

## VIEWPOINT

# New Opportunities in the Changing Landscape of Prevention

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**The focus of medical research** has historically been on curative medicine, yielding better drugs, medical devices, and clinical procedures. Prevention science—the systematic application of scientific methods to the causes and prevention of diseases in populations—has yet to receive the necessary investment and support required to reduce the growing burden of largely preventable noncommunicable diseases (NCDs).<sup>1</sup>

## Human and Economic Burdens of Disease

Recent assessments of the burden of risk and disease found that morbidity and chronic disability account for nearly half of the US health burden.<sup>2</sup> Despite the largest per capita health expenditure of all industrialized nations, the United States has fallen behind peer countries in terms of improvements in population health.<sup>3</sup> Americans reach age 50 with a less favorable cardiovascular risk profile, lung disease is more prevalent and associated with higher mortality, and the death rate from heart disease is the second highest among peer countries. Leading NCD risk factors are unhealthy diets, tobacco smoking, high body mass index, high blood pressure, high fasting plasma glucose levels, physical

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inactivity, and alcohol use.<sup>2</sup> Many of these risks are amenable to preventive interventions based on behavior change, yet comprehensive action by development sectors across the economy to disseminate evidence-based interventions targeting these modifiable risks is inadequate.<sup>4</sup> Furthermore, knowledge about effective prevention interventions for mental illness and musculoskeletal diseases is limited even as their contribution to chronic disability increases.<sup>2</sup>

Noncommunicable diseases have been cited as major contributors to rising health care costs, which the Congressional Budget Office (CBO) projects will be the primary driver of national debt over the next 4 decades.<sup>5</sup> The greatest increase in health care spending between 2000 and 2011 was attributable to drugs, medical devices, and hospital care, with the cost of treating NCDs estimated to exceed 80% of annual health care expenditure, whereas 3% was spent on public health and disease prevention

programs.<sup>6</sup> The National Institutes of Health estimates that 20% of its \$30 billion annual budget is allocated to prevention; however, less than 10% is spent on human behavioral interventions that target the major modifiable risk factors.<sup>7</sup> More investment in prevention science could lead to greater health gains at lower cost.

Low levels of investment in prevention research and development represent a missed opportunity to further scientific knowledge and improve population health. It results in fewer career opportunities for prevention scientists and less research output on the cost-effectiveness of disease prevention compared with new treatments and drug therapies. This lack of evidence about the effectiveness of prevention has led the CBO to question its value, with far-reaching consequences to federal funding decisions. The dominant voices within many sectors of medicine call for better treatments at the expense of greater knowledge and implementation of effective prevention and health promotion strategies.

## Trends Supporting Prevention

However, this state of affairs may be changing as a result of developments within the government, the academic research community, and the private sector.

The NIH Office of Disease Prevention (NIH-ODP) has developed a Strategic Plan 2014-2018 identifying 6 priorities to increase the scope, quality, and effect of prevention research, including identifying current research gaps and promoting the wider use of evidence-based interventions through increased funding for implementation and dissemination research.

The Affordable Care Act (ACA) provides several new areas of support for prevention that will require the use of better prevention science and evidence. The National Prevention Strategy is mandated to work throughout the federal government (including non-health agencies) to present evidence-based findings and recommendations about preventive services, programs, and policies. The Prevention and Public Health Fund has allocated program grants to states for the prevention of diabetes, heart disease, and stroke as well as funding science-based workplace wellness programs, obesity research, and efforts to address tobacco use and health disparities related to chronic diseases and risk factors. The ACA also mandated the Patient-Centered Outcomes Research Institute (PCORI), which is expected to receive an estimated \$3.5 billion to fund patient-centered outcomes research through September 2019. PCORI-funded

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research could be an important avenue for establishing an evidence base for cost-effective prevention interventions.

Complementing government-led approaches that rely mainly on regulations, taxes, and education, advances in the social sciences and technology sector have the potential to reinforce and sustain healthy behaviors. The work of behavioral economists is only just starting to influence public policy. Behavioral economics explains why people are predictably irrational. Interventions using carefully designed nudges and financial incentives show promise for improving patient engagement and adherence to a range of health promotion and wellness programs.<sup>8</sup> There is growing recognition of the need to integrate these insights and approaches into the design and application of new prevention-focused technologies.

This development parallels the expansion of innovation in personalized prevention technology led by the private sector. Software developed by established companies such as Apple, Google, IBM, Microsoft, Qualcomm, and Samsung are synergistic with personal intelligent devices emerging from the entrepreneurial community. Food, beverage, and activity companies are expanding portfolios of products and services to address consumer demand for healthier foods and more active lifestyles. Furthermore, ACA payment reforms such as bundled payments are creating a financial incentive for clinicians and health care organizations to use "automatic hovering" initiatives that deploy an array of smart wireless devices to monitor and improve patient health behavior.<sup>9</sup>

### The Future of Prevention

If prevention science is to fulfill its promise of reducing the burden of NCDs and the human and economic toll they take on US society, specific action should be taken to capitalize on these promising trends.

First, increased and more targeted research is needed on prevention of NCDs in community settings. Many community-based health promotion and disease prevention programs have shown promising health outcomes, but information on how programs affect health care costs is lacking. A more level playing field for funding between prevention and treatment could provide policy makers with critical information for evidence-driven decision making.

Second, NIH-ODP needs to be adequately staffed and have the internal political support required to ensure that all institutes increase their support for prevention science. The model of the Fogarty Center for International Health at the NIH, with a set of institutional arrangements similar to that of the ODP, will be invaluable in enhancing the stature of prevention science.

Third, the Foundation of the NIH has forged important private-public research partnerships of mutual benefit to the NIH, corporations, and nonprofit organizations. The Foundation should be encouraged to consider how to establish such partnerships to accelerate many aspects of prevention science requiring closer private-public interaction and to work more closely with private entities not usually engaged with the NIH.

Fourth, ensuring the widespread uptake of personalized health technology requires a framework comparable to that developed by the National Human Genome Research Institute's Ethical, Legal and Social Implications Research Program, which encouraged basic and applied research on the implications of genetic and genomic findings.

Investing in prevention should be a strategic national priority to help improve the lagging population health of the United States compared with peer countries. Increasing federal funding for prevention science and fostering stronger public-private partnerships are important steps toward providing policy makers with evidence-based tools to use limited resources effectively and efficiently.

#### ARTICLE INFORMATION

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