction of health disparities; develop and assess the essential services needed to lead to the intended performance; and develop and assess the structure (including governance, organization, financing, workforce, and information system) necessary to accomplish the essential services. These studies need to be performed at the national, regional, state, and local levels. Moreover, these studies should standardize common features that all levels can embrace as well as identify unique features that fit specific levels or types of communities. Table 2 summarizes the research priorities identified above related to public health systems research.

Course of Action to Implement Public Health Systems Research

The following course of action is recommended to pursue the above research priorities of public health systems research.

1. Develop logic models on how public health improves population health and reduces health disparities

Even though there is large evidence that public health contributes to population health and that it often does so by influencing social determinants of health, we know very little about how public health can be called upon to address health disparities. We also have little knowledge about the roles of public health at the federal, state, and local levels, respectively. A clear conceptual understanding of these issues is critical and serves as a foundation for concerted efforts towards further research and practice. Therefore, logic models need to be developed about how public health

Table 2. Public health systems research priority areas

● Social determinants of population health
– the relative magnitude/effect of social determinants on population health
– the pathways/trajectories through which social determinants affect population health disparities
● Public health and population health determinants
– how to develop public health strategies to influence socioeconomic determinants of population health
– how policies and strategies can be developed to reduce SES disparities among subpopulations
● Public policy and public health
– examples of broad public policies that focus on population health
– facilitators and barriers towards broad public policies that focus on population health
● Public health performance and governance structure
– what public health strategies, efforts, services, and programs are needed to fulfill the mission of improving population health and reducing health disparities
– how the public health system (including its structure, process, and performance) can be designed at the national, regional, state, and local levels, to carry out these services and programs and therefore fulfill the mission of improving population health and reducing health disparities
– develop indicators to measure improvement of population health and the reduction of health disparities
– develop and assess the essential services needed to lead to the intended performance
– develop and assess the structure (including governance, organization, financing, workforce, and information systems) necessary to accomplish the essential services

improves population health and reduces health disparities at the national, state, and local levels. One way to accomplish this is to convene a joint expert panel and stakeholders meeting where draft logic models are proposed, discussed, and refined after incorporating inputs from all participants. The refined models are then circulated within the public health community and among public health systems researchers for further comments and refinement. These models may be updated periodically as new evidence is gathered.

2. Develop indicators to measure public health performance at the national, state, and local levels

Once consensus is reached regarding the role of public health and the related logic models formulated, we need to develop indicators at the national, state, and local levels that measure public health performance that improves population health and reduces health disparities. A comprehensive national surveillance system of tracking these indicators consistently need to be developed. Eventually, the system will also include measures of inputs (resources, capacity, etc), core function-related processes (public health practices and services) as well as outcome. One way to accomplish this is to use the same joint expert panel and stakeholders meeting where draft indicators (tied to the logic models) are proposed, discussed, and refined after incorporating inputs from all participants. The refined indicators along with the logic models are then circulated within the public health community for further comments and refinement. The indicators may be updated periodically as new evidence is gathered. States are likely to be primarily responsible for developing and implementing a tracking system that captures the public health performance indicators. Since not all states are equal in terms of readiness, technical assistance is needed that enables states to learn from each other and collect comparable information.

3. *Conduct international studies that draw lessons from other industrialized countries*

Case studies of other industrialized countries that have similar political and economic systems and comparable cultural values would help the US learn from the experiences and lessons of successful and unsuccessful attempts to improve public health systems performance. Indeed, many of the topics identified in the research priority areas can benefit from an international perspective. For example, international studies can help address research topics including public health and population health determinants (e.g., how public health strategies can be developed to influence the socioeconomic determinants of population health, and how policies and strategies can be developed to reduce SES disparities among subpopulations), public policy and public health (e.g., examples of broad public policies that focus on population health, facilitators and barriers towards broad public policies that focus on population health), and public health performance and governance structure (e.g., what public health strategies, efforts, services, and programs are needed to fulfill the mission of improving population health and reducing health disparities, and how the public health system can be designed to carry out these services and programs). One way to accomplish this is through commissioned studies that explore these issues for selected countries (e.g., Sweden, UK, Canada,

Australia). Public health professionals and experts from these countries could also be invited to attend an international symposium on public health systems performance and research. The commissioned studies, presentations by local experts, and the discussions that follow could result in a systematic understanding of other countries' experiences and lessons.

4. *Advocate state innovations to improve public health performance*

Due to the political and institutional structures of the US as well as the diversity of local needs and resources, significant and meaningful reforms are likely to happen at the state level. We need to encourage state innovations that try to improve public health infrastructure and performance. One way to accomplish this is to fund evaluations of states' innovative efforts at improving their public health systems infrastructure, practices, and performance. In refining structure and practices based on lessons learned from existing infrastructure, it is important to address the major determinants of population health and health disparities, by focusing on social and community factors, not just access to public health and medical care services for selected individuals. While it is much more difficult to influence social and economic determinants, it is necessary to examine and intervene, when possible, much earlier in the process of poor health development. Since many of these social factors are the root causes of poor health, addressing them will be paramount to improving population health and resolving health disparities in the US. To promote and protect society's interest in health and well-being, public health must influence the social, economic, political, and medical care factors that affect health and illness.

Turning Point is an initiative of The Robert Wood Johnson Foundation to transform and strengthen the public health system. The 21 states participating in this initiative developed multi-sector partnerships to produce public health improvement plans and chose one or more priorities for implementation. Strategies employed for transforming public health systems include institutionalization within government, establishing 'third-sector' institutions, cultivating relationships with significant allies, and enhancing communication and visibility among multiple communities.

5. *Advance community based projects that integrate research and practice*

A major initiative to address the research priorities developed earlier is to encourage community based projects that integrate research with practice. Community has been defined as individuals with a shared affinity, and perhaps

geography, who organize around an issue, with collective discussion, decision making, and action³⁸, or as a group of people who have common characteristics, defined by location, race, ethnicity, age, occupation, interest in particular problems or outcomes, or other common bonds³⁹. For the purpose of promoting a broad public health perspective, community could be broadly defined as including all those (individuals, organizations) residing in a defined geographic area with close political, social, or economic interactions. Community based projects should adhere to the following principles.

Community based projects should foster collaboration between public health agencies and other entities that can make a contribution towards improving health. Improving the health of populations and reducing health disparities will require the participation of traditional health agencies, and involvement from education, housing, environmental, criminal justice, and economic agencies. To achieve cross-agency collaboration, these agencies should create standing mechanisms for policy development among sectors and promote interdepartmental collaboration, and create networks among public and private agencies and particularly with advocates to openly study, evaluate, and disseminate policy options.

Community based projects should stress multi-level integration of interventions. Invariably, for some vulnerable groups there are gaps in service provision and for others there are major duplications. Building on the focus on multiple risk factors, efforts could be made towards unifying services across agencies and organizations with common goals. Domestic and foreign public health initiatives have shown greater promise when utilizing the collective resources of public and private advocates. Recognizing common goals encourages multi-sector alliances and minimizes partisan or other political barriers.

Community based projects should stress participation and empowerment which are critical components of acceptance, success, and continuation of any set of interventions. Greater community involvement and leadership in priority-setting and policy development is critical for the project's ultimate success. Perhaps one of the best ways to include communities in decision-making is to focus on community strengths and resources rather than community deficits or problems. Communities should be seen as action centers for development, progress, and change. Community members and community leaders should have a central role in planning and managing initiatives. Through community mobilization, skill-building, and resource sharing, communities can be empowered to identify and meet their own needs, making them stronger advocates in

supporting the vulnerable populations within and across their community boundaries.

Community based projects should ensure feasibility. Making sure an intervention is feasible is critical to its success. Areas of feasibility to be considered include: technical feasibility (i.e., Can the intervention plausibly solve or reduce the problem as defined?), economic feasibility (i.e., What are the costs and benefits of given intervention from an economic standpoint?), political feasibility (i.e., A proposed intervention must survive the test of political acceptability. This depends on support from key officials, other stakeholders inside and outside of government, and ultimately voters.), and administrative feasibility (i.e., Assess how possible it would be to implement any given intervention given a variety of social, political, and administrative constraints.).

Community based projects should apply strategies. An approach that has been successful in Europe—restating the public health issue using different language—may attract new attention to an issue not previously compelling to the public or policymakers. In the past, advocates have used the social justice argument to persuade the public that inequality in the US needed to be eliminated. Politicians in the Netherlands were more impressed by a discussion centering on “lost human potential” than inequality. Perhaps the same effect would be seen among Americans if the national conversation focused less on social justice.

Community based projects should include a systematic evaluation component to allow feedback and refinement. Programs that are comprehensive in scope (addressing multiple risks) should be evaluated along multiple dimensions, but should be appropriately evaluated against criteria that are feasible to obtain. In too many circumstances, health and social programs are judged on whether they directly impact the health of their consumers, even though the program is funded for short-term cycles (e.g., just two or three years). If these projects are possible over a longer period, programs must be held accountable to meeting their goals to improve health.

6. Search for innovative ways of funding public health systems research

Funding for public health systems research ought to come from a variety of sources. In addition to traditional federal funding sources such as CDC, NIH, HRSA, and AHRQ, foundations can play a major role in shaping and fostering public health systems research. Foundations provide a unique avenue for promoting scientific and policy discussion of a public health issue. In addition to providing the necessary financial resources to further explore issues

such as disparity, foundations are able to influence public opinion through publications and media and the discourse it inspires. In addition, the private sector should also be engaged especially in funding community based projects that aim at improving community health and benefit all those residing in the community including private business.

7. Develop new methodologies and analytic tools

Much of the research and evaluation in this field will not be like traditional medical research that relies on control groups, a large sample size, and a limited number of variables. In contrast, public health systems research typically involves single community and multiple layers of variables. New methodologies and analytic tools need to be developed to further this line of inquiry and advance the field. One way to facilitate this could be through a research retreat where experts in related field (e.g., social scientists, health services researchers, public health researchers, methodologists, qualitative researchers, and practitioners) gather and discuss challenges and solutions. As a result, suggested approaches (methodological and analytic) to carry out public health systems research could be summarized and promoted.

8. Educate the public and enhance dissemination

Education can be used as a tool to raise awareness about population health problems and challenges such as health disparities and to promote a climate of outrage and support for programmatic changes to eliminate such disparities. Technology has provided innumerable means for distributing information. A media campaign incorporating internet, television, radio and print ads with a simple, readable, and galvanizing message could reach and motivate a broad segment of the population. Policy alternatives, goals and research, in particular, should also be well published in highly regarded academic publications in order to ensure consistent political pressure on policymakers. In addition to enhancing awareness, it is critical that the public and policymakers understand the severity of the problem we face. Policymakers are more likely to act when there is a clear public demand and when there is a perceived crisis. One way to demonstrate severity is the publication of international rankings on key health and health care indicators. Taking advantage of national pride by highlighting a public health issue for which the US performs poorly compared to other countries may motivate the public to take steps to improve their national ranking. This strategy has often been invoked to garner support for infant mortality interventions. The US's abominable ranking among OECD countries as the 7th highest in infant mortal-

ity continues to inspire outrage that a country with so many resources does not ensure adequate care for vulnerable citizens.

Education can also be used to establish relevance. Although most Americans are concerned about the plights of the vulnerable populations, relatively few have considered these to be their own problems. Fewer have the understanding that it is actually to their economic advantage to address the plights of vulnerable populations. A rational review of the costs and benefits associated with improving the health of vulnerable populations reveals the advantage of making such an investment. The consideration of costs to the nation resulting from poor health status among the vulnerable cannot evade the public's attention much longer.

9. Engage the policy community

To elevate public health and public health systems research, ultimately, the policy community must be engaged. As the discussion in Part 3 implies, in the US, there is a lack of political conviction about improving population health and reducing health disparities. This is reflected in the absence of a coherent public policy agenda towards population health and in the lack of authority and funding for public health. The federal government has six main areas in which it plays a role in population health: policy making, financing, public health protection, collecting and disseminating information about health and healthcare delivery systems, capacity building for population health, and direct management of services⁴⁰. Events in recent years such as preparedness against natural or human created disasters present a unique opportunity to strengthen the core capacity to deliver the essential public health services and strengthen public health. As stated by McGinnis, "public policymakers need to begin thinking in terms of a health agenda rather than a health care agenda or -even more narrowly-a health care financing agenda"⁴¹.

The US needs to begin to develop a health policy agenda that reflects not just the impact of medical care services on health, but more importantly the impact of social and environmental factors. An examination of current health policy debates reveals that most debates center primarily on financing of health care rather than health outcomes or social determinants of health. The US should expand this focus on financing and issues of cost containment to include "health impact assessment", which would estimate the influence of social, economic, and health care policies on population health, not just cost-savings.

10. Form a national center for public health excellence

that coordinates national efforts to improve public health performance

A national center for public health excellence could be formed to facilitate many of the research, evaluation, and services activities associated with promoting the public health systems research agenda. For example, the center could provide technical assistance to state and community based projects including designing and collecting standard measures and providing training on models commonly used in community health development and evaluation projects. Examples of these models include the health belief model, the transtheoretical model, (stages of change), the planned approach to community health (PATCH), predisposing, reinforcing and enabling constructs in education/environmental diagnosis and evaluation, with its implementation phase: policy, regulatory and organizational constructs in education and environmental development (PRECEDE-PROCEED), and multilevel approach to community health (MATCH)⁴². The center can also help with the evaluation of the projects.

CONCLUSION

This paper summarizes current knowledge regarding the relationships between public health, and social determinants of health, and public policy, identifies the priority areas for further research and knowledge development, and recommends a course of action to carry them out. The next step is for the public health practice and research community to deliberate and reach consensus on these and work out concrete plans to implement research. With public health gaining attention and importance, there is going to be increasing demand for public health research to guide the development of public health services and improvement of public health performance. A shared understanding on the priority research areas and strategies for implementing research is paramount to advancing the field of public health research.

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