Ohio 2016 STATE HEALTH ASSESSMENT

Executive summary

Urgent need to improve health and wellbeing in Ohio

Ohio is a large and diverse state that faces many health challenges despite a wealth of healthcare resources. Several national scorecards and rankings place Ohio in the bottom quartile of states for health (see Figure ES.1). Even more troubling, Ohio's performance on population health outcomes has steadily declined relative to other states over the past few decades, falling from a rank of 27 in 1990 in America's Health Rankings to 39 in 2015. Ohio also has significant health disparities by race, income and geography, and spends more on health care than most other states.[1]

The Ohio 2016 state health assessment (SHA) provides data needed to inform health improvement priorities and strategies in the state.

Purpose

The SHA is a comprehensive and actionable picture of health and wellbeing in Ohio. The purpose of the SHA is to:

- Inform identification of priorities in the state health improvement plan (SHIP)
- Provide a template for state agencies and local partners, with a uniform set of categories and metrics to use in related assessments

The SHA was conducted from March to July 2016 and the SHIP will be completed by the end of 2016. The purpose of the SHIP is to:

- Provide state agency leaders, local health departments, hospitals and other state and local partners with a strategic menu of priorities, objectives and evidence-based strategies
- Signal opportunities for partnership with sectors beyond health

Conceptual framework

The SHA is guided by the conceptual framework shown in Figure ES.2 with the explicit goal of improving health value – the combination of improved population health and sustainable healthcare spending.[2] The framework incorporates the life-course perspective, which prompted consideration of all age groups throughout the SHA process.

Figure ES.1. **Ohio's rank on national scorecards**

	Overall rank	Rank for health outcomes*
America's Health Rankings, 2015 edition	39	41
Commonwealth State Scorecard, 2015 edition	33	41
Gallup-Healthways Wellbeing Index, 2014	47	45
HPIO 2014 Health Value Dashboard	47	40

Ohio ranks in the **top quartile** of states**. Ohio ranks in the **second quartile** of states**. Ohio ranks in the **third quartile** of states**. Ohio ranks in the **bottom quartile** of states**.

*Rank for specific domains: America's Health Rankings: Health Outcomes; Commonwealth: Healthy Lives; Gallup: Physical; HPIO Health Value Dashboard: Population Health
** Commonwealth and HPIO rankings include District of Columbia, other rankings do not.

Framework domains were used to guide selection of metrics included in the SHA data profile section of this report and to examine the many factors that impact health outcomes and spending, as well as disparities:

- Healthcare system effectiveness
- Access to health care
- Public health and prevention effectiveness
- Social and economic environment
- Physical environment

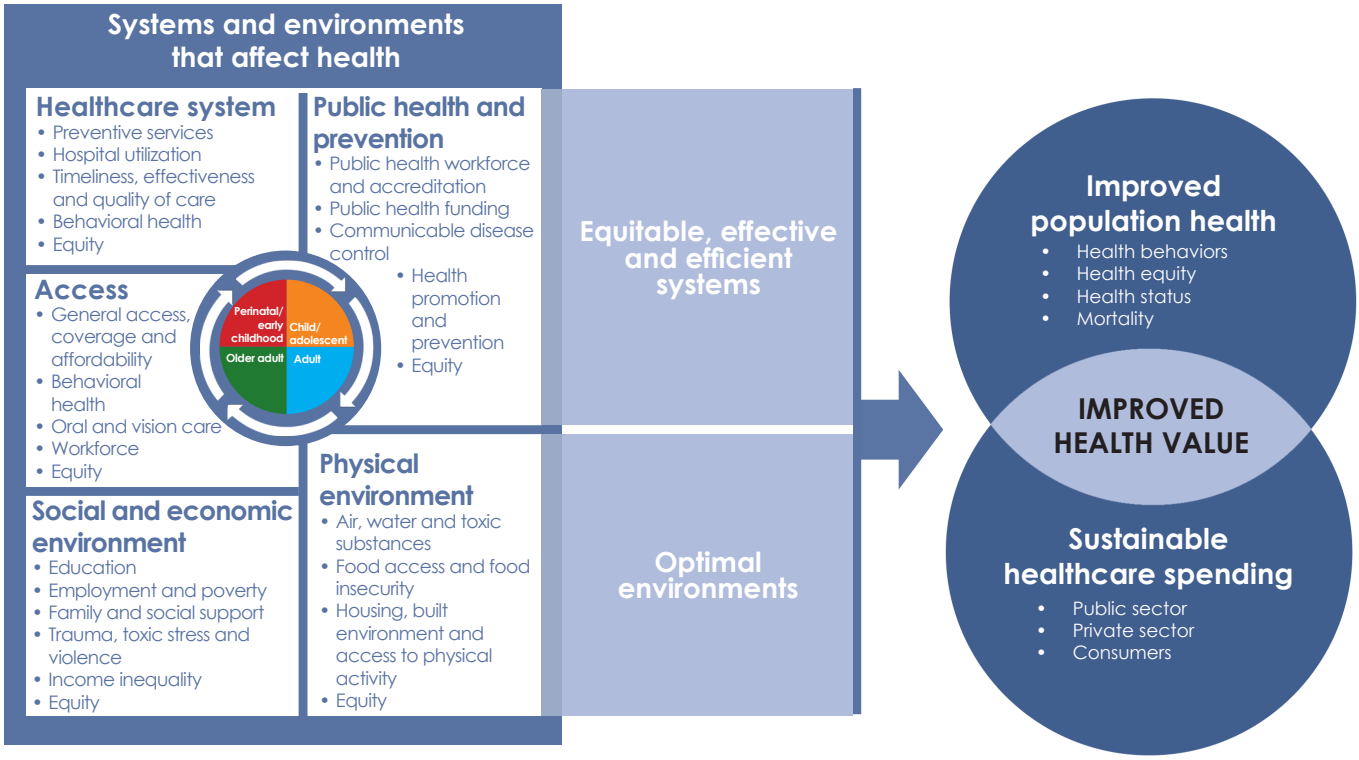
The vision statement guiding the SHA and the SHIP process (see box) acknowledges the strong two-way relationship between health and economic vitality, while the mission statement emphasizes the importance of achieving health equity.

Vision and mission

Vision
Ohio is a model of health and economic vitality.

Mission
Improve the health of Ohioans by implementing a strategic set of evidence-based population health activities at the scale needed to measurably improve population health outcomes and achieve health equity.

Figure ES.2. **State health assessment and state health improvement plan conceptual framework: Pathway to health value**

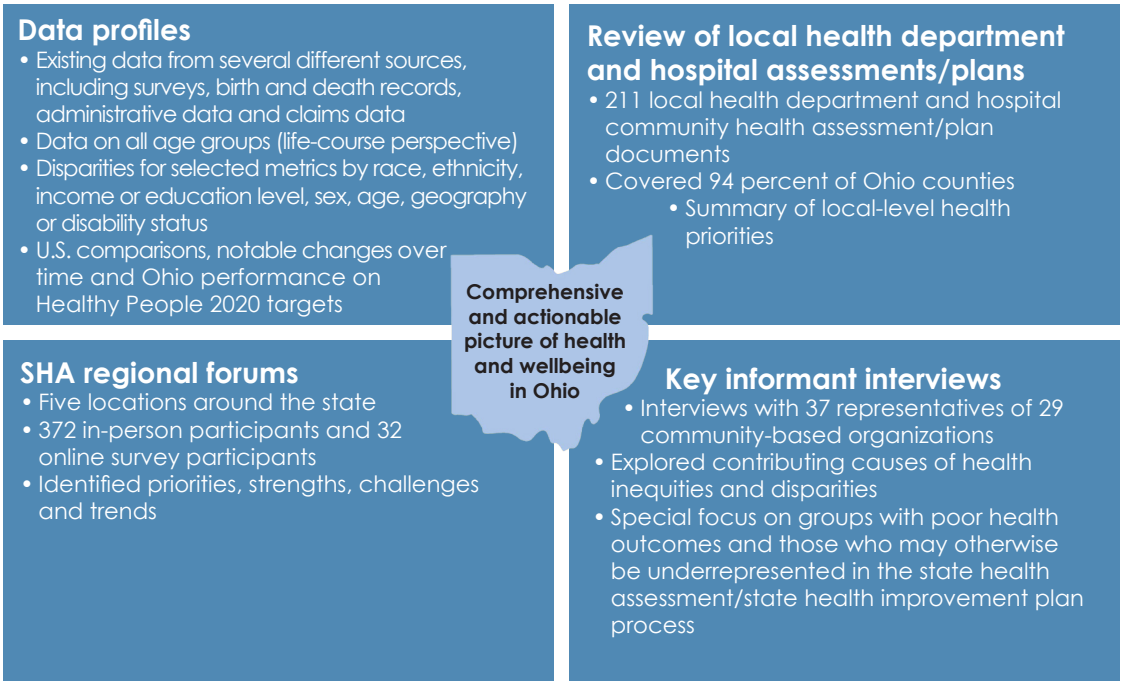


World Health Organization definition of health: Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

Process

This assessment includes over 140 metrics, organized into data profiles, as well as information gathered through five regional forums, a review of local health department and hospital assessments and plans and key informant interviews (see Figure ES.3).

Figure ES.3. **State health assessment (SHA) sources of information**

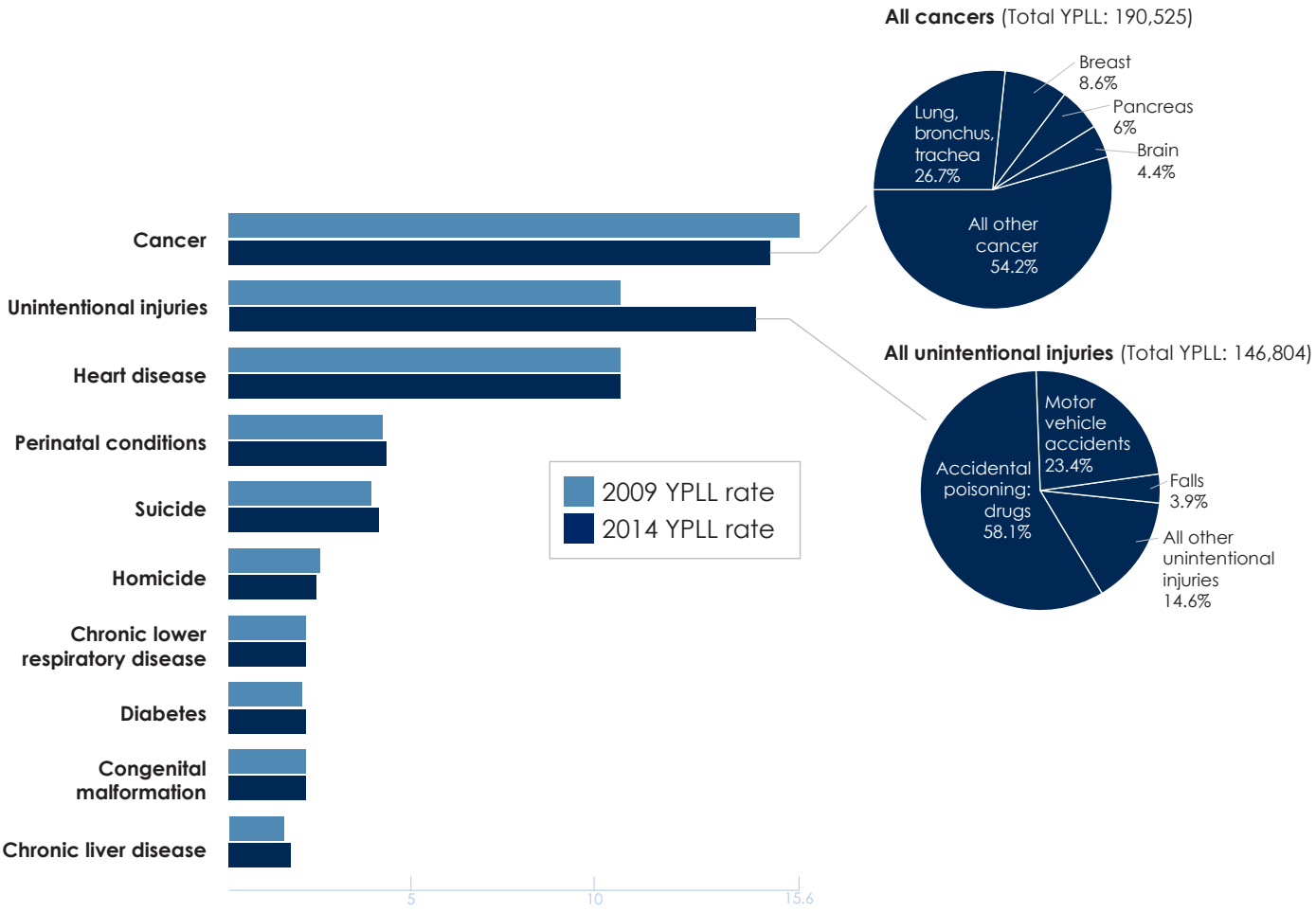


Key finding #1. Many opportunities exist to improve health outcomes

Mental health and addiction. While Ohio faces many behavioral health challenges, including poor access to care and high prevalence of depression, the rise in opiate-related drug overdose deaths stands out as an immediate threat to the wellbeing of Ohioans. Opiate-related diagnoses (heroin and prescription opioids) accounted for 37 percent of addiction treatment admissions in 2014, up from about seven percent in 2001. The unintentional injury death rate, which includes drug overdoses, increased 30 percent from 2009 to 2014 and emerged as Ohio's second highest cause of premature death (see Figure ES.4). Given that unintentional injuries (largely from drug overdoses) and cancer were the two leading causes of premature death in Ohio, addictions to opiates and nicotine (due to Ohio's high tobacco use rates) may be two of the greatest challenges to health and well-being in the state. A sharp increase in the number of babies discharged with neonatal abstinence syndrome also suggests that the consequences of the opiate epidemic are far-reaching and will have long-term effects in Ohio.

Chronic disease. Chronic diseases, including obesity, cardiovascular disease, diabetes and cancer, as well as related risk factors such as tobacco use and poor nutrition, stand out as concerns for Ohio. Obesity and hypertension, for example, are highly-prevalent conditions reported by nearly one-third of Ohio's adult population. The prevalence of adult diabetes rose from 10.4 percent in 2013 to 11.7 percent in 2014. All three of these conditions were more common among middle-aged Ohioans (ages 45-64) than younger Ohioans (ages 18-44), indicating that chronic disease will be a significant challenge for Ohio's growing aging population in the coming years.

Figure ES.4. **Premature death, by cause, Ohio.** Years of potential life lost (YPLL) before 75, per 1,000 population (2009 and 2014)



Source: Ohio Department of Health, Bureau of Vital Statistics

Maternal and infant health. Racial and ethnic disparities in infant mortality stand out as a major challenge for Ohio. In 2014, the black infant mortality rate was more than twice as high as the white rate. This black and white gap is not nearly as large in the U.S. overall, indicating that more can be done to reduce this sobering disparity.

Health behaviors. Tobacco use, poor nutrition and physical inactivity all contribute to, or are closely related to, mental illness, addiction, chronic disease and infant mortality. Compared to the U.S., Ohio has higher rates of adult smoking, youth all-tobacco use, mothers smoking during pregnancy and children being exposed to secondhand smoke at home. Ohio's 2014 adult smoking rate (21 percent) was nine percentage points above the Healthy People 2020 target (12 percent). In addition, Ohio mothers were nearly twice as likely to have smoked during pregnancy in 2014 than in the U.S. overall.

Forty-two percent of Ohioans reported that they did not consume fruits on a daily basis and 26 percent did not eat vegetables on a daily basis in 2013. Access to affordable healthy foods is a challenge for many Ohioans, with 16.8 percent of Ohioans identified as food insecure. This percent is higher than the U.S. comparison and nearly three times the Healthy People 2020 goal of six percent of households.

Physical activity helps to prevent or manage many chronic conditions and supports healthy aging and mental wellness. While more progress is needed on physical activity, this assessment finds that Ohio has some strengths in this area. Regional forum participants identified active living environments as something that made them proud of their community and all regions identified a positive active living environment as one of the most important characteristics of a healthy county or region.

Key finding #2. Many opportunities exist to decrease health disparities

Addressing health disparities is a necessary step towards improving the health of all Ohioans and achieving health equity. There were striking disparities across many metrics in the SHA, with disparities varying widely by race, ethnicity, income and education-level, disability status and other characteristics:

- African-American/black Ohioans were much more likely than any other racial and ethnic group to experience poor health outcomes.
- Diabetes, obesity, hypertension and tobacco use were all more common among lower-income Ohioans (those with household incomes less than $25,000) than among Ohioans with household incomes at $50,000 or more.
- Disparities exist and vary across age and gender. For example, diabetes and hypertension prevalence increased with age, greatly impacting those ages 65 and older.
- People with disabilities experienced substantial disparities across metrics related to health outcomes and accessing health care.
- Appalachian counties in southern and eastern Ohio tend to have poorer health outcomes, such as higher rates of premature death, although there are counties with significant health challenges in all areas of the state.

There are significant gaps in efforts to collect data for various population groups. For example, limited data is available for certain racial and ethnic groups as well as by disability status. To establish the foundation on which to improve the health of all Ohioans, there must be a concerted effort to improve data collection by race, ethnicity, income-level, disability status and across other population groups and characteristics.

Key finding #3. Access to health care has improved, but challenges remain

Ohio performs well on access to care relative to the U.S. and has seen notable improvements on a number of access metrics, including a sharp decline in the uninsured rate in recent years and a decrease in the percent of adults reporting being unable to see a doctor in the past year due to cost.

However, access to care emerged as a top priority for local health departments, hospitals and regional forum participants, possibly reflecting continued concerns about:

- Provider distribution and capacity, particularly for behavioral health and dental care
- Inadequate insurance coverage and lack of affordability that persist despite coverage expansions
- Disparities in accessing health care, including a lack of cultural competence among healthcare providers

Key finding #4. Social determinants of health present cross-cutting challenges and strengths

The social determinants of health refer to an individual's surrounding environment, or the places people live, learn, work and play and the wider set of forces and systems shaping the conditions of daily life.

The social determinants of health can have a significant impact on health risks and health outcomes at all stages of the life course, but are particularly important for children. Many high-priority health problems that surface in adulthood are shaped by conditions and experiences during childhood. Key drivers of health status and disparities by geography, race and ethnicity for Ohio include:

- Employment, poverty, income and education
- Social support
- Violence, trauma and toxic stress, including the high prevalence of intimate partner violence (rape, physical abuse, stalking) and adverse childhood experiences (such as having a parent who has died or been incarcerated)
- Physical environment, including transportation, housing, residential segregation, lead poisoning and air and water quality

Key finding #5. Opportunities exist to address health challenges at every stage of life

Many of the health problems highlighted in this assessment—such as type 2 diabetes, heart disease and addiction—are typically diagnosed during adulthood. Often these health problems are rooted in behaviors and conditions developed early in life, as well as other childhood experiences as described above.

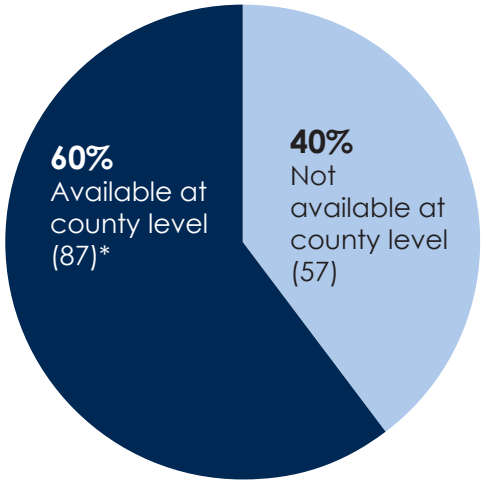
Also, Ohio will have a much larger proportion of older adults in the coming decades. Efforts to improve the wellbeing of Ohioans must also take into consideration the aging of the "baby boom" generation. Addressing Ohio's health challenges must therefore include strategies at every stage of life, as well as strategies designed to improve short-term and long-term outcomes.

Key finding #6. Improved data collection efforts are needed to assess health issues at the local level and for specific groups of Ohioans

Both the nation and Ohio need a more coordinated approach to population health data collection and reporting that makes county-level and disaggregated data (by race, ethnicity, disability status and other characteristics) available on a wider range of key metrics. Despite the existence of many different population health surveys, inadequate sample sizes for these surveys often mean that the data are not available at the local level (see Appendix B).

Greater pooling of data collection resources could increase the efficiency and quality of data available for state and local assessments and evaluation. In addition, increased data sharing between health care and public health could greatly improve the timeliness and usefulness of existing health information.

Figure ES.5. **County-level data availability of state health assessment metrics** (n=144)



*County-level data is limited for 17 metrics (e.g., may not be available for all counties or data for smaller counties may be reported in multi-county regions).

Key finding #7. Widespread agreement on health issues identified at local, regional and state levels can be an impetus for greater collaboration

A great deal of consistency was noted in terms of prioritized health issues identified in local health department and hospital assessments and plans, as well as during the regional forums. Figure ES.6 lists the top 10 health issues from the local health department and hospital assessments and plans, as well as from the regional state health assessment forums. Mental health, alcohol and drug abuse, obesity, cardiovascular disease and diabetes all emerged as local or regional priorities. There was also a great deal of consistency in issues identified across different regions of the state, and among urban, suburban and rural counties, indicating nearly-universal agreement that these are among Ohio's greatest health challenges.

The key informant interviews with representatives of community-based organizations largely confirmed these priorities. Immigrants, refugees and people with disabilities, however, experience some unique challenges, such as language barriers and mobility issues, which are also important priorities for their communities.

Analysis of more than 140 metrics in the SHA also confirmed that these top 10 health issues are predominant challenges for the state.

The interconnectedness of Ohio's greatest health challenges, along with the overall consistency of health priorities identified in this assessment, indicates many opportunities for collaboration between a wide variety of partners at and between the state and local level, including physical and behavioral health organizations and sectors beyond health.

Figure ES.6. **Health issues identified by local health departments and hospitals and at regional SHA forums**

	Top 10 health issues	
	Identified in local health department and hospital assessments/ plans	Identified in SHA regional forums
Mental health and addiction		
Mental health	X	X
Drug and alcohol abuse	X	X
Chronic disease		
Obesity	X	X
Cardiovascular disease	X	X
Diabetes	X	X
Cancer	X	
Chronic disease (unspecified)	X	
Maternal and infant health		
Maternal and infant health	X	
Health behaviors		
Tobacco	X	
Nutrition		X
Access to care		
Access to health care/ medical care	X	
Access to behavioral health care		X
Access to dental care		X
Social determinants of health		
Employment, poverty and income		X
Equity/disparities		X

Note: This summary includes the top 10 health issue categories, out of 36 possible categories. See Appendix C for complete analysis.

Key finding #8. Sustainable healthcare spending remains a concern in Ohio

Ohio's comparatively high healthcare spending is a concern for consumers, employers and policymakers, especially since this spending has not translated into improved population health outcomes. Ohio healthcare spending was higher than the U.S. for nine of 15 metrics, including metrics related to consumer out-of-pocket spending on health care and Medicare. In addition, Ohioans have seen a steady increase in premiums for employer-based health coverage.

Current public and private efforts focused on addressing this concern through payment reform provide the opportunity to invest resources strategically so that outcomes are improved. Evidence-based strategies can also be implemented or accelerated in Ohio to address both high healthcare spending and Ohio's performance on health outcomes.

Conclusion

Due to several recent changes in the policy landscape (including the expansion of health coverage, public and private sector value-based payment reform and legislative attention to mental health, addiction and infant mortality), as well as strong public and private sector leadership and a desire to collaborate at the state and local level, Ohio is now poised to leverage its resources in a more strategic way to achieve measurable improvements in population health outcomes, health equity and healthcare spending. This state health assessment provides the data needed to inform the next steps in Ohio's journey to improved health and wellbeing through the state health improvement plan.

About this report

The Governor's Office of Health Transformation and the Ohio Department of Health governed the preparation of the state health assessment, in partnership with other health-related state agencies.

The SHA and SHIP Advisory Committee includes state agencies and a wide array of external partners representing sectors such as public health, healthcare providers (including hospitals, primary care, and mental health and addiction services), insurers, consumers, community service agencies, employers and populations at-risk for experiencing poor health outcomes. The Advisory Committee met three times to provide input and feedback on the SHA. Additional partners from sectors beyond health will be invited to participate in the SHIP process. A draft version of the SHA was made available for public comment at the end of June 2016.

The Ohio Department of Health contracted with the Health Policy Institute of Ohio (HPIO) to facilitate the state health assessment beginning in March 2016. HPIO provided overall SHA project management and prepared this document. HPIO subcontracted with three other organizations to assist with the project:

- Hospital Council of Northwest Ohio (HCNO): Facilitated regional forums and compiled existing data for data profiles
- OnPointe Strategic Insights: Conducted key informant interviews
- The Kirwan Institute for Race and Ethnicity Studies at The Ohio State University: Assisted with identification of populations for key informant interviews and compilation and display of demographic and disparities data

The full **Ohio 2016 state health assessment** is available at

http://bit.ly/2a2XFB7

Executive summary notes

1. Health Policy Institute of Ohio. "2014 Health Value Dashboard." December 16, 2014.
2. The SHA and SHIP conceptual framework combines elements of the existing County Health Rankings and Roadmaps model of health factors and outcomes with the Triple Aim, a model commonly used in the healthcare sector that includes per capita cost.

DISCUSSION PAPER

Advancing the Health of Communities and Populations

A Vital Direction for Health and Health Care

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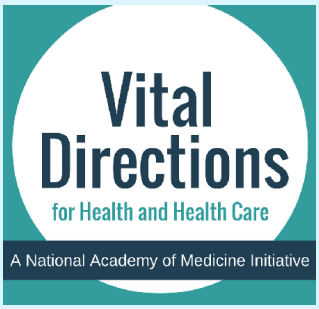
September 19, 2016

About the Vital Directions for Health and Health Care Series



This publication is part of the National Academy of Medicine's **Vital Directions for Health and Health Care Initiative,** which called on more than 100 leading researchers, scientists, and policy makers from across the United States to assess and provide expert guidance on 19 priority areas for U.S. health policy. The views presented in this publication and others in the series are those of the authors and do not represent formal consensus positions of the NAM, the National Academies of Sciences, Engineering, and Medicine, or the authors' organizations. Learn more: **nam.edu/VitalDirections.**

Introduction

We have a long way to go to strengthen the public health system to provide adequate protection for communities. Dollar for dollar our health care expenditures fail to provide us with good health at the most basic level as measured by life expectancy and infant mortality. The United States spends 18% of its gross domestic product—more than $8,000 per person per year—on the provision of medical care and hospital services. That is 2.5 times the average of industrialized nations in the Organisation for Economic Co-operation and Development (OECD), but by any measure our population is less healthy; US life expectancy at birth is well below the OECD average, and our infant mortality is higher than that of all 26 other industrialized nations. In fact, Americans are at a disadvantage at every stage of the life cycle relative to counterparts in peer countries [1].

Recent events like lead contamination in drinking water in Flint, Michigan and other cities across our country; the epidemic of obesity and related chronic diseases in the US; outbreaks of new microorganisms in drinking water like naegleria and legionella; spread of *Aedes* mosquitos that carry tropical diseases like Zika, Dengue and Chikungunya; the serious impacts of catastrophic storms like Hurricanes Katrina and Sandy; and the epidemics of opiate addiction and HIV that are reappearing across the US are ringing alarm bells about our weak public health system.

The World Health Organization has defined health as "the state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" [2]. Health of nations and other population groups

can be compared via use of health outcome metrics that reflect both positive and negative states of health. Such metrics include: "1) life expectancy from birth, or age-adjusted mortality rate; 2) condition-specific changes in life expectancy, or condition-specific or age-specific mortality rates; and 3) self-reported level of health, functional status, and experiential status" [3].

The United States should be capable of meeting or exceeding levels of good health enjoyed by people in other countries. Most factors that influence health are embedded in daily life circumstances apart from interactions with the health care system. These factors have to do with social, environmental, and behavioral influences on health that affect everyone in the population. We need to address environmental factors that range from exposure to pathogens, harmful substances, and pollutants to the widely available and aggressively promoted sugary drinks; foods high in salt, fat, and sugar; tobacco; and alcohol products. Behavioral factors can be addressed, as in successful efforts to reduce smoking, but even in the case of smoking, efforts need to be intensified and directed more precisely to populations at greatest risk of tobacco-related chronic diseases. Addressing social, behavioral and environmental factors that discourage healthy eating patterns or promote unhealthy exposures like smoking—public health—ensures conditions in which people can be healthy.

The state of US population health in the face of our elaborate and expensive health care system is direct and undeniable evidence that there are major opportunities to improve population health that lie outside this system or require fundamental changes in how the system operates. There is strong evidence that investments in prevention at the population level, via public health expenditures, are very effective in promoting health and wellness and reducing costs of medical care [4]. People who have social and economic advantages have a greater chance of achieving and maintaining good health in spite of adverse environmental exposures compared to people who are disadvantaged by such factors as chronic poverty, lack of education, racial or ethnic discrimination, and geographic isolation. In part, the poor US performance on key health measures reflects the apparent greater effect of such disadvantages in the United States than in peer countries. Peer countries may mitigate social disadvantages better through institutionalized universal and targeted social and economic programs [5]. Health economists are beginning to demonstrate that investments in social services (along with public health) also generates positive health impacts as assessed by a number of measures including obesity, asthma, mental health status, lung cancer, heart attacks and type 2 diabetes [6].

As defined by Kindig and Stoddart, *population health* refers to "the health outcomes of a group of individuals, including the distribution of such outcomes within the group"[7]. Historically in the US [8], health care evolved in two, mostly separate, systems—one that provides clinical care, is largely private and provides individual prevention and treatment to patients and a second, public health system, that is mostly governmental and provides population-based health promotion and disease prevention strategies to people who reside in entire geopolitical jurisdictions. Jacobson and Teutsch have proposed that it might be clearer to use the term "total population health" when referencing actions to improve health in entire geographic regions, to distinguish this concept from the growing use of the term "population health" to reference actions to improve health among groups of people served by various health providers, health insurance systems, and/or specific governmental programs [8]. In this paper, the term *population health* should be viewed as synonymous with the concept of *total population health.* In this context, population health is concerned not only with delivering preventive services to individuals, or groups, but also with addressing broader social and environmental determinants of health in entire regions. (Some might refer to this same concept as *community health*.)

Traditionally, the "public health" side of the US two-part health system has had the responsibility for populations in organizational and financial arrangements that are largely separated from the treatment side. Recognition of the need to bring these subsystems together has increased over time. The shift in thinking toward a more comprehensive approach to achieving population health and wellness was prominent in the advice of the Secretary for Health's Task Force on Health Promotion and Disease Prevention Objectives for 2020 (HP2020) and in the character of the subsequent federal health objectives for this decade [9]. As noted below, the Patient Protection and Affordable Care Act (ACA) included a number of provisions that support total population health approaches within the health care system, including both traditional public health efforts as well as efforts to better integrate total population health and health care.

Opportunities for Progress and Policy Implications: A Call for Change

The many excellent efforts to revitalize, expand, and innovate in advancing the health of populations and communities that are under way indicate that the United States is at a critical inflection point for taking more deliberate and effective actions to improve public health and prevention capacity. Such efforts are both expanding access to health care and are extending outside the health sector and, if supported and expanded, create major opportunities for improving the health of populations and communities. These efforts include the establishment of the Prevention and Public Health Fund under the ACA, community needs assessments under the ACA, the establishment of minimum standards for state and local public health programs, support of community-based programs and coalitions, a new Office of Disease Prevention in the National Institutes of Health; and health and wellness programs in corporations. These recent developments have set the stage for making major improvements in population health in the US.

In addition, many far-reaching recommendations relevant to improving population health outcomes have emerged from the National Academies of Sciences, Engineering, and Medicine in recent years. While supporting those longer-term recommendations, this paper identifies potentially transformative initiatives that can be implemented quickly with relatively little incremental expense. These initiatives are predicated on a vision of a healthy community as a "strong, healthful and productive society, which cultivates human capital and equal opportunity. This vision rests on the recognition that outcomes such as improved life expectancy, quality of life, and health for all are shaped by interdependent social, economic, environmental, genetic, behavioral, and health care factors, and will require robust national and community based policies and dependable resources to achieve it" [10].

These recent developments set the stage for a number of specific opportunities to set the nation's prevention and public health efforts on a new path (Figure 1).

Goal 1: Support Strong National Public Health Objectives with Leadership and Investments

The achievement of health goals for communities—total populations—is quite challenging in that many of the factors that influence health are not, and never will be, controlled or directed by the health sector. Public health leaders exert influence in many ways, for example, with information and recommendations (e.g., successive Surgeon General's reports), through influencing (e.g., First Lady Obama's campaign to promote healthy eating and physical activity), and through work in local communities.

The US Department of Health and Human Services' (DHHS) Healthy People 2020 initiative, with input from thousands of members of the public and organized public health and health groups, culminated in more than 1,200 objectives, from which DHHS leadership identified a set of 26 Leading Health Indicators that are tracked at various government levels [11]. That approach can support implementation of a recommendation of a recent consensus study of the National Academies that "The Secretary of the Department of Health and Human Services should adopt an interim explicit life expectancy target, establish data systems for a permanent health-adjusted life expectancy target, and establish a specific per capita health expenditure target to be achieved by 2030. Reaching these targets should engage all health system stakeholders in actions intended to achieve parity with averages among comparable nations on healthy life expectancy and per capita health expenditures" [1].

Building on this, a White House led effort could bring to bear political leadership—across the entire federal government—to invoke more integrated action across sectors and investments in communities to achieve health via application of a *Health in All Policies (HiAP)* approach. Developed in Finland, HiAP has been adopted by the European Union and has been has been credited with resulting in an increased focus on population health in a number of areas, including: social services, diet, nutrition and physical activity, alcohol policies, environmental and health consequences of transport, and mental health impact assessment of public policies [12].

Opportunity: Strengthen Federal Public Health Leadership

Within the US the National Prevention Council (NPC) is an example of a HiAP-oriented initiative at the federal level. This Council, which is chaired by the Surgeon General, brings together representatives from

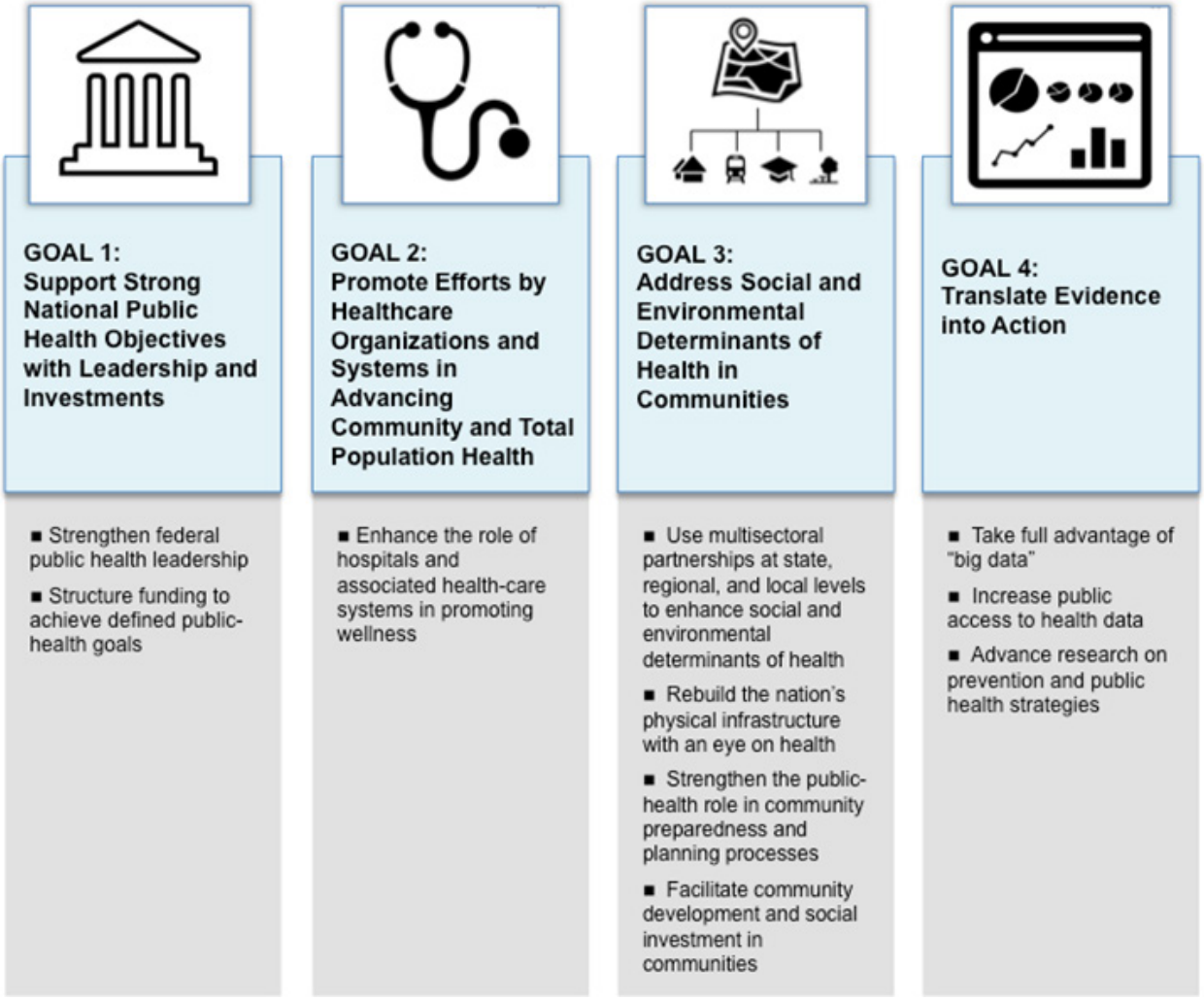


Figure 1 | Opportunities for progress and policy implications.

20 federal departments, agencies and offices, including sectors such as housing, transportation, education, environment, and defense. The National Prevention Strategy [10], developed by the NPC with broad input from diverse stakeholders, needs to be raised to a much higher level of priority in the administration. This includes creating a stronger focus in the White House with adequate funding and decision authority to coordinate multisectoral population health and prevention efforts throughout the government and by vesting stronger authority at the highest levels in the DHHS to align all DHHS activities with population health and prevention goals. Such leadership in the White House could be achieved via strengthening the role of the Domestic Policy Council (DPC) in population health promotion, or via establishment of a new office. The role of the Secretary of DHHS and other leaders could be elevated. Of note, both the DPC and the Secretary of DHHS, have congressional authority to undertake such an initiative already. Such efforts can build upon the NPC's National Prevention Strategy. Finally, the administration needs to be a clear champion of the concept that investing in prevention has high priority and has a greater proven return than does other health care investment [4].

The HiAP approach has been supported by a tool called the *Health Impact Assessment (HIA)*, which can be applied when a more formal assessment is required [13]. Many have suggested formal adoption of an HIA approach in the US, and there is an emerging body of evidence for its applicability [14]. By Executive Order the White House could require explicit consider-

ation of health impacts (or benefits) for major federal expenditures.

Specific White House coordination could help support activities to promote health in communities. Such an effort could build on the last administration's "Sustainable Communities" initiative (which included housing, environment and transportation but not health.) It could benefit from a number of initiatives that have been carried out by the private sector to address housing and economic opportunity, environmental health, and access to health services in communities to improve health [15].

Less obvious but perhaps of equal importance is tax policy. For example, there are corporate tax credits for affordable housing ($7.8 billion for 2016), wind power ($2.9 billion in 2016), and orphan-drug research ($900 million). There are exclusions and deductions for "research and experimentation" ($5.8 billion), domestic production ($13.2 billion), and charitable contributions to health organizations ($1.9 billion) [16]. There are numerous opportunities in existing tax policies for the White House to enhance the health benefits for communities and promote a full-scale population health improvement strategy.

The White House could also consider the development of an Opportunity Development Bank, a public–private partnership that is dedicated to infrastructure development and invests tax revenues at high rates of economic and social return. The investments could include early childhood interventions, preschool enhancements, juvenile justice diversion programs, high-school counseling programs, adult job training programs, adult criminal rehabilitation, substance use prevention programs, housing support, and library expansions. Returns on such investment potentially can be extremely high [17]. Some programs have a rate of return as high as 100%; the social returns can be even higher, perhaps $15 or $20 for every dollar invested.

Opportunity: Structure Funding to Achieve Defined Public Health Goals

According to the National Academies, a minimum set of public health services are needed in every community [18]. In 2012, it recommended that Congress "authorize a dedicated, stable, and long-term financing structure to generate the enhanced federal revenue required to deliver the minimum package of public health services in every community." It also stated that "such a financing structure should be established by enacting a national tax on all medical care transactions to close the gap between currently available and needed federal funds"[18].

Congress and the administration can work together to define the public health services that could be supported by the federal government and others and to enact legislation that would authorize and appropriate resources, including funding, for these purposes.

Goal 2: Promote Efforts by Health Care Organizations and Systems in Advancing Community and Total Population Health

Health care organizations and systems, both public and private, need support in expanding their missions and activities to include a focus on the maintenance of good health and well-being in the people and communities that they serve. The traditional focus on disease screening and treatment reinforces a focus on health problems at a relatively late stage in the process and is not cost effective [4]. It discourages accountability for overall community and population health and engagement in the large-scale community-based health-promotion and disease-prevention activities of which medical encounters are only one aspect.

For many years the public health system has been engaged in providing access to medical care for underserved populations as well as promotion of clinical preventive services like immunizations, blood pressure screening and cancer screening. Developments of the last few years are shifting many of these clinical preventive activities into the clinical care system; at the same time, until all Americans have access to health care, the public health system will continue to be responsible for safety net function. More recently, the clinical care system is seeking the achievement of the "Triple Aim" that was proposed by the Institute for Healthcare Improvement [19], and seeks to simultaneously lower the costs of health care, improve the quality of health care delivery, and improve health outcomes among the populations that are served. The Centers for Medicare and Medicaid Services (CMS) has embraced the concept of population health promotion under the triple aim and there is evidence of progress in several areas. Under the ACA, federal funds can be used for US Preventive Services Task Force-approved preventive services without co-pay. The ACA has also permitted the use of federal health care funds for community-based prevention for the first time (the PH Trust Fund). Additionally, the movement towards

Medicaid and Medicare managed care and increasing incentives for managed Medicare and Medical Homes are examples of financial incentives that are beginning to reward prevention activities in the context of individual patient care. All of these activities are laying the groundwork for more engagement of health care organizations and systems in advancing community and total population health.

Opportunity: Enhance the Role of Hospitals and Associated Health Care Systems in Promoting Wellness

Community benefits requirements for nonprofit hospitals under Internal Revenue Service (IRS) 501(c)(3) regulations have foreseen the benefits of changes in progressive hospital and community systems [20]. We would favor refining community benefits requirements to provide incentives to regional efforts and to ensure the inclusion of local health departments and public health schools and programs in analysis and planning efforts. Those efforts are accountable to hospitals' community benefits obligation, except where community benefits funds are already subsidizing Medicaid or uncompensated care, and generate a large amount of revenue, more than $24 billion in 2011 [21]. Such activities include generation of community demographic and health data and community engagement and participation functions. Specific policies could include erasing the distinction between community-health improvement and community-building, creating a new IRS category for priorities identified in total population health needs assessments, offering incentives for multi-institutional pooling, and encouraging hospitals to move toward allocating the full value of their tax benefit to community-health improvement and charity care.

Accountable care organizations (ACOs) emerged as a component of the ACA as a means of encouraging healthcare providers to coordinate care throughout the spectrum of wellness, prevention, and treatment, with shared accountability and risk. Hundreds of ACOs have been formed, and some have led to better outcomes, lower total costs, and improved patient care and experiences [22]. Even so, ACOs as currently constructed entail only traditional components of medical care and have yet to develop comprehensive wellness models that incorporate other elements of prevention and wellness. For example, oral health services continue to be marginalized rather than embraced as a vital feature of population health, particularly in low-income and otherwise vulnerable populations, despite recognition by CMS in 2011 that "oral health [should be] included in . . . the Accountable Care Organization demonstration" and that the Center for Medicare and Medicaid Innovation should "develop innovative scalable models for the delivery of oral health care" [23]. Drawing from the initial success of many ACOs, the model needs to be more expansive in this and other fields, such as mental health.

The principal role of Medicaid is to be the provider of health insurance for the poor. However, it also has a tradition of promoting health and wellness. As Medicaid continues to expand and evolve, state waivers are increasingly extending its reach to promote better health for the underserved. That affords an opportunity to test new models and partnerships between health care providers and community-based programs that have been shown to improve social conditions that promote well-being. CMS could be given more authority to waive Medicaid rules and work with states to accelerate the incorporation of prevention and population health into state Medicaid programs. Outcomes related to improved total population health and reduction in health disparities should be included as valid outcomes of Medicaid.

Goal 3: Address Social and Environmental Determinants of Health in Communities

Because no two communities are exactly alike, strong community engagement not only by local public health agencies and health care providers but also by housing, environmental, financial, transportation and other sectors is needed to address social and environmental determinants of health. How we build and maintain our homes, buildings, and cities and the infrastructure for transportation, physical activity, drinking water, and sanitation has a critical effect on our health. Moreover, communities will not be healthy unless all are served equitably. Current fragmented approaches exacerbate health inequities, but multisectoral approaches improve equity. In many ways such efforts reflect application of the HiAP approach at a local level.

Opportunity: Use Multisectoral Partnerships at State, Regional, and Local Levels to Enhance Social and Environmental Determinants of Health

To carry out the population health improvement planning and resource mobilization that we call for, the administration could stimulate and assist in funding of broad multisectoral partnerships that promote total population health. Many communities across the country already are creating community health agendas, leveraging assets, making health a locally defined issue in which everyone has a stake, and moving policy change at the local and regional levels. But too few health departments have the resources needed to lead such community efforts. A federal effort to support community multisectoral partnerships could be launched in 100 communities across the country in a three-year program to establish national models. Effects measured should include educational, public safety, and economic indicators and health indicators already defined in Healthy People 2020.

Opportunity: Rebuild the Nation's Physical Infrastructure with an Eye on Health

The brown water flowing from spigots in Flint, Michigan is just the tip of the iceberg for the gradual breakdown in many of our drinking water systems, as well as our neglected transportation systems, sewer systems, and energy distribution systems. Large adverse health and economic consequences are already being felt directly in many communities [24]. We propose a multisectoral approach targeted to jurisdictions with older physical infrastructures that will engage them in an assessment of infrastructure weak spots so that they can plan for and fund community structural improvements—leveraging not only health assets but the Department of Labor, Department of Housing and Urban Development, and other relevant department efforts in a coordinated and collaborative manner. A multisectoral approach is important because much of the work could be funded by the private sector (gas, electric power, water, and sanitation utilities). In New York City, Mayor de Blasio's Underground Infrastructure Working Group is an example of an effort to bring sectors together to coordinate infrastructure repair work so that it can be done more quickly and efficiently. Congress and the executive branch could pair the effort with existing job-training efforts to prepare people in low-income communities for work in the many sectors that are involved with maintenance and improvement of the physical infrastructure. Public health should inform these efforts so that infrastructure improvements address environmental health and safety issues that are critical for the health of communities.

Opportunity: Strengthen the Public Health Role in Community Preparedness and Planning Processes

Rather than respond to the "disaster of the month" (Zika virus, Ebola, hurricanes, earthquakes, floods, and the like), we need efforts to enable communities to withstand and recover from myriad disastrous events. Such efforts need to anticipate threats, minimize adverse effects on health, and rapidly restore function after a crisis. Community preparedness planning is multisectoral, but public health has an important role to play in ensuring that those who are most vulnerable (such as residents of assisted-living facilities) are protected from health consequences; in strengthening community health systems and integrating them with community resources, including the private sector; and in integrating community preparedness effort with day-to-day planning to combat the health threats posed by daily living and the epidemic of chronic diseases and prevalence of untreated mental illnesses that are the causes of premature death, disability, and diminished quality of life. Collaboration between the private and public sectors could improve the ability of communities to plan, prepare, respond, and recover. It has been shown to work during the recent H1N1 influenza outbreak in which federal, state, and local partnerships addressed a serious epidemic. Public health preparedness systems need to be adequately resourced and sustained if they are to be able to identify the emergence of new health threats and respond to them effectively.

Opportunity: Facilitate Community Development and Social Investment in Communities

Under White House leadership, broadening investment in human capital through new financial vehicles can be encouraged. We bring several ideas to the table to identify new ways to mobilize resources for total population health. Some of these could be led by the White House via consideration of tax and investment policies as described above. Others could emanate from local efforts.

The partnership of the Federal Reserve Bank, the Robert Wood Johnson Foundation, and the Kresge Foundation has played a key role in connecting financial investment in commercial development and housing to improved health in communities. In several communities, it has facilitated loans in conjunction with philanthropic investment that addresses housing and economic opportunity, environmental health, and access to health services.

Corporations can be involved in ways that go well beyond workplace wellness programs. Direct linkages between local public health agencies, business leaders, community groups, not-for-profit organizations, and the health care community can forge a common language and understanding of employee and community health problems and broaden participation in setting total population health goals and strategies. Corporations can work with government to gather, interpret, and exchange mutually useful data. They can use their knowledge of marketing and social marketing techniques to promote individual behavior and community change [25].

Health care systems and organizations have a key opportunity to create environments for improved population health. If they leverage the entirety of their assets—for example, as employers, purchasers, consumers, and potential energy conservers—the effect of intentional business practices can potentially improve the health of a population more than actual delivery of services. Moreover, studies suggest that a large moderate-income workforce can have a greater role in generating income in a community than a smaller high-income workforce. When income disparities narrow in a community, population health improves.

Goal 4: Translate Evidence into Action

Advancing community and population health requires acting immediately on what we know even while we are setting research priorities and funding mechanisms to strengthen the evidence base of new population health interventions. The DHHS Advisory Committee on Health Promotion and Disease Prevention Objectives for 2020 identified where taking action on the basis of what we already know about interventions can improve community and population health. This includes evidence on what works and what does not work. The marked increases in the availability of health data to facilitate evidence translation and generation increase the practicability of use for prevention.

Opportunity: Take Full Advantage of "Big Data"

The use of "Big Data" is an emerging field that may be key to the promotion of population health. The term "Big Data" refers to very large datasets obtained from a variety of sources that, if appropriately managed and analyzed, can yield a wealth of detailed information to support achievement of various population health objectives. All efforts related to assessments, planning, preparedness, and development of a common understanding of facts at very granular levels geographically can help to identify social and environmental determinants of health, and give a clearer picture of health status and trends in a number of dimensions [26]. Efforts like the County Health Rankings project, which ranks the more than 3,000 counties in the US based on a model that combines health outcomes with health factors, provide a basis for identifying communities that most need health improvement efforts, and for rallying support for those efforts across sectors [27].

Nationally, billions of dollars have been invested in efforts led by the Office of the National Coordinator for Health Information Technology to individual access to electronic health information as well as connectivity among systems so that information can be shared across systems while protecting data security and privacy [28]. No such strong national efforts have been undertaken to understand the data needs to support population health efforts. Such efforts should build on clinical data collection to support the broader advancement of population health by standardizing reporting of population health measures (for example, patient-reported measures of wellness and reported health conditions). They should also include geographic and, where possible, individual data relevant to environmental and social determinants of health. A later step would be to aggregate and release this information in a way that complies with the Health Insurance Portability and Accountability Act to allow policy-makers to address issues comprehensively among sectors that currently remain siloed (i.e., to integrate across data with regard to underlying physical and social environments, with data on health and wellness, to assist with community-wide prevention efforts.)

Opportunity: Increase Public Access to Health Data

DHHS should expand early success in supporting public availability of health datasets and the development of informatics tools to facilitate aggregation and link-

ages with related datasets. Data.gov and similar efforts already have helped researchers to understand and policy-makers to solve persistent problems related to health effects in association with physical and social environments, factors related to timing and identification of risk factors, and triggers of predictable events. It is of critical importance that public health researchers and policy makers work closely with the health care industry to improve its data so that it can maximize their use for population health. There are substantial opportunities for sharing and commingling of public and private datasets, which would advance the open-data movement to the next level.

Opportunity: Advance Research on Prevention and Public Health Strategies

Community prevention activities are too often undertaken with a weak evidentiary base, largely because the support for such research is meager. Unlike clinical practice, the practice of public health has few opportunities for product development and promotion. The onus is on government to fund public health research.

The National Research Council and IOM report *U.S. Health in International Perspective: Shorter Lives, Poorer Health. Panel on Understanding Cross-National Health Differences Among High-Income Countries* stated that "the National Institutes of Health and other research funding agencies should commit to a coordinated portfolio of investigator-initiated and invited research devoted to understanding the factors responsible for the US health disadvantage and potential solutions, including lessons that can be learned from other countries" [1]. In addition, the report also recommended that the federal government increase the portion of its budget allocated to population and community-based prevention research that

- Addresses population-level health problems.
- Involves a definable population and operates at the level of the whole person.
- Evaluates the application of discoveries and their effects on the health of the population.
- Focuses on behavioral and environmental (social, economic, cultural, and physical) factors associated with primary and secondary prevention of disease and disability in populations.

CMS has recently funded a number of Health Care Innovation Awards, some of which support linkage between health services and community social services to support the broader needs of individual patients. They have announced an intention of expanding this approach via a recently announced 5-year, $157 million program to test a model called Accountable Health Communities (AHC). The CMS Innovation Center will use these grants to "test whether systematically identifying and addressing health-related social needs can reduce health care costs and utilization among community-dwelling Medicare and Medicaid beneficiaries" [29]. Such prevention research explicitly seeks to fund itself through health care savings. However, prevention research funded by other agencies also is an excellent investment even though the costs and savings are not directly linked within their budgets.

A number of efforts have been made to encourage the National Institutes of Health (NIH) to fund more prevention research and these need to be intensified. There are other agencies whose research programs should be strengthened: Centers for Disease Control and Prevention (CDC) and Environmental Protection Agency (EPA). Federal health research agencies need to focus not only on genetic but also social and environmental determinants of health, both discovery-oriented research about how these determinants cause ill health (or promote wellness) and translational research on how to apply this knowledge to improve health in communities. Such research needs to focus on the most vulnerable. For example, pregnant women, infants, children, the elderly, those who are genetically vulnerable or immunocompromised.

In the long run, health care expenditures need to help to support a *Prevention Research Trust Fund* to support Community-Centered Outcomes Research just as we now have support for the Patient-Centered Outcomes Research Institute (PCORI) via the ACA. Such research could be housed in NIH or CDC as a freestanding institute on the model of or within the Patient-Centered Outcomes Research Institute (PCORI). It should involve not only academic research but community participatory models that are directed especially to underserved communities and social and environmental determinants of health and that empower communities to manage interventions [30]. The effort would generate the evidence needed for tackling the most serious public health problems at the community level via research that is difficult to fund through existing avenues in NIH and elsewhere. Priorities for the effort

should be drawn from existing expert bodies, such as the Community Preventive Services Task Force recommendations, public health professional and government organizations, and National Academies report recommendations. The research should explicitly address both costs and benefits of prevention strategies.

Conclusion

We have made a number of proposals, of which the most important are related to the establishment of clear points of accountability and leadership for total population health in the United States, both in the White House and in DHHS. The United States can have the best community and population health in the world, but that cannot happen unless such strong public health objectives are articulated and widely shared.

We suggest that not only the public health system, but many other entities will need to play a role if we are to be successful. Health care organizations, both public and private, need to be held accountable for promotion of good health and disease prevention, not only for treatment of the illnesses. Communities need to be accountable for bringing public health agencies together with other sectors in a number of contexts to develop a shared sense of what can be done collaboratively to promote health and to address shortcomings in our physical infrastructure and community preparedness efforts that are increasing risks. The government and the finance communities need to be brought together to pursue new financing strategies for infrastructure investment and community development, including efforts that directly address the social determinants of poor health in communities.

"Big data" needs to be harnessed to support public health and disease prevention efforts. Public health translational research is needed to move discoveries from fundamental bench science and social science to the development and testing of community and population-level interventions. Such research is unlikely to be funded unless a trust fund is created and a government entity is made accountable for ensuring that it is done.

This paper has focused on opportunities to advance the health of the nation through a lens that considers whole communities and focuses on public health or population health approaches to creating or enhancing physical and economic environments for promoting health and preventing diseases. The approaches and opportunities discussed here complement those identified in other Vital Directions discussion papers. In particular, public health approaches can engender transformative changes in the systems and entrenched institutional policies and practices that lower our overall standard of living and perpetuate systemic social disadvantages for some demographic groups; and they can address the "social determinants" of health and achieve health equity (Adler et al., 2016), improve options for healthy eating and physical activity (Dietz et al., 2016), and foster good physical and mental health and well-being throughout the life course. It is essential to recognize the connections among these papers to find strategies that are compatible and mutually reinforcing. For example, many communities that have poor access to services have the highest burden of mental health and substance-abuse problems (Knickman et al., 2016).

The United States has great opportunities to advance the health and well-being of communities and populations at large and to make progress both in saving lives and in reducing the cost of health care. We have identified a number of approaches for moving forward; at the core of all of them is the need to marshal and align forces across sectors and communities toward disease prevention. Achieving the highest possible level of health in communities and populations requires a rebalancing of our overall investment in ways that enhance disease prevention and wellness strategies throughout the lifespan and builds the strength and resilience of communities.

Summary Recommendations for Vital Directions

1. Support strong national public health objectives with leadership and investments.
2. Promote efforts by health care organizations and systems in advancing community and total population health.
3. Address social and environmental determinants of health in communities.
4. Translate evidence to action.

References

1. National Research Council and Institute of Medicine (2013) U.S. Health in International Perspective: Shorter Lives, Poorer Health. Panel on Understanding Cross-National Health Differences Among High-Income Countries. Steven H. Woolf and Laudan Aron, Eds. Committee on Population, Division of Behavioral and Social Sciences and Education, and Board on Population Health and Public Health Practice, Institute of Medicine. Washington, DC: National Academies Press.
2. World Health Organization (1948) Preamble. Constitution. Geneva: WHO.
3. Parrish R (2010) Measuring population health outcomes Preventing Chronic Disease 2010; 7(4): A71. http://www.cdc.gov/pcd/issues/2010/jul/10_0005.htm. Accessed 9/11/16.
4. McCullough JC, Zimmerman FJ, Fielding JE, Teutsch SM (2012) A Health Dividend for America: The Opportunity Cost of Excess Medical Expenditures. American Journal of Preventive Medicine 43: 650-654.
5. McLeod CB, Hall PA, Siddiqi A, Hertzman C (2012) How society shapes the health gradient: work-related health inequalities in a comparative perspective. Annu Rev Public Health 33: 59-73.
6. Bradley EH, Canavan M, Rogan E, Talbert-Slagle K, Ndumele C, et al. (2016) Variation In Health Outcomes: The Role Of Spending On Social Services, Public Health, And Health Care, 2000-09. Health Aff (Millwood) 35: 760-768.
7. Kindig D, Stoddart G (2003) What Is Population Health? American Journal of Public Health 93: 380-383.
8. Jacobson DM, Teutsch SM (2012) An environmental scan of integrated approaches for defining and measuring total population health by the clinical care system, the government public health system, and stakeholder organizations. . Washington, DC: National Quality Forum.
9. Fielding J, Kumanyika S, Manderscheid R (2014) Healthy People 2020—A Strategy for Improving Population Health in the United States. Public Health Reviews 35: 1-24.
10. National Prevention Council (2011) National Prevention Strategy. Washington, DC: U.S. Department of Health and Human Services, Office of the Surgeon General.
11. Koh HK, Blakey CR, Roper AY (2014) Healthy people 2020: A report card on the health of the nation. JAMA 311: 2475-2476.
12. Puska P, Ståhl T (2010) Health in All Policies—The Finnish Initiative: Background, Principles, and Current Issues. Annual Review of Public Health 31: 315-328.
13. Wernham A, Teutsch SM (2015) Health in all policies for big cities. Journal of Public Health Management and Practice 21: S56-S65.
14. IOM (Institute of Medicine) (2014) Applying a health lens to decision making in non-health sectors: Workshop summary. Washington, DC: The National Academies Press.
15. Acosta J, Whitley MD, May LW, Dubowitz T, Williams M, et al. (2016) Stakeholder Perspectives on a Culture of Health: Key Findings. . Santa Monica, CA: RAND Corporation.
16. US Treasury (2016) 2016 Tax Expeditures. US Treasury.
17. Washington State Institute for Public Policy (2016) Benefit-Cost Results: Public Health. Olympia, WA.

18. IOM (Institute of Medicine) (2012) For the Public's Health: Investing in a Healthier Future. Washington, DC: The National Academies Press.
19. Improvement IfH (2016) IHI Triple Aim Initiative. Cambridge, MA.
20. Rosenbaum S (2016) Hospital Community Benefit Spending: Leaning In on the Social Determinantsof Health. Milbank Q 94: 251-254.
21. Rosenbaum S, Kindig D, Bao J, Byrnes M, O'Laughlin C (2015) The Value Of The Nonprofit Hospital Tax Exemption Was $24.6 Billion In 2011. Health Aff (Millwood) 34: 1225-1233.
22. Kassler WJ, Tomoyasu N, Conway PH (2015) Beyond a Traditional Payer — CMS's Role in Improving Population Health. New England Journal of Medicine 372: 109-111.
23. Center for Medicare and Medicaid Services (2011) Improving Access to and Utilization of Oral Health Services for Children in Medicaid and CHIP Programs: CMS Oral Health Strategy. Washington, DC: US Department of Health and Human Services.
24. American Society for Civil Engineers (2013) 2013 Report Card for America's Infrastructure. Reston, VA: ASCE.
25. IOM (Institute of Medicine) (2015) Business engagement in building healthy communities: Workshop summary. . Washington, DC: The National Academies Press.
26. National Academies of Sciences Engineering and Medicine (2016) Metrics That Matter for Population Health Action: Workshop Summary. . Washington D C: The National Academies Press.
27. Remington PL, Catlin BB, Gennuso KP (2015) The County Health Rankings: rationale and methods. Population Health Metrics 13: 11.
28. DeSalvo KB, Dinkler AN, Stevens L (2015) The US Office of the National Coordinator for Health Information Technology: Progress and Promise for the Future at the 10-Year Mark. Annals of Emergency Medicine 66: 507-510.
29. Alley DE, Asomugha CN, Conway PH, Sanghavi DM (2016) Accountable Health Communities — Addressing Social Needs through Medicare and Medicaid. New England Journal of Medicine 374: 8-11.
30. Selby JV, Forsythe L, Sox HC (2015) Stakeholder-driven comparative effectiveness research: An update from PCORI. JAMA 314: 2235-2236.

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ANALYSIS & COMMENTARY

Mental Health And Addiction Workforce Development: Federal Leadership Is Needed To Address The Growing Crisis

ABSTRACT The mental health and addiction workforce has long been plagued by shortages, high turnover, a lack of diversity, and concerns about its effectiveness. This article presents a framework to guide workforce policy and practice, emphasizing the need to train other health care providers as well as individuals in recovery to address behavioral health needs; strengthen recruitment, retention, and training of specialist behavioral health providers; and improve the financial and technical assistance infrastructure to better support and sustain the workforce. The pressing challenge is to scale up existing plans and strategies and to implement them in ways that have a meaningful impact on the size and effectiveness of the workforce. The aging and increasing diversity of the US population, combined with the expanded access to services that will be created by health reform, make it imperative to take immediate action.

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Mental health and substance use conditions are major contributors to the overall burden of disease around the world.[1] Of the six leading causes of years lived with disability, the following four are mental health or substance use conditions: depression, alcohol use disorders, schizophrenia, and bipolar disorder. Commonly referred to as behavioral health conditions, they also are inextricably linked to physical illnesses, serving as risk factors and often impeding adherence to the treatment of those illnesses.[2]

In the United States at the beginning of the current decade, about forty-five million people, or one in five adults, experienced a mental condition. Substance use conditions affected about twenty-two million people age thirteen or older, with the majority of those people being dependent on or abusing alcohol.[3] Prescription drug abuse has been described by the Centers for Disease Control and Prevention as a public health epidemic.[4]

Unfortunately, the same data reveal that many people in need of treatment never receive it. Only 39 percent of those with mental health conditions obtained care.[3] The situation was far worse for those with substance use conditions: Only 10.8 percent of those people received treatment.[5]

Many factors are cited as sources of this "treatment gap," including the stigma and discrimination associated with these conditions, lack of health care coverage, insufficient services and linkages among services, and an inadequate behavioral health care workforce.[6,7] The workforce's insufficient size, frequent turnover, relatively low compensation, minimal diversity, and limited competence in evidence-based treatment have all been cause for concern.[8]

This article examines issues surrounding the supply of and demand for the mental health and

addiction workforce. Additionally, it examines three factors that have implications for that workforce nationally: the aging of the US population, the increasing racial and cultural diversity of that population, and health care reform. The article outlines a framework to guide policy regarding health workforce development. We argue that federal leadership and action are needed to scale up well-defined plans and strategies to address the growing workforce crisis.

Defining The Workforce Shortage

There are no systematically collected and uniform data on the US mental health and addiction workforce.[8] Information on its size, demographic characteristics, geographic distribution, and specialties can best be understood by piecing together disparate information from professional associations, licensing and certification boards, and scattered state and federal sources. Despite the absence of solid data, there is a long-standing and commonly held belief that the behavioral health workforce supply is inadequate.

Multiple factors drive this belief. Foremost among these is the fact that many health care employers report high turnover rates among behavioral health workers and difficulty in filling vacant positions.[9] It is particularly challenging to recruit physicians and nurses into the behavioral health field. And just as challenging is recruiting clinicians who specialize in the treatment of children, adolescents, older adults, and people with co-occurring mental and substance use conditions.[10–12]

For example, according to the estimates in one analysis, in 2020 there will be 4,312 fewer child and adolescent psychiatrists than will be needed.[13] According to the same analysis, only six states have an adequate supply of child and adolescent psychiatrists, and people living in rural areas or in poverty have less access to those professionals than do people who are better off or who live in more densely populated areas.[13]

The consensus that a behavioral health workforce shortage exists has been further bolstered by the fact that people seeking services frequently struggle to obtain timely access to a qualified provider.[10] Advocacy organizations and the media have noted the refusal of many private practitioners to accept insurance and their insistence on payment from the patient. This problem is unlikely to be remedied by recent health care reforms that expand coverage but do not mandate providers' participation.[14]

Access issues are complicated by the uneven geographic distribution of the behavioral health workforce, which is heavily concentrated in urban areas. Notably, 85 percent of federally designated mental health professional shortage areas are in rural locations.[8]

A recent and extensive analysis funded by the Health Resources and Services Administration found that 77 percent of US counties had a severe shortage of prescribers (psychiatrists), and almost one in five counties had an unmet need for nonprescribers (psychologists, advanced-practice psychiatric nurses, social workers, licensed professional counselors, and marriage and family therapists). Rural counties and those with lower per capita incomes had greater shortages than more densely populated counties and those whose residents were better off.[15]

In a recent survey, 49 percent of clinical directors in agencies specializing in the treatment of substance use conditions acknowledged that they had difficulty filling open positions, primarily because of a lack of qualified applicants.[9] Annual turnover has been high: It is estimated to be 18.5 percent nationally[9] but exceeds 40 percent in some reports.[10] This high turnover rate has been attributed to the fact that addiction counselors move among vacant positions in the field or leave the field altogether because of its low wages and benefits and heavy caseloads, as well as the stigma associated with both having addictions and working with people who do.[9]

The Bureau of Labor Statistics projects a 27 percent increase in the number of jobs for counselors specializing in substance abuse and behavioral disorders between 2010 and 2018. That projection is based on the assumption that more people will seek treatment and that drug offenders will increasingly be required to get treatment rather than being sentenced to jail.[16]

The Impact Of Changing Demographics And Reforms

THE AGING POPULATION The Census Bureau projects that from 2010 to 2030 the number of adults age sixty-five or older will increase from 12 percent to 20 percent of the US population.[17] A recent Institute of Medicine report on the mental health and addiction workforce for older adults estimated that in 2010, 5.6–8.0 million adults age sixty-five or older had one or more of twenty-seven mental or substance use conditions that are experienced by older adults—which include anxiety, depressive, and personality disorders; alcohol and drug dependence and abuse; and complicated grief.[11] These conditions were associated with a broad range of negative effects, including emotional distress, functional disability, declines in physical health, increased hospitalization and nursing home placement, greater mortality and suicide, decreased quality of life, and increased cost.

A consensus has emerged that the mental health and addiction workforce must be competent to treat people from diverse cultures.

Not only does the aging US population require a large volume of services, but providing care to older adults with behavioral health problems requires special knowledge and skills. For example, aging has an impact on the metabolism of alcohol, drugs, and prescription medications. And because older adults are more likely than younger people to have cognitive and functional impairments, it may be more difficult both to diagnose and to manage behavioral health problems in older adults. In addition, the feelings of loss and grief that many older adults experience affect their health in ways that caregivers must be able to recognize and manage.[11]

The Institute of Medicine concluded that there is a major shortfall in professionals who are adequately trained and actively engaged in meeting the behavioral health needs of older adults.[11] There are fewer than 1,800 geriatric psychiatrists in the United States, and the number is declining.[18] It is projected that by 2030 there will be only one geriatric psychiatrist for every 6,000 older Americans with mental and substance use conditions.[18] Just 1 percent of the nation's advanced-practice registered nurses are certified and working full time in gerontology, and just 4 percent are certified in mental health and addictions. Similarly, only 4.2 percent of licensed members of the American Psychological Association identified geropsychology as a focus.[11]

INCREASING RACIAL AND CULTURAL DIVERSITY Another major demographic shift with implications for behavioral health workforce development is the projected increase in diversity in the US population. Members of racial and ethnic minority groups made up 37 percent of the population in 2010—a proportion expected to grow to 57 percent by 2060.[19] Minority status is associated with higher levels of poverty, unemployment, and homelessness as well as with lower levels of education, health insurance coverage, and proficiency in English. In turn, these characteristics are related to difficulty in accessing and receiving high-quality care, which adversely affects overall behavioral health.[20,21]

For example, Benjamin Le Cook and colleagues[22] examined the data from the Medical Expenditure Panel Survey between 2004 and 2009 and found that 40 percent of whites with a probable need for mental health care initiated treatment, as compared to 27 percent of Hispanics and 24 percent of African Americans. And members of minority groups have significantly higher mortality rates from conditions related to substance use.[23]

In contrast to the increasingly diverse population needing behavioral health services, there is a striking lack of diversity in the behavioral health workforce. Only 6.2 percent of psychologists, 5.6 percent of advanced-practice psychiatric nurses, 12.6 percent of social workers, and 21.3 percent of psychiatrists are members of minority groups.[24] Non-Hispanic whites constitute 70–90 percent of the addiction treatment workforce.[25]

The low rates of diversity in the workforce are troubling since evidence suggests that minority health professionals are more likely than others to serve people of color.[25] In addition, health care consumers who share a culture and race with a provider develop a stronger therapeutic alliance and have higher treatment retention rates, compared to consumers who are from a different culture and race than their provider.[26,27]

Of course, even if a provider shares a race or culture with a client, the two may still differ in their awareness or beliefs about the impact of race or culture on health and health care. In any case, matching providers and clients by race or culture is often not possible. Thus, a strong consensus has emerged among federal and state policy makers and educators that there must be equitable access to culturally relevant care[28] and that the entire mental health and addiction workforce must be competent to treat people from diverse cultures. Achieving these goals means that educators and supervisors must help providers develop a sensitivity to cultural differences in perceptions about illness, treatment, and recovery, as well as the ability to adapt care to the personal goals, cultural beliefs, and primary language of each client. Although cultural competence training has been made a high priority, data on its impact are largely lacking.[29]

HEALTH CARE REFORM Another major force shaping behavioral health workforce needs is the Affordable Care Act. Passage of the act led many policy makers to conclude that demand for behavioral health services and professionals to provide them would increase dramatically. A re-

cent report from the Department of Health and Human Services[30] projected that the act will expand mental health and substance abuse disorder benefits for sixty-two million Americans. A previous report from the Substance Abuse and Mental Health Services Administration[31] projected that every 10 percent increase in the demand for treatment would result in the need for 6,800 additional counselors for substance abuse alone. As a result, the projected increase in access to care is likely to have major, as yet uncertain, implications for workforce demand.

The Affordable Care Act includes provisions designed to further develop this workforce through mechanisms such as grants for education, training, and loan repayment, with a specific focus on social workers, psychologists, and child and adolescent mental health care providers. Physicians and nurses are not eligible for these grants. However, the funds authorized for many of these provisions are relatively small, and funding has not been appropriated for all of them. In addition, implementation of the act has already been marked by controversy and complexities that diminish its potential impact.

6,800

Counselors needed

Every 10 percent increase in the demand for substance abuse treatment could result in the need for 6,800 additional counselors. The increased access to care resulting from health reform will have major although uncertain implications for workforce demand.

Policy Recommendations

The mental health and addiction fields have undertaken numerous efforts to examine these workforce issues and devise strategies to address them.[9,32] The most comprehensive effort, led by the Annapolis Coalition on the Behavioral Health Workforce, involved more than 5,000 stakeholders in the development of a national action plan funded by the Substance Abuse and Mental Health Services Administration in response to concerns expressed by provider and professional associations, consumer advocates, educators, and policy makers. The final report, available online, outlines hundreds of specific recommended actions to be taken by different groups of stakeholders.[8] (The authors of this article helped create and manage the Annapolis Coalition during the past decade.)

The Annapolis Framework, which was derived from the action plan, initially focused on the specialist behavioral health workforce. Recent initiatives have expanded it to include integrated behavioral health and primary care. As shown in Exhibit 1 and discussed below, the framework outlines nine strategic goals, which are the focus of the recommendations in this article. The goals are focused on broadening the concept of "workforce," strengthening the workforce, and creating structures to support it.

BROADENING THE CONCEPT OF 'WORKFORCE'

The large gap between demand and supply suggests that the specialist workforce alone will not be able to meet the future behavioral health care needs of the US population. Given the uneven distribution of the specialist workforce, simply expanding it is unlikely to remedy problems of access, particularly for underserved populations.[33]

▶TRAINING OTHER HEALTH CARE PROVIDERS: Developing the capacity of health care providers other than behavioral health specialists to address mental and substance use conditions has emerged as a high priority on the agenda of this field. For example, the Institute of Medicine report on older adults[11] placed a strong emphasis on evidence-based, integrated care models that shift the locus of responsibility to primary care providers; the organization of care through interprofessional teams, in which behavioral

EXHIBIT 1

The Annapolis Framework

Area	Specific goals
Broadening the concept of "workforce"	1. Expand the roles of individuals in recovery and their families to actively participate in and influence their own care, provide care and support to others, and educate the workforce 2. Expand the role and capacity of communities to effectively identify their needs and promote behavioral health and wellness 3. Expand the role and capacity of all health and social service providers, through interprofessional collaboration, to meet the needs of people with mental and substance use conditions
Strengthening the workforce	4. Implement systematic recruitment and retention strategies at the federal, state, and local levels 5. Increase the relevance, effectiveness, and accessibility of training and education 6. Foster the development of supervisors and leaders in all sectors of the workforce
Creating structures to support the workforce	7. Establish financing systems that enable employee compensation commensurate with required education and levels of responsibility 8. Build a technical assistance infrastructure that promotes adoption of workforce best practices 9. Implement a national research and evaluation program on behavioral health workforce development

SOURCE Adapted from Hoge MA, et al., An action plan for behavioral health workforce development (Note 8 in text).

The boundaries between the educational silos of the behavioral health disciplines need to become more permeable.

health specialists are often consultants rather than the primary providers; and the use of care management, outreach, patient and family education, and self-management strategies.

Similarly, in addiction treatment there is evidence for the effectiveness of integrated care models in which primary care providers conduct early screening and brief interventions, provide therapy that includes medication such as buprenorphine, and coordinate care with addiction counselors in the same health care setting.[34]

▶**CONSUMERS AS PROVIDERS:** People in recovery from addiction have long been employed as part of the workforce in the substance use disorders field.[35,36] In fact, 41 percent of clinical directors in addiction agencies reported making concerted efforts in the past year to recruit and employ people in recovery.[9] Recent initiatives have greatly expanded consumers' involvement in the mental health workforce through such approaches as self-care, sharing decision making with professionals, and providing peer support in volunteer or paid positions.[8]

There have also been major efforts to develop competencies, training programs, and certifications for people providing peer support.[10] More than twenty states are now reimbursing certified peer specialists under Medicaid, and another twenty-two states have indicated their intent to do so.[37] Although the evidence base lacks rigor, research has supported the value of peer interventions in reducing substance use and psychiatric inpatient readmissions and in improving physical and mental health, as well as interpersonal relationships and occupational functioning.[36,38]

For people with alcohol dependence, there is evidence that participation in peer-led twelve-step groups increases abstinence rates among those in professional treatment and that it may produce equivalent outcomes for those not seeking professional treatment.[36] A recent Cochrane Review concluded that outcomes for clients served by consumer-providers on mental health teams were no better or worse than those served by professionals employed in similar roles.[39]

STRENGTHENING THE WORKFORCE

▶**RECRUITMENT AND RETENTION:** There will always be the need for a specialist behavioral health workforce, particularly to treat people with severe behavioral health conditions. The relevant specialties include psychiatry, psychology, clinical social work, advanced-practice psychiatric nursing, marriage and family therapy, psychosocial rehabilitation, and mental health and addiction counseling.

Best practices in recruiting and retaining a workforce of such specialists include early exposure to career opportunities in this field and the special populations served, mentoring by behavioral health specialists, training stipends, minority fellowships, loan repayment programs, and the development of career ladders. Paying wages commensurate with the education, experience, and responsibility required of such specialists appears to be a primary factor in the success or failure of recruitment and retention efforts.[8]

From a policy perspective, the combination of political will and funding can yield successful recruitment of specialists. For example, the wars in Iraq and Afghanistan led eventually to the expansion of behavioral health services in the Veterans Health Administration, which in turn created greater workforce demand and identified shortages. Increased funding, combined with an executive order signed by President Barack Obama, led to the hiring of 3,262 mental health professionals and support staff within twelve months.[40] At a broader level, federal legislation creating greater parity in coverage between medical and behavioral health conditions has challenged the societal stigma associated with the latter[41] and set the stage for an expansion of service and workforce demand.

▶**EDUCATION AND TRAINING:** Higher education programs and accrediting bodies must expedite curriculum reform as they struggle to keep pace with emerging evidence-based practices and guidelines, quality improvement approaches, and models of care based on interprofessional teams.[28] Continuing education programs should adopt evidence-based teaching approaches, replacing the typical brief lecture and workshop formats that have been proven to have little or no effect on the skills of health care providers.[8] The boundaries between the educational silos of the numerous behavioral health disciplines need to become more permeable to address the absence of cross-fertilization of knowledge and skills across provider types,

effective team functioning, common standards of care, and consensus on core competencies.[28]

Greater use must be made of online technologies as a way to increase access to education, with an ongoing review of their efficiencies and effectiveness.[42] Continuing efforts should be made to identify and teach competencies in collaborative team-based care, particularly care for children and adolescents, older Americans, and racially and culturally diverse populations. The current and future workforce also needs training in addiction treatment, since half of the professionals in most mental health disciplines and a third of addiction counselors have had no coursework in the diagnosis and treatment of substance use conditions.[43]

CREATING STRUCTURES TO SUPPORT THE WORKFORCE

▶**FINANCING SYSTEMS:** A team of researchers at Brandeis University has argued that partial failures in the economic market have left behavioral health services and the agencies that deliver them underfunded.[44] The impact of these forces on the supply side is that the size of the workforce is constrained: Employers, striving to remain fiscally viable, suppress wages and benefits and increase the burden on each worker, producing higher levels of employee burnout and turnover.[45] Salaries in behavioral health care—particularly in addiction services—are considered to be well below those for parallel positions in other health care sectors and in business.[10]

Richard Frank and Sherry Glied[46] estimated that shortly after World War II, the economic benefit to an individual of pursuing graduate training in behavioral health was 10–25 percent greater than having a bachelor's degree; however, the economic return on that graduate training is now negative compared with training for other potential careers. Efforts to recruit and retain an adequate workforce will be seriously hampered until payments for services reach levels that incentivize people to choose and remain in behavioral health careers and that enable provider organizations to offer employee compensation commensurate with required education, levels of responsibility, and work demands.

▶**TECHNICAL ASSISTANCE STRUCTURE:** There are few organized efforts to gather, analyze, and disseminate knowledge about workforce practices in behavioral health. Thus, an infrastructure providing information and technical assistance to the field on the implementation of best practices in workforce development is sorely needed.

Discussion

Although the sources of information are imperfect, there is a relatively clear consensus about the general characteristics, strengths, and weaknesses of the mental health and addiction workforce. There has also emerged a fairly clear and consistent vision regarding the broad strategies and specific actions necessary to expand and better train the specialist workforce, engage other health and social service providers and people in recovery to meet behavioral health needs, and develop the structural supports necessary to grow the workforce and make it more effective.

Missing, however, is evidence that any of these strategies is being scaled up and implemented in a fashion that is likely to have a meaningful impact on workforce size or effectiveness. Over the past fifteen years the federal government has funded multiple workforce assessments and plans, but it has never adopted or implemented a comprehensive plan. With few exceptions, workforce initiatives have been limited in scope, affecting few areas of the country and few current or potential providers. And whether these initiatives are federal or local, seldom have sufficient resources been allocated to produce major changes in the composition or practice of the workforce.

Time and again, the impact of pilot workforce projects has eroded as demonstration funding ended without any mechanism for sustainability.[8] For example, in 2003 the Health Resources and Services Administration created grants under the Graduate Psychology Education Program to develop geropsychology training programs. However, the agency funded only seven programs nationwide and terminated all funding after three years. This led directly to program closures.[11]

There are many hypotheses about why there has been no concerted response to the workforce crisis in behavioral health. One possible explanation is that the societal stigma associated with mental and substance use conditions creates a culture in which inattention to needs is tolerated, at least to a degree. Another is that the responsibility for workforce development is widely dispersed among governmental agencies and nongovernmental organizations, which diminishes the likelihood that any single entity will take action. A third is that workforce development requires a long-term, comprehensive plan and sustained action, which do not fit easily within the time-limited, issue-focused agendas of ever-changing government administrations.

Whatever the reason, it is clear that concerted federal action and leadership are the ingredients most needed now to address the workforce crisis in behavioral health. Multiple federal agencies—particularly some of those in the Department of Health and Human Services—have enormous potential influence in this arena. These include

the Substance Abuse and Mental Health Services Administration, the Health Resources and Services Administration, the Agency for Healthcare Research and Quality, the Centers for Medicare and Medicaid Services, the National Institutes of Health, the Centers for Disease Control and Prevention, and the Indian Health Service. They are uniquely positioned to accomplish the following four critical tasks.

The first is to advocate for resources from the administration and Congress to effectively address the workforce crisis. The case needs to be made that expanded access to services under health reform is of limited usefulness without a workforce that is both competent and large enough to provide effective services to the country's diverse population.

The second task is to allocate a greater portion of the agencies' energies and resources to workforce development. A recent Institute of Medicine report documented critical instances in which federal agencies are withdrawing support for behavioral health workforce development and pursuing policies that undermine workforce efforts to deliver evidence-based treatment.[11]

The third task is to create a robust national technical assistance infrastructure on workforce development that encompasses mental health and addiction services. As described above, this practical step is necessary to assemble and disseminate information on best practices on topics such as recruitment, retention, and training and to assist educators, employers, and others in implementing these practices.

The final task is to facilitate coordinated and sustained activity on workforce development by federal agencies and other important stakeholders. Federal agencies must coordinate their own efforts and should convene and influence action by other groups that shape recruitment, retention, training, and employment of the workforce. These include state and county governments, educational institutions, professional associations, employers and their trade organizations, third-party payers, accrediting bodies, and foundations.

The limitations of federal authority and influence are clearly recognized. Nonetheless, the carrots, sticks, and bully pulpits typically used by federal agencies to influence health care or address problems in the workforce have not been widely employed in this case.

Conclusion

Federal agencies have commissioned many initiatives to assess and document workforce challenges and to create a number of detailed blueprints for systematically strengthening the behavioral health workforce. A comprehensive nationwide effort to scale up these plans and strategies is now long past due. The aging and increasing diversity of the US population, combined with the expanded access to services that will be created by health reform, make it imperative to act now. ■

NOTES

1 Kessler RC, Aguilar-Gaxiola S, Alonso J, Chatterji S, Lee S, Ormel J, et al. The global burden of mental disorders: an update from the WHO World Mental Health (WMH) surveys. Epidemiol Psichiatr Soc. 2009; 18(1):23–33.

2 World Health Organization. Investing in mental health. Geneva: WHO; 2003.

3 Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. Results from the 2010 National Survey on Drug Use and Health: summary of national findings. Rockville (MD): SAMHSA; 2011.

4 Center for Disease Control and Prevention. CDC grand rounds: prescription drug overdoses—a U.S. epidemic. MMWR Morb Mortal Wkly Rep. 2012;61(1);10–3.

5 Office of National Drug Control Policy. 2013 national drug control strategy [Internet]. Washington (DC): White House; 2013 [cited 2013 Sep 13]. Available from: http://www.whitehouse.gov/ondcp/2013-national-drug-control-strategy

6 Substance Abuse and Mental Health Services Administration, Office of Applied Studies. Results from the 2009 National Survey on Drug Use and Health: mental health findings. Rockville (MD): SAMHSA; 2010.

7 Schomerus G, Lucht M, Holzinger A, Matschinger H, Carta MG, Angermeyer MC. The stigma of alcohol dependence compared with other mental disorders: a review of population studies. Alcohol Alcohol. 2011;46(2):105–12.

8 Hoge MA, Morris JA, Daniels AS, Stuart GW, Huey LY, Adams N. An action plan for behavioral health workforce development: a framework for discussion [Internet]. Rockville (MD): Substance Abuse and Mental Health Services Administration; 2007 [cited 2013 Sep 13]. Available from: http://www.samhsa.gov/workforce/annapolis/workforceactionplan.pdf

9 Ryan O, Murphy D, Krom L. Vital signs: taking the pulse of the addiction treatment profession: a national report—version 1 [Internet]. Kansas City (MO): Addiction Technology Transfer Center National Office in residence at the University of Missouri–Kansas City; 2012 Sep 28 [cited 2013 Sep 13]. Available from: http://www.attcnetwork.org/documents/VitalSignsReport.pdf

10 Substance Abuse and Mental Health Services Administration. Report to Congress on the nation's substance abuse and mental health workforce issues. Rockville (MD): SAMHSA; 2013.

11 Institute of Medicine. The mental health and substance use workforce for older adults: in whose hands? Washington (DC): National Academies Press; 2012.

12 Kim WJ. Child and adolescent psychiatry workforce: a critical shortage and national challenge. Acad Psychiatry. 2003;27(4):277–82.

13 Thomas CR, Holzer CE 3rd. The continuing shortage of child and adolescent psychiatrists. J Am Acad Child Adolesc Psychiatry. 2006; 45(9):1023–31.

14 Cunningham PW. Loophole for mental health care. Politico [serial

on the Internet]. 2013 Mar 4 [cited 2013 Sep 18]. Available from: http://www.politico.com/story/2013/03/reform-law-expands-access-to-mental-health-care-88347.html
15 Thomas KC, Ellis AR, Konrad TR, Holzer CE, Morrissey JP. County-level estimates of mental health professional shortage in the United States. Psychiatr Serv. 2009;60(10):1323–8.
16 Bureau of Labor Statistics. Occupational outlook handbook: substance abuse and behavioral disorder counselors [Internet]. Washington (DC): Department of Labor; 2012 Mar 29 [cited 2013 Sep 13]. Available from: http://www.bls.gov/ooh/community-and-social-service/substance-abuse-and-behavioral-disorder-counselors.htm
17 Institute of Medicine. Retooling for an aging America: building the healthcare workforce. Washington (DC): National Academies Press; 2008.
18 Bartels SJ, Naslund JA. The underside of the silver tsunami—older adults and mental health care. N Engl J Med. 2013;368(6):493–96.
19 Census Bureau [Internet]. Washington (DC): Census Bureau. Press release, U.S. Census Bureau projections show a slower growing, older, more diverse nation a half century from now; 2012 Dec 12 [cited 2013 Sep 13]. Available from: https://www.census.gov/newsroom/releases/archives/population/cb12-243.html
20 Alegria M, Lin J, Chen C, Duan N, Cook B, Meng X. The impact of insurance coverage in diminishing racial and ethnic disparities in behavioral health services. Health Serv Res. 2012;47(3 Pt 2):1322–44.
21 Sanchez K, Chapa T, Ybarra R, Martinez ON Jr. Eliminating disparities through the integration of behavioral health and primary care services for racial and ethnic minority populations, including individuals with limited English proficiency: a literature review report [Internet]. Austin (TX): Hogg Foundation for Mental Health; 2012 Sep [cited 2013 Sep 13]. Available from: http://www.hogg.utexas.edu/uploads/documents/OMH%20Report_FINAL-FINAL.pdf
22 Le Cook B, Zuvekas SH, Carson N, Wayne GF, Vesper A, McGuire TG. Assessing racial/ethnic disparities in treatment across episodes of mental health care. Health Serv Res. 2013 Jul 16 [Epub ahead of print].
23 Lo CC, Cheng TC. Racial/ethnic differences in access to substance abuse treatment. J Health Care Poor Underserved. 2011;22(2):621–37.
24 Substance Abuse and Mental Health Services Administration. Mental health, United States, 2010. Rockville (MD): SAMHSA; 2012.
25 Pfefferle SG, Gibson TS. Minority recruitment for the 21st century: an environmental scan. Cambridge (MA): Abt Associates, Inc.; 2010.
26 Field C, Caetano R. The role of ethnic matching between patient and provider on the effectiveness of brief alcohol interventions with Hispanics. Alcohol Clin Exp Res. 2010;34(2):262–71.
27 Chao PJ, Steffen JJ, Heiby EM. The effects of working alliance and client-clinician ethnic match on recovery status. Community Ment Health J. 2012;48(1):91–7.
28 Institute of Medicine. Improving the quality of health care for mental and substance-use conditions. Washington (DC): National Academies Press; 2006.
29 Bhui K, Warfa N, Edonya P, McKenzie K, Bhugra D. Cultural competence in mental health care: a review of model evaluations. BMC Health Serv Res. 2007;7:15.
30 Beronio K, Po R, Skopec L, Glied S. Affordable Care Act expands mental health and substance use disorder benefits and federal parity protections for 62 million Americans [Internet]. Washington (DC): Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation; 2013 Feb 20 [cited 2013 Sep 13]. (ASPE Issue Brief). Available from: http://aspe.hhs.gov/health/reports/2013/mental/rb_mental.cfm
31 Substance Abuse and Mental Health Services Administration. Report to Congress: addictions treatment workforce development. Rockville (MD): SAMHSA; 2009.
32 Substance Abuse and Mental Health Services Administration. Strengthening professional identity: challenges of the addictions treatment workforce—a framework for discussion. Rockville (MD): SAMHSA; 2006.
33 Robiner WN. The mental health professions: workforce supply and demand, issues, and challenges. Clin Psychol Rev. 2006;26(5):600–25.
34 Pating DR, Miller MM, Goplerud E, Martin J, Ziedonis DM. New systems of care for substance use disorders: treatment, finance, and technology under health care reform. Psychiatr Clin North Am. 2012;35(2):327–56.
35 Faces and Voices of Recovery. Addiction recovery peer service roles: recovery management in health reform [Internet]. Washington (DC): Faces and Voices of Recovery; 2010 Sep 10 [cited 2013 Sep 13]. Available from: http://www.facesandvoicesofrecovery.org/publications/enews/2010-09-23/9.11.10_PRSS_health_reform_final.pdf
36 White WL. Peer-based addiction recovery support: history, theory, practice, and scientific evaluation. Chicago (IL): Great Lakes Addiction Technology Transfer Center; 2009.
37 Daniels AS, Fricks L, Tunner TP, editors. Pillars of peer support—2: expanding the role of peer support services in mental health systems of care and recovery [Internet]. Atlanta (GA): Pillars of Peer Support; 2011 Feb [cited 2013 Sep 19]. Available from: http://www.pillarsofpeersupport.org/POPS2010-2.pdf
38 Sledge WH, Lawless M, Sells D, Wieland M, O'Connell MJ, Davidson L. Effectiveness of peer support in reducing readmissions of persons with multiple psychiatric hospitalizations. Psychiatr Serv. 2011;62(5):541–4.
39 Pitt V, Lowe D, Hill S, Prictor M, Hetrick SE, Ryan R, et al. Consumer-providers of care for adult clients of statutory mental health services. Cochrane Database Syst Rev. 2013;3:CD004807.
40 Department of Veterans Affairs. Washington (DC): VA. Press release, VA hires more mental health professionals to expand access for veterans; 2013 Feb 11.
41 Cummings JR, Lucas SM, Druss BG. Addressing public stigma and disparities among persons with mental illness: the role of federal policy. Am J Public Health. 2013;103(5):781–5.
42 LeBlanc P. Making sense of disruptive technologies and higher education: a theory of change, the growth of online programs, and the next generation of delivery models. Paper presented at: American Enterprise Institute Conference; 2012 Aug 2; Washington, DC.
43 Dilonardo J. Workforce issues related to physical and behavioral healthcare integration: specifically substance use disorders and primary care: a framework. Paper presented at: Workforce Issues: Integrating Substance Use Services into Primary Care Conference; 2011 Aug 10–11; Washington, DC.
44 Tompkins CP, Merrick EL, Reif S, Horgan CM. Financing issues in the behavioral health workforce. Chapter 21 in: Hoge MA, Morris JA, Daniels AS, Stuart GW, Huey LY, Adams N. An action plan for behavioral health workforce development: a framework for discussion [Internet]. Rockville (MD): Substance Abuse and Mental Health Services Administration; 2007 [cited 2013 Sep 13]. p. 272–8. Available from: http://www.samhsa.gov/workforce/annapolis/workforceactionplan.pdf
45 Gabel S. Demoralization in mental health organizations: leadership and social support help. Psychiatr Q. 2012;83(4):489–96.
46 Frank RG, Glied SA. Better but not well: mental health policy in the United States since 1950. Baltimore (MD): Johns Hopkins University Press; 2006.

Systems Strategies for Better Health Throughout the Life Course

A Vital Direction for Health and Health Care

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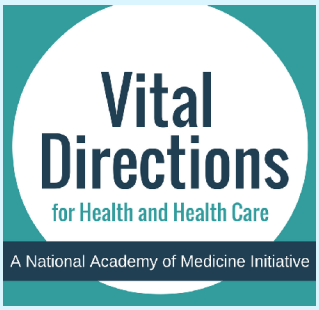

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Introduction

Health and health care outcomes for Americans should be better for most, and much better for some. This should be possible with currently available knowledge and resources. Capturing the potential will require adapting our strategies and approaches to the reality that health is not immutably determined at birth, but shaped by different factors over time. Similarly, caring for health cannot be confined to singular interactions within the walls of the health care system, but must fully engage powerful determining influences residing in other systems—e.g. education, employment, justice, transportation—which are natural parts of our lives. Exploring the nature and strategic opportunities inherent in these intersecting influences is the focus of this paper, and the implications for societal attention and resources suggest the promise of shifting emphases across the life span, across systems, and within the health care system.

Our assessment begins with an overview of the prominent health and health care challenges for Americans, and they are many. U.S. life expectancy at birth ranks 43rd in the global community, and has even recently declined among some specific groups (1). Unacceptable disparities in health outcomes and access persist among certain populations, in particular African-Americans and Native Americans (2). The U.S. health system ranked in a World Health Organization assessment only 37th in performance among 191 member nations (3), and in a recent study of 11

highly industrialized OECD nations, the U.S. ranked last (4). These deficiencies are all the more glaring in the face of health expenditures that are clearly the highest in the world, about 50% higher than the country next behind us, and requiring investment of nearly 18% of our total economic productivity (GDP) in 2015 (5). Why are we performing so poorly relative to our potential? A major reason lies in the fact that the foci of our attention, our resources (6), and our incentives are too narrow and too late: despite an increasingly strong and specific understanding of the preventable elements in the development of many of our health challenges—social, behavioral, environmental—our investments are primarily directed to their biomedical manifestations, well after the problems have taken root.

Health is the product of our experiences layered onto the biological matrices we inherit. Those experiences begin at conception, and, through the intersecting influences of genetics, environment, social circumstances, behaviors, and medical care, health emerges and takes form. Each of us represents, in essence, a complex system in constant and dynamic interface with other systems that shape our fates in manners great and small. The process is not linear, but one in which similar experiences may exert variable influences at different points. In this paper, we explore the implications of these dynamics for efforts to improve health prospects throughout those interwoven influences at various stages over the course of people's lives (7). Because emerging health problems and potential required solutions span well beyond a single determining factor or single point in time and place, it is necessary to take a systems-oriented perspective (8). In doing so, we respect the simple fact that optimal health will not be achievable or affordable—for society or individuals—without attention to the effectiveness, efficiency, and availability of essential services within and among the various sectors important to health outcomes.

Fortunately, transformational insights, tools, and initiatives are emerging that offer practical prospects for dramatic advances in the ability to mobilize information, cooperation, and collaborative action for more effective and efficient progress from the national down to the community and individual levels, on behalf of better health throughout the life course. We review these prospects by touching briefly on several questions:

- What are the most common health threats at each stage throughout life?
- Whatare the root sources of diseases, disability, and death most prominent among Americans?
- Why do we spend so much and get so little for our national health system investment?
- Which systems and partner stakeholders must be more seamlessly engaged?
- How can financing, accountability, technology, and culture be aligned to foster system-wide transformation for better health over the life course?

Health and Disease Over the Life Course

What are the most common health threats at each stage throughout life?

In terms of morbidity and mortality rates, health profiles vary substantially by life stage, Four of every ten childhood deaths, before age 15, occur in among babies in their first 28 days of life (9), about half due to congenital malformations, disorders related to short gestation and low birth weight, and maternal complications during pregnancy (10). Throughout infancy—the first year of life—the major causes of death are complications related to birth and birth defects, sudden infant death syndrome (SIDS), and unintentional injury (11). After age 1, injuries take over as the leading cause of death among children (12), and hold that position until age 44, followed by heart disease, cancer, and homicide, at different times and ages. Among adolescents and young adults, ages 15 to 24, suicide and homicide appear among the leading killers (13), ranking number 2 and 3, respectively among this age group. In adults ages 35 to 65, the major causes of death are cancers and heart disease (11), and after age 65, heart disease is the leading cause of death, followed by cancer and respiratory disease (13).

But illnesses and injuries that are counted most easily are often not the experiences most important to health prospects. Life expectancy at birth in the United States is now more than 81 years for females and 76 years for males, and for most of those years health status is more a reflection of the presence or absence of illness or injury, consequent level of function, sense of well-being, or predispositions, circumstances, or experiences that influence future profiles on these dimensions (14). Although death is the most striking, definitive, and tragic reflection of health status, it is far

too limiting as a measure of the health of a population (15). In the U.S. in 2013, for example, there were fewer than 15,000 total deaths among the nearly 75 million children under age (14), but nearly 25 million were overweight or obese, more than 30 million lived in low income families and 15 million in poverty, in the range of some 5 million lived in a household touched by violence (16, 17), more than 1 million were the victims of child abuse and neglect (18), with the highest rates among the youngest (19, 20). In 2015, about 1.1 million people under age 75 died, but those who suffer from diabetes, depression, and alcohol abuse, amount to 18, 11, and 15 times that number, respectively (21, 22).

In this respect, the most important childhood determinants of health over the life course are at least as much those related to the caring, social, environmental, and behavioral experiences, as to health services received. This is especially the case for ages 0 to 3, when central nervous system development occurs at such a rapid rate, with ongoing development of physical stature and physiologic function. Advances in neuroscience have provided a much deeper understanding of brain development in the early years, as well the remolding during adolescence that sets the stage for issues with lifelong consequences—e.g. overweight and obesity, substance abuse, psychological disorders (23). It is often assumed that children are generally healthy and, if they suffer a health problem or developmental delay, they will grow out of it. However, while children can be resilient, adversity during these sensitive developmental periods is often embedded, only to emerge years later as a source of disability and ill-health (7, 24, 25). The role of attention and nurturing as an influence on health status, nearly always a relevant determinant, may not be again as relatively important a focus until the final years of a natural life span (26).

Over a lifetime, acute infections represent the most frequent sources of short-term functional limitation among all age groups, with asthma and short term injuries increasing in later childhood, and obesity and depression occurring at higher rates as children move into adolescence (27). In adolescence and young adults, substance abuse emerges as a more common near- and longer-term health threat (28), as does risky sexual behavior and violence in some populations. In the past 15 years, opioid addiction rates have rapidly increased, particularly in white, rural communities, in part as a result of neglectful prescribing behavior among clinicians, in part as a result of segmenting and marginalizing the treatment strategies for those with pain and behavioral health problems (29). Addiction rates among active duty military personnel, which had previously been on the decline, tripled from 2005 to 2008, and rates of depression and suicide and post-traumatic stress disorder also increased (30, 31).

Throughout adulthood, various exposures, experiences, and lifestyles contribute increasingly to disease and injury, the rate and impact compounded by growing co-occurrence of multiple diseases and conditions. Among those over age 50, nearly half suffer from arthritis, 28% have heart disease, approximately 25% are overweight or obese, 22% have cancer, and 6.5% have lung disease (32). Approximately 45% of those over 50, and 75% of those over 65, report multiple co-occurring conditions that restrict their activities in some fashion (33). Among people over age 75, approximately 14% suffer from some form of dementia. The societal impact is crippling from the increased occurrences of obesity, diabetes, depression, and dementia (34). Successfully reducing the occurrence of most of these conditions, and the extent of incapacities imposed, requires multifaceted, life course-oriented strategies.

Health Disparities

Some people—and some groups—differ substantially from the aggregate profile. Differences occur among various race, ethnic and socio-economic groups, but the largest overall disparities occur among African Americans relative to whites. For example, despite the relative safety of gestation and birth in the United States, African-American babies are more than twice as likely to be born with a low birth weight or to die in their first year of life (35, 36). Interestingly, babies born to mothers who are immigrants from Africa experience low birth weight and related problems at rates similar to whites, suggesting the existence of other factors or stressors for African-Americans (37).

Beginning at birth, the experience of disparities tends to accumulate and widen over time. Black children are twice as likely as white children to have asthma, and obesity is twice as common among American Indian children compared to their white and Asian counterparts (38). Obesity disparities emerge as early as preschool (39), and the prevalence of overweight

and obesity among black girls ages 2 to 19 is about 6% higher than for their white counterparts (40). Because obese children are at higher risk for obesity and cardiovascular disease as adults, the disadvantage extends into adulthood.

Almost one half of black adults suffer from hypertension, the highest population-specific prevalence in the world (41). The annual incidences of stroke and heart disease among African-Americans in the United States are about 2 and 1.5 times, respectively, those among whites (42). Although the yearly cancer incidence among African Americans is about the same as whites, cancer death rates projected through 2018 for African Americans are expected to be about 14% higher for women and 27% higher for men (43). Rates of Alzheimer Disease and other dementias among African Americans, range in estimates from of 14% to 100% higher (44). Life expectancies are shorter for African-Americans by about 3 years for women, and 5 years for men (45). On the other hand, for those who reach age 75, the difference in life expectancy between whites and blacks is only about 0.4 years (14).

The Determinants of Health

What are the root sources of disease, disability, and death most prominent among Americans?

Why do different groups and individuals demonstrate such different health profiles? A great deal has been learned in the relatively recent past about the answer to these questions, and the answer is not "fate". As noted earlier, health is the measure of our functional capacity that results from the interplay of factors in five domains shaping our life courses: our biological predispositions, social circumstances, physical environments, behavioral patterns, and access to the health care we need (46). Figure 1 presents a schematic of how some of these factors might play out to shape health status and health prospects at various times and in various circumstances (47).

Biologic predispositions

Point: It is not all about genes. The starting point is indeed with our genes, the predispositions we inherit from our parents. Although very few diseases can be classified as purely genetic in nature, work throughout the world daily identifies new associations between known conditions and specific gene profiles. Importantly, however, more is continuously being learned about epigenetics, the multiple cellular and molecular mechanisms by which genes can be turned on or off and the information modified as it is expressed in cells by different exposures and experiences, and even how experience-related epigenetic modifications can be passed on to subsequent generations. As insights deepen about sensitive periods of health development

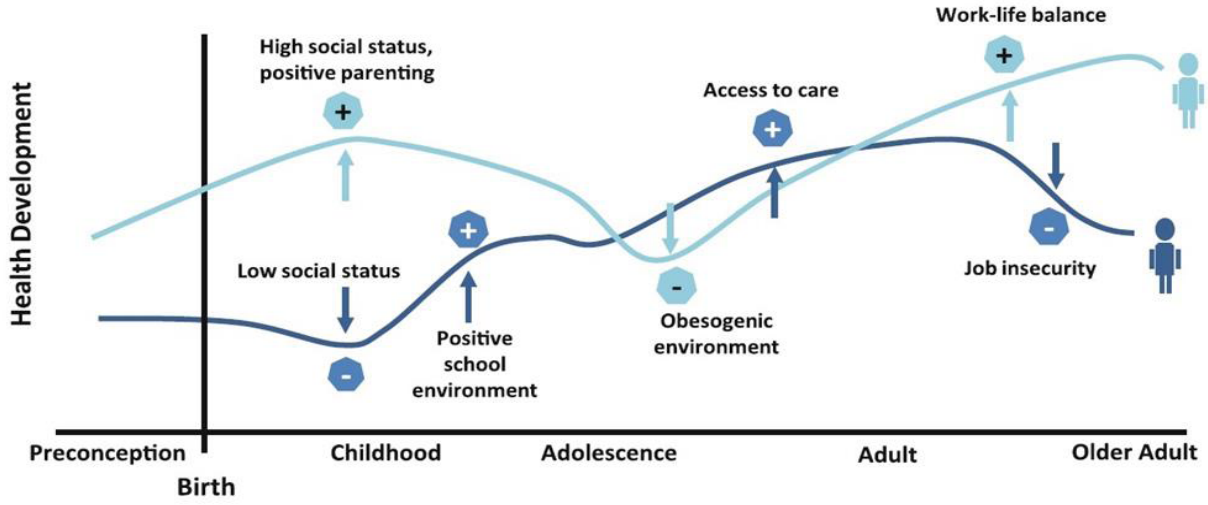

Figure 1: Schematic of variable life stage influences

Source: Halfon, N., Larson, K., Lu, M., Tullis, E., & Russ, S. (2014). Lifecourse Health Development: Past, Present and Future. Maternal and Child Health Journal, 18(2), 344–365.

and how the impact of the interactions of our individual gene compositions with our physical, social, and behavioral environments, the better equipped we will be to act on that knowledge in ways that buffer impacts and optimize health development over the life course.

Medical Treatment

Point: It also is not all about medical care, unless one is ill or injured. In 2015, total U.S. expenditures for health were about $3 trillion, with medical treatment receiving more than 90% of the total. Yet, the impact of those expenditures on the aggregate health of the population was very limited (48). They were not expenditures aimed at the factors most important to the nation's health profile. Shortfalls in the access or quality of medical care are especially surprising in the context of the high U.S. expenditures, and require remediation, but other approaches are required for better health. Illustrative is the fact that approaches to improve birth outcomes and address disparities that have primarily focused on enhancing access to prenatal care, have proven insufficient in achieving the gains possible (49, 50). Addressing barriers to care access is a basic social responsibility, but effective engagement of health improvement opportunities requires strategies and investments that are broad and multisystem in nature.

Behavioral Patterns

Point: Health behaviors are central, but are also more than choice. Among the influences on health, those related to behavioral patterns represent the single most prominent preventable source. Tobacco, dietary factors, physical inactivity, and alcohol misuse, account for many preventable deaths among Americans, including from coronary heart disease, stroke, cancers of the colon, breast, and prostate, and diabetes (49). Diet and physical activity factors together account for about a third of preventable premature deaths among Americans (51). Unintended pregnancies significantly impact individual and community health, yet one in three births in the U.S. is unintended, including most of those born to teens (52, 53). Illicit drug use is one of the few leading causes of death with increasing rates, and along with alcohol abuse, imposes a broad and leading social, morbidity, and mortality burden on Americans and their communities (54). Behaviors are, however, driven at least as much by external factors as internal, as, for example in the access and affordability of healthy foods. They are reflections of culture, access, economics, and other factors such as the quality of early experiences and the central importance of supportive human relationships, underscoring the intersections among the domains of influence that require sustained system-wide strategies across communities.

Social Circumstances

Point: For many, health is substantially about social circumstances (55). Health is powerfully influenced by our social conditions and services—education, income, employment, housing, neighborhoods, racism, social networks (56). For the population as a whole, the most consistent predictor of the likelihood of death in any given year is level of education. For those ages 45 to 64 with limited education, the chance of death in a given year is four times those with graduate degrees (57). Income levels have consistently been associated with life expectancies, and one measure of income inequality, holds that a one percent increase in inequality doubles the likelihood of death over a decade (58), presumably due to disproportionate exposures to neighborhood violence, suboptimal school environments, and unstable households (59). Also important is that *perceptions* matter—perceptions of income inequality, perceptions of limited choices, perceptions of community cohesion (60). Stress "gets under the skin" and exerts an effect that can grow over the life course (61, 62, 63).

Physical Environments

Point: The pace of progress will reflect the integrity of our environments. Environments affect health in myriad ways: silent and invisible inadvertent toxic exposures to workplace and product hazards; zoning and design features of our built environments that structurally impair or facilitate health promoting or health degrading life and workstyle patterns; ecosystem changes from human activities that foster novel zoonotic infections (64). Two of the largest and most rapidly occurring epidemics to confront the United States—and the world—in recent years have roots in changes in our physical environments: obesity and HIV. They also underscore the intersecting character of the domain determinants, and the importance of tending simultaneously to the dynamics across systems of influence.

Causes and Consequences of System Shortfalls

Why do we spend so much and get so little for our national health system investment?

Substantially, this is due to constraints on our lines of sight. Because most health improvement efforts—disease and injury prevention, treatment, and rehabilitation—are designed around a single encounter or issue, it is there that they often end. Immunizing a toddler, delivering a baby to a young mother, setting a broken arm, counseling someone depressed, testing a blood sugar level, screening for high blood pressure, treating a leg ulcer, explaining an employee safety program, preparing a school meal plan, scheduling for chemotherapy, preparing a hospital discharge, each represents the dedicated work of a skilled health professional usually delivered with a focused sense of purpose in anticipation of the best result. Yet the reasons care is needed, and the likelihood of its optimal impact on health prospects, depend on myriad factors beyond a single precipitating event or diagnosis, such as a heart attack, stroke, or diabetic retinopathy—factors that include the interplay of behaviors, environments, socioeconomic status, ethnic and gender biases and prejudices, factors that can course throughout communities and throughout lives. Our aims must clearly orient beyond the singular (65).

Certainly, our payment and reward systems focus on the singular and the serial—occurrence of an illness and its treatment, sometimes repeatedly. Health care financing is largely structured around separate charges for individual components of services provided for a particular diagnosis, presenting powerful organizational and financial disincentives to the health care stewards we trust to be focused on producing optimal health results for patients and families. Even when focus is turned to results rather than services—value rather than volume, as the saying goes—unless incentives are aimed to present and engage the longer term, multisystem factors often involved, attention will be more naturally drawn to a near term and narrow single condition perspective (66). A clinical team attempting to help a person manage diabetes will be substantially hindered the focus is limited to the presenting vital signs and blood chemistry profiles, when the most basic success factors reside in patient distinctions as to medication cost and access, literacy, family circumstances, mobility, digital accessibility, dietary patterns, employment status, neighborhood character.

Economic Implications

Consequences of short-term and narrowly-focused interventions are not only registered in underperformance with respect to morbidity and mortality tables. Performance inefficiencies and shortfalls are expensive. Costs are personal to people and their families, they are collective to organizations whose efficiency and effectiveness are tightly linked to the health status of those who populate them, and they are societal to populations whose aggregate vitality and capacity are sapped both by the economic burden of waste and by the dispiriting and debilitating impacts of unnecessary disparity and marginalization.

Children born in low income, high risk circumstances, and who are not seamlessly linked to the support they need, risk being delayed or disabled from the outset. The lifetime costs of the resulting services required and lost productivity experienced will likely far exceed what would have been the cost of the initial investment. Without effective linkage of activities, as indicated, among schools, clinicians, social service, law enforcement, and juvenile justice organizations, teens and young adults who are passing through the challenges natural to that period will be placed at greater risk—and lifelong expense and loss of income potential—from issues such as pregnancy, alcohol and drug abuse, depression, and violence. People who live and work in communities in which the cultural signals, norms, and opportunities are aimed at fostering attention, support, and priority to health and health-promoting strategies are more likely to be healthier, with the attendant personal economic advantages.

At the organizational level, the burden of our failure to capture system-wide opportunities for greater efficiencies can be considerable. In 2011, hospital readmissions due in part to missed opportunities to better manage care coordination at discharge, imposed more than an estimated $40 billion dollars (67, 68, 69, 70). The cost of lost productivity due to illness imposes a substantial burden on workplaces, often generating costs well beyond those for health care alone (71). In the aggregate, the full, extent of the economic consequences of our fragmented system are unknown, but

the costs are staggering. We do know from various studies that about 30% of overall health expenses in the U.S. is unnecessary—the costs of unneeded services, care delivered inefficiently, charges that are too high, excessive administrative costs, missed prevention opportunities, and fraud (72, 73). Beyond this, are the personal and social costs imposed by unwanted pregnancies, learning disabilities unaddressed, overweight and obesity, alcohol and substance abuse, criminality and incarceration, and others that could potentially be avoided or modified if the interfaces and incentives were aligned for their cooperative engagement. Still more consequences reside in the resulting loss of economic productivity among those affected.

Potentially Transformative System Partnerships

Which systems and partner stakeholders must be more seamlessly engaged?

Harnessing society's full potential for optimizing health outcomes across the lifespan requires reaching out well beyond the health care system, from the earliest days of childhood. That potential is determined by the robustly networked interplay among systems and services that, in diverse ways, have central bearings on health prospects, and for which insights are applicable from other sectors using integrative platform models to manage the flow of goods and services (74). Examples follow of some of the relevant stakeholders identified in the discussion of the issues mentioned here.

Clinicians, Health Care Organizations, Pharmcies

Across the board, no country can claim a cadre of health professionals that is more skilled, more dedicated, or more highly resourced than those in the United States. Yet, clinicians and health care organizations often are challenged in addressing issues of great social and developmental importance to patients (75). Prevailing cultures, financing, standards, accountability, accessibility, and organizational structures are largely designed to foster narrow perspectives and poorly coordinated activities, certainly between health care and other systems important to optimizing health prospects, but also among different health care institutions providing relevant services, and even among service units within the same organization. Successful models of team care, linked interventions, and information system platforms indicate not only that the care delivery process itself can feasibly operate in a fashion transformative for near-term and lifelong health prospects, but it has the potential to operate as system that continuously learns and improves (76, 77). By promoting consistent leadership messaging on health progress, underscoring key trends, identifying groups within their own institutions with disproportionate shortfalls, emphasizing the intersecting system-wide influences, indicating steps to marshal community-based corrections and monitoring progress within their own communities, effective leaders can move organizations beyond disconnected efforts to implement system-wide strategies for better health.

People and Their Families

Since the appearance of the first village healers, health and health care have operated through a flow of authority and expertise that went in only one direction, from healer to patient. With transformations in access to knowledge and tools, the prospects are at hand for an unprecedented democratization of health and health care decision-making and delivery (78). Unimagined a generation ago, the speed at which advancing digital technology has put health improvement potential literally at our fingertips is simply stunning (79). Already possible is support through virtually immediate access to information and assistance, on-line and real-time advice and counseling for specific circumstances, rapidly growing applications for decision assistance for a variety of health and medical issues, GPS (geographic positioning) tailored care access and care monitoring facilitation, remote site diagnosis and assessment of certain laboratory and physiologic parameters, and even the early stages of remote site therapeutic measures. Patient portals and tele-consults have already improved the quality of information available for ongoing care, reduced the need for outpatient visits in many facilities, and made possible improved care for homebound and geographically distant people. The growing capacity for gathering, assessment, and use of individual clinical data dramatically accelerates to prospects for continuous learning and care that is better tailored to an individual's life course circumstances. Rate limiting factors relate not so much to technologic constraints as to equitable functional access, the need for

greater priority on system interoperability, the development and testing of reference standards to ensure reliability, cross-sector strategies for deployment, and adoption of an operative personal linkage approach to allow the service integration, improvement, life course tailoring, and learning that is technically feasible.

Social Services

In the spirit of the adage that the advancement of a society can be judged by the way it treats its most vulnerable, some of our most important gains as a nation have come as a result of efforts to reach out and engage the basic needs of the poor and the isolated. As a society, there is substantial common ground on the basic notions; that every person has the basic food and shelter they need; that care is available to all pregnant women; that newborns and their mothers have the appropriate services required; that young families contending with unfamiliar experiences and new financial pressures have helpful assistance, including the lifelines and links of home visits if required; that young children get an early start with positive socialization and educational experiences; that schools and care organizations be alert for social circumstances placing children in jeopardy; that those who are ill, infirm and homebound have ready access to assistance that meets them where they are; that those in the late stages of life suffer as little pain, displacement, and as little loss of dignity as possible. Although these are social values around which beliefs are broad, the public and private efforts to act upon them can often be sporadic, disjointed, uncoordinated, with limited follow-through—multiple organizations tending individually to responsibilities for narrow segments of the needs. Promising intersectoral and multisystem models have been demonstrated for high health care utilizers—the so-called "hot spotters" (80)—through the work of various organizations. The Camden Coalition used targeted and tailored multi-faceted services with a group of high cost, high utilizer individuals and reported a 50% reduction in costs and hospital visits (81). A community-oriented organization, Health Leads, using a multidisciplinary team-based model to address connect high risk individuals with community-based resources such as employment, health insurance, and food, reported broad-based positive impact in reducing those needs (82). The Commonwealth Care Alliance is a not-for-profit delivery system for complex medical nee patients served by Medicare and Medicaid. Using multidisciplinary clinical teams, their Senior Care Plan model reported nearly half the rate of hospital stays of those in fee for service plans, as well as much lower medical spending growth over 5 years (83). These promising results suggest the need to deepen the partnership between clinical and social organizations in the interest, first, of the patients served, but clearly as well for community and financial sustainability.

Public Health and Safety Agencies

Public health holds society's front line responsibility for identification and engagement of health threats to the population. Many of the most important health gains of the past century have come as a result of public health measures ranging from those of sanitation and hygiene to safer food, reductions in deaths among mothers and babies, immunization and infection control programs, and on to campaigns on tobacco and lifestyle issues. The effectiveness of public health has long been dependent on a close relationship with the clinical community, and, if the number and variety of newly emerging diseases is increasing with population expansion and ecosystem change—e.g. Lyme Disease, HIV, SARS, Ebola, Zika, among others—the seamless interface of public health and clinical care systems is essential. Of related importance is the ability of public health be able to draw upon, and share the results of, emerging laboratory, genetic, GPS, information processing, and crowd sourced data for strategic communitywide planning and response. Simply stated, public health should be a central steward of system interfaces and strategic direction for better health throughout the life course.

Schools and Pre-School Facilities

Virtually every child in the nation attends a school, and, while education has to be the first priority for our schools, for too many children, their school is the closest thing they have to an agent with a dedicated interest in their welfare. Beyond the fact that educational level is the most powerful determinant of lifelong health prospects, schools have also served as the anchor locus for community health interventions such as immunizations, drug and alcohol use, teen pregnancy, and health behavior efforts. If schools are to be able to effectively manage their basic educational responsibilities, while also helping advance the agendas of the

health and social service sectors, the communication interfaces with those sectors have to be as seamless and fluid as possible, the data bases interoperable, and the reward structures fully aligned.

Income and Payment Organizations

Employers have a clear incentive for keeping their workforces healthy, as do those who manage the health care payments for their employees and other stakeholders. Although as a group, no sector may have a greater stake in the long term health prospects of the population as a whole, whether from a productivity or cost of care perspective, the current payment systems, as well as the rate of turnover among employee groups and beneficiaries, all provide adverse incentives for the longer term view needed. Shorter term approaches oriented to value-based and bundled payment models are of interest, as are accountability initiatives tailored to focusing payments on proven interventions. But for these stakeholders to be able to bring to bear their considerable influence in the interest of system-wide strategies for better health throughout the life course, the prevailing payment system will have to move more directly to one that aims to improve overall population and community-wide health outcomes, with accountability measures directed to and focused on system-wide performance in improving health. Similarly, state flexibility to use Medicaid and other categorical federal funding to improve a shift to population-based care and accountability structures may help reduce fragmentation and stimulate systems-oriented leadership and integration at the community level.

Broadcast and Social Media

The nature of our digital lives is changing so rapidly, it is difficult to know the trajectory of its evolution. But it is clear that it is a rapidly spreading and global force that is likely to have a very important influence on health-related dynamics over the life course. The use of social media, by virtue of its nature, has the ability to instant cross lines of previously disparate and separate sectors. Whether from the perspective of the use of communication channels to influence perspectives, or to draw attention to emerging problems, or to rally support for action, or to use crowdsourced data as a research tool, this is an arena of direct relevance for life course strategies.

Consumer Product Retailers

Marketing is a clearly established accelerant of human behavior, for better or for worse. Television marketing in the 1950's and 1960's drove the ascendance of cigarette use and pushed tobacco to the leading spot among the nation's killers. On the other hand, televised counter-tobacco marketing in the time from 1968 to 1970 yielded the historically steepest decline in tobacco use, and actually led to some relief in the tobacco industry when television advertising—and the mandatory counter-ads—were eliminated. Advertising of food products targeted to children clearly had an impact on their attitudes and food choices, and probably on the rates of childhood obesity. The potential effectiveness of sustained social marketing strategies to facilitate positive behavior change suggests that marketing awareness is clearly relevant to conceptualizing life course strategies for health improvement (84).

Law Enforcement and the Courts

The nation is currently experiencing a resurgence of addiction, in this case fueled by increased use of opioids by young people. Accordingly, we are reminded of the central role of the law enforcement and the courts in any strategy aimed at effective engagement of those afflicted with addiction. Police have clearly said "We can't arrest ourselves out of this problem." These circumstances, as well as those in which the first surfacing of childhood endangerment may be in family courts, underscore the critical importance of common agendas and strong and effective communication channels between and among the justice, social services, education and clinical care systems.

Community Commons Stewards

Sustained multi-system progress for health improvement across the life course starts where people live, work, and play. In part, health care organization leaders can play a natural role in this respect. Hospitals can advance community-wide strategies for health improvement, and have an economic incentive to do so, via community benefit programs. Municipal public health departments are poised to steward a coordinated agenda linking health, community, and economy in development efforts. Community agencies planning and setting not only standards for food, sanitation, and environmental safety, but also standards for green space,

for activity friendly building designs, for zoning in the placement of fast food and alcohol outlets, for working with employers in the development of community-wide initiatives, all can have important influences on the extent to which a community culture of continuous health improvement becomes a central element of a community's identity (85). Community leadership, with the elected leader at the lead, is central to fostering the bridges across sectors, and ensuring the establishment and tracking of key indicators necessary for attention and progress throughout the life course (86).

Vital Directions for Better Health Throughout the Life Course

How can financing, accountability, technology, and culture be aligned to foster system-wide transformation for better health over the life course?

With so many issues and stakeholders—in the face of such complexity—how can a life course, systems-oriented approach be envisioned, much less implemented? Our view is that it is substantially achievable with more effective use of the tools and aggregate resources already available and in use at some level today, but which require the leadership and will to refine, implement, and spread: 1) health care financing that supports and rewards health improvement at the population level, in addition to the best care for individuals; 2) a parsimonious set of validated core measures to drive sustained systems-wide focus and accountability for actionable factors most important to health—the vital signs for our vital directions; 3) seamless digital connectivity affording operative real-time interfaces across sectors and across time; and 4) a transformative culture of health equity and continuous health improvement in every community throughout the nation. Each can be accomplished, and is dependent only on strong collaborative-minded public and private leadership at every level—national, state, local, organizational, and individual (87, 88).

Vital Direction: *Shift health care payments to financing that rewards system-wide health improvement.* Basic expenditure principles—personal, private, and public—include: know what you want, know its price, pay for its delivery. Because for the prevailing health care financing pattern, none of these pertain, our payment model has resulted in substantial system distortions. With larger and larger sums in play, health care payments are made not for health outcomes or treatment packages, but for many—sometimes hundreds—of individual components; the prices of either those individual components or their likely total cost is rarely known until completion of a course of uncertain duration; and, as noted, payments made are often unrelated to delivery of results (89). The result is a fragmentation of incentives down to a focus on the smallest possible unit, rather than the overall performance of the system for an individual or a population. We pay for illness, not for health (90). If we are to forge effective interfaces among the various system elements importantly shaping health outcomes, then payments need to shift to reward overall system performance in delivering those outcomes, including incentives for more effective attention to children at risk (91). Some prepaid health plans—e.g. Kaiser Permanente, Group Health, parts of Geisinger—are based on this philosophy and, as a result, tend to have more prominent community-facing dimensions. The Centers for Medicare and Medicaid Services has initiated a broad-based payment Learning and Action Network with the aim of developing alternative payment models for accelerated transition from payments for individual services, ultimately to a system profile that maximizes payments based on value delivered to a population (92). By assuming financial responsibility for specific populations, health care organizations have a vested interest in better linking to the community, including local health and social service departments, schools, senior centers, and faith-based institutions. What's required is a substantial acceleration of the progress toward a health financing system that clearly supports and rewards health improvement at the population level, in addition to the best care for individuals (93).

Vital Direction: *Initiate multi-level standardized measurement of system performance on core health indices.* In order to make progress toward better health, we must know where we stand—on representative issues for each of the dimensions most important to health: health care, social circumstances, environment, health behaviors, individual and community engagement, and, of course, health status. The challenge is that if the measures are too numerous and are incon-

sistently formulated from place to place and time to time, they are ineffective and even counterproductive. There remains an urgent need to align and condense our current measurement approaches to a core set of standardized measures reliably available for broad comparison across institutions and across time. If our restructured payment systems are aimed at a substantially improved focus on results—on the performance of the system in producing better health in the near and the long term—then our assessment models must be similarly designed to assess system performance. Ironically, as we have become better able to measure clinical activities, and as our focus on accountability has imposed requirements for more measurements, the result has actually been to shift focus away from the performance of the system to the delivery of individual services. Moreover, multiple, often incompatible approaches to measuring delivery of the same service, have further complicated the issue. Across clinical care, thousands of individual measures are collected to measure results on hundreds of clinical conditions, and without harmonization the opportunities for reliable cross-institutional or system-wide lessons are highly limited. On the grounds that a small set of standardized and harmonized core measures, aimed at system performance should be collected at every level—national, state, communal, and, as indicated, institutional—the Institute of Medicine's recent report, Vital Signs, recommends such core set. It proposes just 15 core and composite measures of health, health care, costs, and engagement, including measures such as high school graduation rate, teen pregnancy rate, and obesity. Additional refinement remains for practical implementation of the 15 measures at all levels, but, again, this is a feasible potential tool to shift attention and action to broader and more effective system interfaces and performance. We need vital signs to assess and direct progress toward our vital directions.

Vital Direction: *Speed development of a universally accessible and interoperable digital health platform.* The most basic element defining a system is the network of nodes important to a functional objective—improving health for a defined population—and basic to the effectiveness of the system's operation is the timeliness and reliability of information flow among those nodes. In a substantial departure from the historical limits, we now have the practical possibility of virtually instantaneous communication among the stakeholders. The barriers that exist to achieving that possibility are formidable, but they are not technically prohibitive. Agreeing to standards for interoperability, assuring their system-wide application, working out use and privacy protocols, ensuring interface and personal access capacities for individuals, embedding analytic tools for continuous learning, these are all feasible and their accomplishment would establish the infrastructure for transformative multi-system, multi-sectoral, initiatives enabling life course oriented strategies for health improvement. With our rapidly accelerating capacity for real-time linkage and learning, we have in place the potential to establish and grow a continuously learning and improving health system.

Vital Direction: *Foster awareness and action on a community culture of continuous health improvement.* Ultimately, transformative changes in health and health care require transformative leadership and action at the community level. Effective integration, application, and assessment of multi-sector and multi-domain strategies to mobilize the clinical, social service, educational, voluntary, commercial and related stakeholders—to mobilize the citizenry—on behalf better health for all, requires leadership to catalyze the emergence of the community-wide vision of the possible. It takes a culture change on many dimensions, away from one that is focused on the narrow and proximate, to one inspired by what is feasible to achieve, and how to achieve it, for the issue that ultimately matters most to people: their health, the health of their families and the health of their neighbors. This is the aim, for example, of the Culture of Health movement envisioned by the Robert Wood Johnson Foundation (94). Building on what has already been demonstrated on the ability to use a well-developed digital platform to improve services and linkages and to accelerate knowledge and evidence development, as well as what has been accomplished by continuous improvement initiatives in health care and elsewhere, the beginnings of a move toward a community culture of continuous health improvement are also in place. Using provisions of the community benefit requirements in the tax code that compel the many non-profit health care organizations to assess and work toward meeting community needs,

tools are available for community leaders to mobilize support and movement toward a transformative community health culture.

Conclusion

Especially given the considerable resources available and used in the American health care system, we are substantially underperforming. On the other hand, compelling and actionable knowledge is now available about the ways in which health is shaped from its very beginning by factors outside the health system, as well as how engaging those factors more effectively can improve health prospects over a lifetime. With the tools available and the prospect of reinforcing leadership, technical assistance, and policy initiative from the national, state, and private sectors, the possibility should be at hand for better health prospects at the start of life, throughout its course, and at its conclusion. By aligning financial incentives, by employing measures that drive attention and accountability to where it matters most, by taking advantage of the potentially stunning power of the emerging digital platform, and by determined efforts to strengthen community capacity to catalyze necessary changes in community culture and priority, substantial advances in health, health care, and health equity is attainable for Americans.

Summary Recommendations for Vital Directions

1. Shift health care payments to financing that rewards system-wide health improvement.
2. Initiate multi-level standardized measurement of system performance on core health indices.
3. Speed development of a universally accessible and interoperable digital health platform.
4. Foster awareness and action on a community culture of continuous health improvement.

References

1.Institute of Medicine. 2014. U.S. Health in International Perspective: Shorter Lives, Poorer Health. Washington, DC: The National Academies Press. doi:10.17226/13497.

2.Pearcy, J. N., and K. G. Keppel. 2002. A summary measure of health disparity. Public Health Reports. 117(3):273-280.

3.World Health Organization (WHO). 2001. The World Health Report 2000: Health Systems: Improving Performance. Public Health Reports 116(3):268-269.

4.Davis, K., K. Stremikis, C. Schoen, and D. Squires. 2014. Mirror, Mirror on the Wall, 2014 Update: How the U.S. Health Care System Compares Internationally. The Commonwealth Fund.

5.Squires, D., and C. Anderson. 2015. U.S. Health Care from a Global Perspective: Spending, Use of Services, Prices, and Health in 13 Countries. The Commonwealth Fund.

6.Murray, C. 2013. The State of US Health, 1990-2010: Burden of Diseases, Injuries, and Risk Factors. Journal of the American Medical Association. 310(6):591-606.

7.Halfon, N. and M. Hochstein. 2002. Life course health development: an integrated framework for developing health, policy, and research. Milbank Quarterly 80(3): 433-479.

8.Emanuel, E., N. Tanden, S. Altman, S. Armstrong, D. Berwick, F. deBrantes, M. Calsyn, M. Chernew, J. Colmers, D. Cutler, T. Daschle, P. Egerman, B. Kocher, A. Milstein, E.O. Lee, J.D. Podesta, U. Reinhardt, M. Rosenthal, J. Sharfstein, S. Shortell, A. Stern, P.R. Orszag, and T. Spiro. 2012. A Systemic Approach to Containing Health Care Spending. New England Journal of Medicine.

9.World Health Organization. 2011. Newborn Death and Illness.

10.Centers for Disease Control and Prevention: Infant Mortality. Page last updated: 01/12/2016.

11.Centers for Disease Control and Prevention. 2014. National Center for Health Statistics: Leading Causes of Death.

12.Consumer Federation of America. 2013. Child Poverty, Unintentional Injuries and Foodborne Illnesses: Are Low-Income Children at Risk?

13.Centers for Disease Control and Prevention. 2006. Report: Injury–A Risk at Any Stage of Life.

14.Xu J. Q., S.L. Murphy, K. D. Kochanek, and B. A. Bastian. 2016. Deaths: Final Data for 2013. National Vital statistics Reports.64 (2):1. Hyattsville, MD: National Center for Health Statistics.

15.Fineberg, H.V. 2013. The State of Health in the United States. JAMA. 310(6):585-586.

16.Child Witness to Violence Project-fact sheet. Retrieved online:http://www.childwitnesstoviolence.org/facts--myths.html

17.Child Trends. 2016. Children's Exposure to Violence. Retrieved online: http://www.childtrends.org/?indicators=childrens-exposure-to-violence

18.Institute of Medicine. 2014. New directions in child abuse and neglect research. Washington, DC: The National Academies Press.

19.Wight,V., M. Chau, Y. Aratani. January 2010. Who are America's Poor Children? The Official Story. January 2010. National Center for Children in Poverty. Columbia University.

20.Child Maltreatment. 2015. Forum on Child and Family Statistics. Retrieved online: http://www.childstats.gov/americaschildren/family7.asp

21.Centers for Disease Control and Prevention. 2014. National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States. Atlanta, GA: U.S. Department of Health and Human Services.

22.Center for Behavioral Health Statistics and Quality. 2015. Behavioral health trends in the United States: Results from the 2014 National Survey on Drug Use and Health (HHS Publication No. SMA 15-4927, NSDUH Series H-50). Substance Abuse and Mental Health Services Administration.

23.Wise, P. H.. 2016. Child poverty and the promise of human capacity: childhood as a foundation for healthy aging. Academic pediatrics; 16(3):S37-45.

24.Essex M. J., T. Boyce, C. Hertzman, L. L. Lam, J. M. Armstrong, S. Neumann, and M. S. Kobor. 2013. Epigenetic vestiges of early developmental adversity: childhood stress exposure and DNA methylation in adolescence. Child development;84(1):58-75.

25.Boyce W. T., M. B. Sokolowski, and G. E. Robinson. 2012. Toward a new biology of social adversity. Proceedings of the National Academy of Sciences;109(Supplement 2):17143-8

26.Gawande, A. 2016. Quantity and Quality of Life: Duties of Care in Life-Limiting Illness. JAMA. 315(3):267-269

27.Gordon, L., A. Diaz, C. Soghomonian, A. Nucci-Sack, J. Weiss, H. Strickler, R. Burk, N. Schlecht, and C. Ochner. 2016. Increased Body Mass Index Associated with Increased Risky Sexual Behaviors. Journal of Pediatric Adolescent Gynecoogly. 29(1):42-7.

28.Blum, R. W., and F. Qureshi. 2011. Morbidity and Mortality among Adolescents and Young Adults in the United States: AstraZeneca Fact Sheet.

29.Rudd, R. A., N. Aleshire, J. E. Zibbell, and R. M. Gladden. 2015. Increases in Drug and Opioid Overdose Deaths — United States, 2000–2014. Morbidity and Mortality Weekly Report. 64.50-51 (2016): 1378-382.

30.Newsletter of the Office of National Drug Control Policy. 2010. PsycEXTRA Dataset 1.2: Executive Office of the President.

31.Tanielian, T., and L. H. Jaycox. 2008. Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery. RAND Center for Military Health Policy Report.

32.Centers for Disease Control and Prevention. 2013. The State of Aging and Health in America 2013. Atlanta,GA: Centers for Disease Control and Prevention, U.S. Dept. of Health and Human Services.

33.U.S. Department of Health and Human Services. 2010. Multiple Chronic Conditions—A Strategic Framework: Optimum Health and Quality of Life for Individuals with Multiple Chronic Conditions.

34.Alzheimer's Association. 2015 Alzheimer's Disease Facts and Figures. Alzheimer's & Dementia 2015;11(3)332

35.Reichman, N. E. 2005. Disparities in Low Birth Weight by Race, Ethnicity, and Nativity. School Readiness: Closing Racial and Ethnic Gaps. 15(1).

36.Collins, J. W., R. J. David, A. Handler, S. Wall, and S. Andes. 2004. Very Low Birthweight in African American Infants: The Role of Maternal Exposure to Interpersonal Racial Discrimination. American Journal of Public Health. 94(12): 2132–2138.

37.Braveman, P. 2008. Perspective: Racial Disparities at Birth: The Puzzle Persists. Issues in Science and Technology. 24(2).

38.Centers for Disease Control and Prevention – Asthma Fact Sheet.

39.Anderson, S. E., and R. C. Whitaker. 2009. Prevalence of Obesity Among US Preschool Children in Different Racial and Ethnic Groups. Arch pediatr Adolesc Med. 163(4):344-8.

40.Skinner, A.C., and J. Skelton. 2014. Prevalence and Trends in Obesity and Severe Obesity Among Children in the United States, 1999-2012. JAMA Pediatrics. 168(6):561-566.

41.Freedman, D. S., W. H. Dietz, S. R. Srinivasan, and G. S. Berenson. 2009. Risk Factors and Adult Body Mass Index Among Overweight Children: The Bogalusa Heart Study. Pediatrics. 123(3):750-7

42.Mozaffarian, D, E. J. Benjamin, A. S. Go, D. K. Arnett, M. J. Blaha, M. Cushman, S. de Ferranti, J. P. Després, H. J. Fullerton, V. J. Howard, M. D. Huffman, S. E. Judd, B. M. Kissela, D. T. Lackland, J. H. Lichtman, L. D. Lisabeth, S. Liu, R. H. Mackey, D. B. Matchar, D. K. McGuire, E. R. Mohler, C. S. Moy, P. Muntner, M. E. Mussolino, K. Nasir, R. W. Neumar, G. Nichol, L. Palaniappan, D. K. Pandey, M. J. Reeves, C. J. Rodriguez, P. D. Sorlie, J. Stein, A. Towfighi, T. N. Turan, S. S. Virani, J. Z. Willey, D. Woo, R. W. Yeh, M. B. Turner MB, and the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. 2015. Heart disease and stroke statistics—2015 update: a report from the American Heart Association. Circulation. e29-322.

43.American Cancer Society. 2016. Cancer Facts & Figures for African Americans 2016-2018. Atlanta: American Cancer Society

44.Alzheimer's Association. 2002. Report: African Americans and Alzheimer's Disease: The Silent Epidemic.

45.Centers for Disease Control and Prevention. 2011. QuickStats: Life Expectancy at Birth, by Sex and Race/Ethnicity — United States.

46.McGinnis, J. M., P. Williams-Russo, and J. R. Knickman. 2002. The Case For More Active Policy Attention To Health Promotion. Health Affairs. 21(2)..

47.Halfon, N, K. Larson, M. Lu, E. Tullis, and S. Russ. 2014. Lifecourse Health Development: Past, Present and Future. Journal of Maternal and Child Health. 18(2):344-365

48.Lu, M. C. 2010. We can do better: improving perinatal health in America. Journal of Women's Health. 19(3):569-74

49.Mokdad, A.H., J.S. Marks, D.F. Stroup, and J.L. Gerberding. 2004. Actual Causes of Death in the United States, 2000. JAMA. 291(10):1238-1245.
50.McGinnis, J.M., and W.H. Foege. 1993. Actual causes of death in the United States. JAMA. 270(18):2207-2012.
51.Centers for Disease Control and Prevention. 2014. Press Release: Up to 40 percent of annual deaths from each of five leading US causes are preventable. http://www.cdc.gov/media/releases/2014/p0501-preventable-deaths.html
52.World Bank. 2015. Adolescent fertility rate (births per 1,000 women ages 15-19) from 2011-2015. http://data.worldbank.org/indicator/SP.ADO.TFRT (Accessed July 9, 2016).
53.Mosher, W. D., J. Jones, and J. C. Abma. 2012. Intended and unintended births in the United States: 1982 – 2010. National Health Statistics Reports (55):1-28.
54.Centers for Disease Control and Prevention. 2011. Vital signs: Current cigarette smoking among adults aged > 18 years – United States, 2009-2012. Morbidity and Mortality Weekly Report 60(35):1207 – 1212. Atlanta, GA: CDC.
55.Halfon, N., K. Larson, and S. Russ. 2010. Why Social Determinants. Healthcare Quarterly 14(1):1-8.
56.Braveman, P, S. Egerter, and D. R. Williams. 2011. The Social Determinants of Health: Coming of Age. Annual Review of Public Health. 32:381–98.
57.Hummer, R. A., and E.M. Hernandez. 2013. The Effect of Educational Attainment on Adult Mortality in the United States. Population Bulletin 68(1): 1–16.
58.Zheng, H.. 2012. Do people die from income inequality of a decade ago?. Social Science & Medicine 75(1);36-45.
59.Addy, S., and V.R. Wright. 2012. Basic Facts about Low-income Children, 2010: Children Under 18. New York: National Center for Children in Poverty, Columbia University.
60.Chetty, R., M. Stepner, S. Abraham, S. Lin, B. Scuderi, N. Turner, A. Bergeron, and D. Cutler. 2016. The Association Between Income and Life Expectancy in the United States, 2001-2004. Journal of the American Medical Association 315(16):1750-1766.
61.Lu, M.C. 2010. We can do better: improving perinatal health in America. Journal of Women's Health 19(3): 569-574.
62.McEwen, B.S. 1998. Protective and damaging effects of stress mediators. New England Journal of Medicine 338(3):171–179.
63.Arias, E. 2016. Changes in life expectancy by race and Hispanic origin in the United States, 2013–2014. NCHS data brief, no 244. Hyattsville, MD: National Center for Health Statistics.
64.Frist, B. 2015. Where Health and Environment Converge. 15 April 2015. Forbes. http://www.forbes.com/sites/billfrist/2015/04/15/where-health-and-environment-converge (accessed July 8, 2016).
65.Berwick D.M., T.W. Nolan, and J. Whittington. 2008. The Triple Aim: Care, Health, And Cost. Health Affairs. 27(3):759-769. doi: 10.1377/hlthaff.27.3.759.
66.Daschle, T., P. Domenici, B. Frist, and A. Rivlin. 2013. Prescription for Patient-Centered Care and Cost Containment. New England Journal of Medicine 369(5): 471-474.
67.Health Policy Brief: Care Transitions. 2012. Health Affairs. http://www.healthaffairs.org/ (accessed July 8, 2016)
68.Kasper, E.K., G. Gerstenblith, and G. Hefter. 2002. A Randomized Trial of the Efficacy of Multidisciplinary Care in Heart Failure Outpatients at High Risk of Hospital Readmission. Journal of the American College of Cardiology 39(3):471-480.
69.Hernandez, A. F. 2010. Relationship Between Early Physician Follow-up and 30-Day Readmission Among Medicare Beneficiaries Hospitalized for Heart Failure. Journal of the American Medical Association.
70.Hines, A. L., M. L. Barrett, H. J. Jiang, and C. A. Steiner. 2011. Conditions With the Largest Number of Adult Hospital Readmissions by Payer. AHRQ Statistical Brief.
71.Loeppke, R., M. Taitel, V. Haufle, T. Parry, R. C. Kessler, and K. Jinnett. 2009. Health and Productivity as a Business Strategy: A Multiemployer Study. Journal of Occupational and Environmental Medicine. 51(4) 411-28.
72.Institute of Medicine. 2010. The Healthcare Imperative: Lowering Costs and Improving Outcomes. Workshop Series Summary.
73.Berwick, D.M., and A.D. Hackbarth. 2012. Eliminating Waste in US Health Care. JAMA. 307(14):1513-1516.

74.Parker, G., M. Van Alstyne, and S. Choudary. 2016. Platform Revolution. W.W. New York, NY: Norton & Company.
75.Diaz, A, and N. Manigat. 1999. The Health Care Provider's Role in the Disclosure of Sexual Abuse: The Medical Interview as the Gateway to Disclosure. Children's Health Care. 28(2).
76.Margolis, P. A., L. E. Peterson, and M. Seid. 2013. Collaborative Chronic Care Networks (C3Ns) to transform chronic illness care. Pediatrics 1;131(Supplement 4):S219-23
77.Forrest C. B., P. Margolis, M. Seid, and R. B. Colletti. 2014. PEDSnet: how a prototype pediatric learning health system is being expanded into a national network. Health Affairs 33(7):1171-7.
78.Fineberg, H. V. 2012. From shared decision making to patient-centered decision making. Israel Journal of Health Policy Research.1:6.
79.Frist, B. 2014. Connected Health And The Rise Of The Patient-Consumer. Health Affairs.
80.Gawande, A. 2014. The Hot Spotters. The New Yorke
81.Green, S. R., V. Singh, and W. O'Byrne. 2010. Hope for New Jersey's City Hospitals: The Camden Initiative. Perspectives in Health Information Management. 7(1).
82.Garg, A., M. Marino, A. R. Vikani, and B. Solomon. 2012. Addressing Families' Unmet Social Needs Within Pediatric Primary Care: The Health Leads Model. Clinical Pediatrics. 51: 1191-1193.
83.Meyer, H. A New Care Paradigm Slashes Hospital Use and Nursing Home Stays for the Elderly and the Physically and Mentally Disabled. Health Affairs. 30(3): 412-415.
84.Institute of Medicine. 2006. Food Marketing to Children and Youth: Threat or Opportunity? Washington, DC: The National Academies Press.
85.Lavizzo-Mourey, R. and J. M. McGinnis. 2003. Making the Case for Active Living Communities. American Journal of Public Health. 93(9):1386-1388
86.Inkelas, M., and P. Bowie. 2014. The Magnolia Community Initiative: The Importance of Measurement in Improving Community Well-Being. Community Investments 26(01):18-24.
87.Fineberg, H. V. 2012. A Successful and Sustainable Health System — How to Get There from Here. New England Journal of Medicine. 366(11):1020-7.
88.Halfon N., P. Long, D. I. Chang, J. Hester, M. Inkelas, and A. Rodgers. 2014. Applying a 3.0 transformation framework to guide large-scale health system reform. Health Affairs 33(11):2003-11
89.Frist, B. and T. Daschle. 2015. Advancing Transparency in Healthcare: A Call to Action. The Hill.
90.Daschle, T. 2009. Moving the Focus from Illness to Wellness. Medical Laboratory Observatory.
91.Lavizzo-Mourey, R. Halfway There? Health Reform Starts Now. Journal of the American Medical Association. 315(13):1335-6
92.Daschle, T., P. Domenici, B. Frist, and A. Rivlin. 2013. How to Build a Better Health-Care System. The Washington Post.
93.Berwick D. M. 2016. Era 3 for Medicine and Health Care. Journal of the American Medical Association. 315(13):1329-1330.
94.Lavizzo-Mourey, R. Why We Need To Build a Culture of Health In The United States. Acad Med. 90(7):846-8.

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