

Population Health as a Means for Health Care Organizations to Deliver Value

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Poor population-level health outcomes relative to other advanced countries, rising health care costs, the increasing prevalence of chronic disease, persisting health care disparities and access issues, and the aging population drive an urgent need for change in the US health care system to simultaneously improve health and reduce costs.¹⁻³ This imperative emerges during a time of increasing awareness of the major impact of environmental and social factors on health relative to health care, a time of expanding health data resources and health information technologies, and a time of substantial opportunity for health care reform through the Affordable Care Act.⁴⁻⁷ Convergence of these trends and opportunities creates unprecedented potential for transforming health care delivery in the United States and affecting sustainable advances in population health. The US Department of Health and Human Services, recognizing this potential, has called for an intensification of efforts around health care reform focused on value-based payment models, integrated team-based models of care, and increased attention by health care providers to population health.⁸

Transforming Health Care to Deliver Value

Improving value for patients lies at the heart of health care transformation, where value is defined in terms of outcomes that matter to patients relative to the cost of achieving those outcomes. Accordingly, improving value requires improving outcomes without a corresponding increase in costs or, alternatively, reducing costs without a corresponding sacrifice in outcomes. Pursuit of value in health care requires, in part, a restructuring of care delivery and relevant changes in measurement of outcomes that matter to patients. The call for a new focus on value in health care that attends to access to care, quality of care, quality of life, length of life, patient satisfaction, cost of care, and the distribution of those

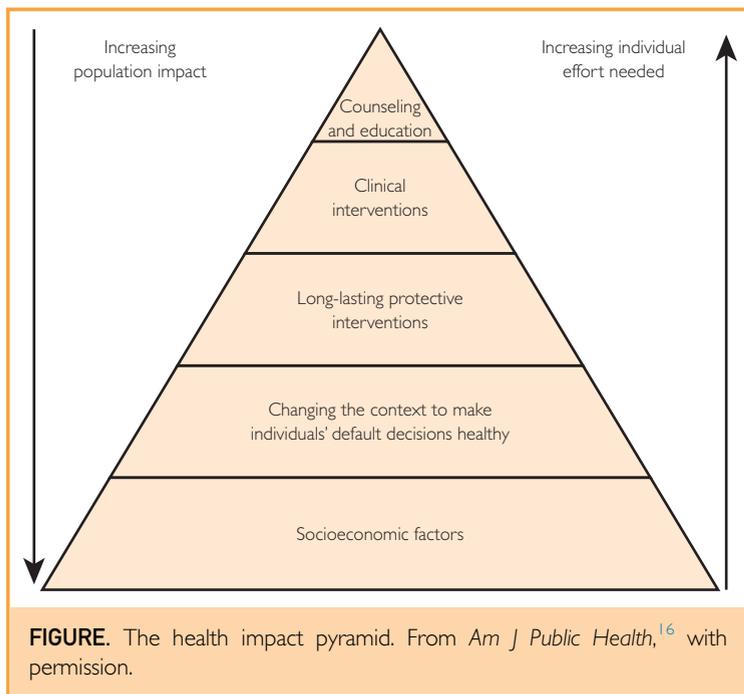
outcomes in the population points to a need to shift from paying for the volume of services delivered to paying for the outcomes delivered.⁹ As we move toward such financial incentives, health care organizations should seek to discard services that have no beneficial effect on outcomes and to deliver services that offer benefits more efficiently and, therefore, less expensively. Health care organizations should also work with community partners to achieve positive effects on the nonclinical determinants of health that will enhance the value of the services they directly provide and the outcomes to which they may be held accountable.^{10,11} Furthermore, and more to the point of this commentary, health care organizations should also seek to replace beneficial but problematic (too expensive, too inefficient) services with alternative interventions that deliver outcomes at less cost or with higher efficiency. While acknowledging that much of the work of population health improvement lies outside of the health care sector, we argue that health care organizations can deliver value through population health interventions. In this commentary we describe examples wherein health care organizations can successfully adopt population health approaches across the prevention continuum to improve population health.

Population Health Approaches to Health

As described by the Canadian Institutes of Health Research, "Population health interventions are policies, programs and resource distribution approaches that impact a number of people by changing the underlying conditions of risk and reducing health inequities."¹² Examples of population health interventions include immunization programs, population screening programs (eg, colonoscopy), housing and transportation policies that support healthy behavior, and taxes and laws that reduce unhealthy behavior (eg, smoking bans). Although population health, of course, includes policy-level and community-



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based efforts—such as fluoridation of public water and iodization of salt—it also includes interventions that can be pursued by health care organizations independently or in cooperation with relevant stakeholders. Population health interventions may be arrayed across the determinants of health: clinical care, health behaviors, socioeconomic factors, and environmental factors. Indeed, solutions to the pressing public health issues in the United States, including the obesity epidemic, substance abuse issues, and continued use of tobacco, will require ongoing multisectorial engagement. Health care organizations have an important role to play in addressing these issues. The focus of this commentary is on the ways in which health care organizations can pursue population health approaches across the prevention continuum to improve population health.

Health care organizations pursue these efforts through a sense of responsibility to all their patients, sometimes referred to as their *populations of empaneled patients*. Health care organizations, sometimes in partnership with others in the community, address the broader determinants of health. These population health interventions complement individual interactions during traditional clinical

encounters. It is these population health interventions that we consider in this commentary regarding health care value.

It is recognized that with traditional roles of health care and typical encounter-based care, traditional clinical services account for 20% of a population's health.¹³ To improve the value of the care delivered, health care organizations must expand in vision, reach, and practice to affect health through population health interventions. Not all population health interventions will take place at the policy, government, or regional level. Some will, instead, require practitioners and health care organizations to take a broader and more proactive approach to the practice across panels or populations of patients and in partnership with community organizations.^{14,15} We reviewed examples of well-studied population health interventions conducted by health care organizations whose documented value—patient outcomes relative to total cost—justifies their broader implementation.

The Health Impact Pyramid: A Framework for Population Health Primary Care

Thomas Frieden, director of the Centers for Disease Control and Prevention, introduced a conceptual framework, the health impact pyramid, that organizes health interventions across the prevention continuum into 5 categories (Figure).¹⁶ He offered this pyramid to correct previous conceptualizations that tended to emphasize aspects of traditional clinical health services and ignore most of the known population health determinants. In this pyramid, the base represents interventions that have the greatest population health impact and require the least individual effort. Forming this base are improvements to the socioeconomic factors or social determinants of health. As one moves up the pyramid, the impact to population health decreases and individual effort increases. The next level includes changes in the environmental context to make the individual's default choice the healthy choice. The middle level includes long-lasting protective interventions, such as immunizations. The second-to-the-top level includes traditional encounter-based clinical interventions. At the top of the pyramid, Frieden placed individual counseling and education, representing interventions that have the least impact on population health and the greatest requirement for individual effort. In this commentary, we

use the health impact pyramid to organize our discussion of the potential for clinically based population health efforts, and we provide examples of clinically based population health interventions that have a strong evidence base for delivering value.

Counseling and Education. The top of the pyramid represents the most challenging work-space for population health scientists and managers. For example, Wake and Lycett¹⁷ point out the opportunity costs of persistent study of futile population-based educational and motivational efforts with childhood obesity. They contend that the misinterpretation of these study results, as well as the persistence of schools and public health departments in implementing futile interventions, will preclude the implementation of more effective measures to improve population health.¹⁷ Nonetheless, some clinically based population health interventions focused on counseling and education have demonstrated cost-effectiveness (eg, smoking cessation counseling, weight reduction counseling, and active living education). For example, Solberg et al¹⁸ report from their literature review that repeated clinical tobacco cessation counseling is one of the most important and cost-effective preventive services that can be provided in medical practice. Clinic-based population health measures, such as preemptive education of parents on the use of topical otic analgesics, do, indeed, work to reduce health care utilization and, thus, cost of care.¹⁹

Clinical Interventions. Second from the top of the pyramid are those ongoing clinical interventions aimed at prevention, early detection, and disease management (eg, primary, secondary, and tertiary prevention). These often are conducted at clinical encounters scheduled by the patient for health maintenance (eg, lipid panel screening and blood pressure measurement) but can be extended to encounters originally scheduled for other types of care. Community-wide programs include school district programs that provide for the identification of children who would benefit from early educational interventions and the early interventions themselves. Clinical practices can and do conduct developmental screening to identify children for such programs as well as other encounter-based programs to prevent disease, detect disease

early, or engage patients in disease management. The Advisory Committee on Immunization Practices enjoins clinicians to use every clinical encounter to assess immunizations.²⁰ Li et al²¹ reported a systematic review of the cost-effectiveness of interventions to prevent and control diabetes mellitus. They identified 2 such interventions that the investigation found to be “very cost-effective,” defined as costing \$25,000 or less per life-year gained or quality-adjusted life-year. The first was universal opportunistic screening for undiagnosed type 2 diabetes in African American people aged 45 to 54 years, and the second was annual screening for diabetic retinopathy and ensuing treatment in persons with type 1 or 2 diabetes.

Long-lasting Protective Interventions. Long-lasting protective interventions form the middle layer of the pyramid (eg, human papillomavirus vaccination, influenza vaccination, and fluoride varnish). State-run programs of newborn screening for rare metabolic diseases and school and day care rules requiring routine childhood immunizations serve as great community examples of primary prevention at this level, as do school-located immunization clinics and hospital programs that support newborn vitamin K administration. These interventions are one-time or relatively infrequent interventions that do not require ongoing effort. Colorectal cancer screening is often given as an example of a long-lasting protective secondary prevention intervention, given the 10-year screening interval and the protective effects of polyp removal.¹⁶ Maciosek et al²² demonstrated the cost-effectiveness of colorectal cancer screening. Through a secondary analysis, they showed that if a birth cohort of 4 million individuals received colorectal screening at the recommended intervals, 31,500 deaths would be prevented and 338,000 years of life would be gained over the lifetime of the birth cohort.

Changing the Context to Make Individuals’ Default Decisions Healthy. The next level in the health impact pyramid includes “...interventions that change the environmental context to make healthy options the default choice, regardless of education, income, service provision, or other societal factors.”^{16,p691} Examples may include creating systems for standing orders for preventive screenings,

reminder recall systems for preventive care, and school-located immunization programs. Communities can improve health through the built environment that facilitates walking and cycling through safer streets and neighborhoods and by tax codes and zoning rules that promote food availability and reduce the size and impact of inadvertent food deserts. Community-based organizations, including not-for-profit food shelf programs, schools, and even commercial restaurants, can reduce the availability of foods that facilitate unhealthy nutritional choices while adding and expanding offerings that support healthier eating options. Similarly, others have found cost-effective ways to offer interventions in places more convenient to the patient—such as the workplace—in ways that change the cultural norms regarding those interventions. For example, there is mounting evidence supporting the clinical impact and cost-effectiveness of workplace health promotion and disease management programs.²³ Regarding clinically based population health interventions, Campbell and Rumley²⁴ report significant cost-effectiveness in delivering influenza vaccines in the workplace in their study of 6 North Carolina textile plants. The companies saved \$2.58 for every dollar spent on the employee vaccination program through the reduction in lost workdays.

Socioeconomic Factors. In Frieden's pyramid, interventions with the greatest impact on population health and the least individual effort form the base, including improvements to socioeconomic factors or social determinants of health. Examples include society-wide efforts to reduce the impact of poverty on health equity and measures to reduce poverty directly through improved pay, employment benefits, expanded job opportunities, and expanded efforts to support education and training. Communities can make major contributions here through efforts to raise household incomes, improve transportation options, and address affordable housing. Community-based organizations can work locally to provide assistance in housing, day care, and financial planning. Health care organizations can also address socioeconomic factors. Of course, health care organizations can work to create more affordable access and more efficient utilization. Less traditional clinically based population health approaches include concerted efforts to improve literacy and address

food insufficiency. Pediatric and family medicine practices across the country have adopted programs such as Reach Out and Read.²⁵ Federally qualified health centers collocate with the Women, Infant, and Children's (WIC) nutritional supplementation program. Studies demonstrate their cost-effectiveness. For example, rather than practice in isolation or attempt to expand clinical services on site, Margolis et al²⁶ used an approach, based on systems theory, to integrate the care delivered in various settings, including the home, primary care, and other community health and social services. The intervention, involving 8 clinical practices collaborating with community organizations, included intensive home visiting, office practice education for clinicians, and community organization collaborations. The investigators demonstrated, in this population of low-income mothers and their children, outcomes that included reductions in poverty as reflected by reduced durations of mothers and their children receiving Aid to Families With Dependent Children benefits and reduced numbers of mothers receiving WIC and food stamps at 12 months.

Limits to Health Care Organization–Based Population Health Interventions

In their review of various approaches to assigning the magnitude of the impacts of measurable and modifiable determinants of population health, Booske et al²⁷ concluded that clinical services account for only 20% of health. The other 80% is attributed to health behaviors (30%), social and economic factors (40%), and the physical environment (10%). Although the limited impact of current clinical services does not prevent expansion of health care organizations' effect on health, health care organizations cannot make major improvements in their population's health by merely providing current clinical services. Health care organizations must instead expand their scope of care to improve health behaviors with an appreciation for the social and economic factors and the physical environments that influence the health of patient populations.²⁸ New models for collective interventions that include health care, community organizations, businesses, education, public health, government policy makers, and others are being discussed and developed.²⁹ Indeed, community health centers have led the way in this regard, putting in place many of the interventions

available to health care organizations to address population health concerns through dedication to an expanded scope and mission.³⁰

Other limitations exist in addition to scope and mission. Hemming et al^{31,p1058} write, “In many settings, particularly in the area of (service delivery interventions), service providers often implement new interventions without full evidence of effectiveness.” In their commentary, they note the persisting reluctance to conduct randomized clinical trials of service delivery interventions while asserting that these interventions still require scientific investigation to provide valid, reliable, and generalizable evidence. As Wake and Lycett¹⁷ comment, not all rational interventions are successful in practice. They themselves noted that their 3 randomized clinical trials did not report substantive effects on childhood obesity with various iterations of population-based interventions to educate and motivate in school settings. The interventions had face validity, but the data they generated from their studies did not substantiate their study hypotheses. Depending on the nature of the intervention and how it would be implemented, its study may require novel methods of conducting studies of comparative effectiveness, such as cluster randomized trials and stepped wedge trials.^{31,32} Furthermore, not all evidence-supported interventions are successfully demonstrated despite the expense and size of the randomized trial. The Multiple Risk Factor Intervention Trial remains a compelling example of contamination of the control group.³³ The large, randomized, albeit unblinded, trial of nearly 13,000 individuals did not find a difference between those who were randomized to receive the intervention and those who were not. The intervention consisted of a variety of risk-reducing measures, including smoking cessation, blood pressure control, cholesterol reduction, and dietary restrictions. The interventions were well-known to the control group and their clinicians, and it seemed that a substantial number of the control group adopted the intervention measures on their own through the aid of their clinicians because their risk reduction was better than expected. Many believe that this contamination resulted in failure of the trial to demonstrate the intervention’s effectiveness. Finally, population health interventions often depend on either limited public health finances or novel, and thus

uncertain, finance mechanisms.³⁴ Experts raised such concerns about the adequacy of the additional payments provided by the Minnesota Health Care Homes initiative, which sought to support care management between patient encounters for government-insured patients who had medically complex conditions.³⁵ Despite the concerns, however, during the study period (2010-2012), Medicaid enrollees in Minnesota health care homes had 9.2% lower costs than those in non-health care home clinics.³⁶

Conclusion

To improve their position with the value equation, health care organizations should continuously pursue practice improvement efforts to identify waste, harvest returns through value payment methods, and work toward redirecting funds to support population health approaches. We assert that such practice improvement efforts ought to be continually pursued with an eye toward improving the health of populations. Several clinically based population health interventions across the prevention continuum already exist, but we should conduct well-designed, generalizable studies of sufficient sample size to test the effectiveness of other promising interventions. Furthermore, we need to find mechanisms to fund and implement such interventions in practice. This will require increased attention to and funding for health care delivery science, particularly the science of dissemination and implementation. The opportunities for success exist; however, careful consideration of the evidence as well as its application must guide the shift from encounter-based care to population-based care. Last, health care organizations should consider how they will work in their communities to improve the value equation for their patients by increasing health in the community and in partnership with others.

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