Making the Workplace a More Effective Site for Prevention of Noncommunicable Diseases in Adults

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Objective: Efforts to realize the potential of disease prevention in the United States have fallen behind those of peer countries, and workplace disease prevention is a major gap. This article investigates the reasons for this gap. **Methods:** Literature review and expert discussions. **Results:** Obstacles to effective use of workplace disease prevention include limited leadership and advocacy, poor alignment of financial incentives, limitations in research quality and investment, regulation that does not support evidence-based practice, and a dearth of community–employer partnerships. **Conclusions:** We make recommendations to address these obstacles, such as the inclusion of health metrics in corporate reporting, making the workplace a central component of the strategy to combat the effect of noncommunicable diseases, and linking prevention directly benefit businesses' bottom lines.

A significant proportion of the burden of major noncommunicable diseases (NCDs), including cardiovascular disease, type 2 diabetes, some cancers, chronic respiratory diseases, and some mental illnesses,[1] can be prevented by addressing tobacco use, physical inactivity, unhealthy diets, and excessive alcohol consumption. Prevention includes avoiding these unhealthy behaviors and managing biometric risk factors such as high blood pressure, high blood glucose levels, and high blood lipid levels.[2] For certain risk factors, such as tobacco use and inadequate lipid management, US trends are positive, but other areas, including risk factors such as obesity and diseases such as diabetes, and mental illness, trends are worsening.[3] Evidence that NCD prevention works is clear—Where tobacco control, diabetes prevention, and better management of lipids are implemented, related health outcomes improve.[4]

Efforts to realize the potential of health promotion and disease prevention in the United States have fallen behind those in other Organization for Economic Cooperation and Development (OECD) countries. A recent Institute of Medicine report[5] and comparative analyses using the latest Global Burden of Disease data[3] show that over the past decades life expectancy and disease-specific survival rates in the United States have not improved at the rate seen in peer countries. Americans live shorter lives and experience more illnesses than people in peer countries, they reach the age of 50 years with less favorable cardiovascular risk profiles, and their death rate from ischemic heart disease is the second highest among OECD countries. Lung disease is more prevalent and associated with higher mortality rates in the United States than in peer countries.

This difference in life expectancy has been increasing despite significantly greater health care spending by the United States than by any other country; median per capita spending among all OECD countries in 2009 was $3223, less than half the $7960 per capita spent in the United States.[6]

What accounts for the paradox of high spending on health care with relatively poor health status and life expectancy? The answer lies in where money is spent. When compared with investment in the treatment of disease, public health and preventive services have historically been underinvested in by government in the United States.[6] Furthermore, social care spending in the United States is relatively low compared with the high levels of health care spending. Across the OECD, for every $1 spent on health care, $1.80 is spent on social services, compared with only $0.83 in the United States.[7] Although it is not simply the amount of money invested in prevention and social services that ensures its efficacy, but rather how this money is spent, the magnitude of spend is a broad indicator of the focus of the US health care system compared with other health systems. These findings on government level spend are well described elsewhere. The focus of this article is on this imbalance of spend in working-age adults and the relative lack of attention to workplace prevention efforts compared with the treatment of disease in working-age adults.

THE CENTRALITY OF WORKPLACE HEALTH TO US POPULATION HEALTH

Employers in the United States are well positioned to focus on prevention to influence the health of 155 million working-age Americans and to reap some financial benefit.[8] More than half of US residents have employment-based health insurance coverage through their own or other people's employers.[9]

The cost of health insurance is clearly a concern for employers. In 2010, US employers spent a total of $560.9 billion for group health insurance, an increase of approximately 67% over the past 10 years.[10] For the third consecutive year, nearly 60% of chief financial officers cited health care costs as their main financial concern for their companies, above revenue growth, cash flow, and corporate tax rates.[11] They are aware of the significant contribution of NCDs (including mental illnesses)[1] to this cost, with half of all business leaders worrying that at least one NCD will hurt their company's bottom line in the next 5 years.[12] In addition, there is strong evidence that reducing NCD risk within working adults could significantly reduce health care costs within working age.[13] Despite this, employers continually underinvest in prevention, apportioning less than 2% of their total health care expenditures to prevention.[14]

We will examine five key obstacles to increasing the level of investment and ensuring the investment is deployed in the best manner to have the greatest effect for the business. We further show how

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several of these factors combine and affect how return on investment (ROI) arguments are currently constructed and used.

Limited Leadership and Advocacy

Visible and sustained senior leadership commitment to prevention is critical to its success.[6,15] In the United States, advocacy by a small number of government and political figures has raised the profile of prevention and galvanized some action by industry, nongovernmental organizations, and communities. Examples include Surgeon General C. Everett Koop on tobacco control and AIDS prevention, First Lady Michelle Obama on healthy diets and physical activity, and former New York City Mayor Michael Bloomberg on a wide range of health promotion initiatives. Within industry, a small but growing group of chief executive officers (CEOs) has stimulated prevention work for their employees and often formed coalitions with other companies and groups.[16] Many CEOs of US corporations have been drivers of the World Economic Forum's global Workplace Wellness Alliance, and most winners of the annual C. Everett Koop National Health Awards have been led by CEOs who have taken a strong public as well as intracompany stand on the value of health and the importance of prevention. These include L.L.Bean Inc Chairman Leon Gorman, State of Nebraska Governor Dave Heineman, Alcon Laboratories executive leadership, Eastman Chemical Chairman and CEO Jim Rogers, and Prudential Financial Chairman and CEO John Strangfeld. Despite these exemplars within government and industry, the cadre remains small. The Towers Watson Global Workforce Survey revealed that less than 50% of employees think that the senior leadership in their organizations has a sincere interest in employee well-being.[17] In addition to this, there is a significant lack of representation from smaller businesses (eg, the World Economic Forum's global Workplace Wellness Alliance membership is entirely larger businesses). Businesses employing fewer than 500 people account for 49% of employment in the United States and 35% in organizations with fewer than 100 employees,[18] so leadership within smaller businesses is critical.

Beyond the executive level, operational responsibility often lies in the hands of the chief medical officer, an individual responsible for human resources, and sometimes the corporate social responsibility team.[10] Most of these leaders receive varying levels of training on occupational safety and environmental health (OSH), a related field to prevention as it focuses on the prevention of harm to employee health through accident, injury, or the workplace environment. Nevertheless, few leaders at these levels have received the necessary training to design and implement prevention programs to reduce major NCD risks. Although a few courses have been developed for workplace prevention practitioners, such as the International Association for Worksite Health Promotion online course, their use is not widespread. Furthermore, most health professionals working inside companies have not been exposed to recent advances in behavioral economics and environmental design such as BJ Fogg's model,[19] the principles of which are transforming classic approaches to behavior change.

Employee-driven advocacy for prevention remains modest. This is in contrast to historically strong employee advocacy for OSH. Despite both disciplines being focused on prevention of harm to employee health, prevention is frequently considered to be around "life risks," whereas OSH is focused on "job risks" and so employees have seen a greater role for employers in the latter than the former.[20] In response to employee advocacy for OSH, the US Department of Labor's Occupational Safety and Health Administration enforces regulatory standards, and the Centers for Disease Control and Prevention (CDC)'s National Institute for Occupational Safety and Health and its partners guide research through the National Occupational Research Agenda. As a result, resource allocation for OSH is often compulsory for a business, whereas there is less pressure for prevention resources.

Poor Alignment Between Financial Incentives and Disease Prevention

The factors that lead to disease development have their roots in a complex chain of events that often begin in early childhood. The effects on the body of risky health behaviors, such as tobacco use, unhealthful diets, and low levels of physical activity, accumulate over time and in close association with social and environmental factors.[21] Thus, the probability of disease and death is related to years of exposure to a collection of risks, and every point in life represents a chance to prevent risk. Nevertheless, an individual's age and cumulative risk determine how successful efforts to return to minimum risk levels will be, because some damage may be irreversible.

As illustrated in Fig. 1, the prevalence of risky health behaviors varies by age and specific risk. The cumulative effect of risky health behaviors leads to an increase in the prevalence of biometric risk factors, including elevated blood pressure, high cholesterol and glucose levels, and overweight or obesity, which increases rapidly after the age of 40 years.[22] In turn, because of the cumulative effects on the body of risky health behaviors and biometric risk factors, the prevalence of NCDs such as diabetes and cardiovascular disease increases with age, with significant prevalence beginning at the age of 55 years.[20,23,24] Mental health is one NCD category for which the risk factor pathway remains less well described and the incidence pattern differs, because the median age of onset of major depressive disorder is 32 years.[25]

There are three significant life stages, each of which has a different prevalence profile of risk and disease, and each of which offers a different opportunity for prevention in the United States. They are described as follows:

1. Childhood: Prevention early in childhood confers maximum lifelong benefits at minimal cost because the cumulative effect of risk at this age is low. In the United States, preemployment risks are generally seen as the domain of public health; however, the greatest financial savings from such interventions become visible beyond middle age (when health care costs are highest) and so accrue to business or other government agencies.
2. Working age: Employers assume critical roles during working years at a time when risk levels are already high but well before the highest levels of disease prevalence and costs are reached. Although employers see some of the benefit of prevention in the working-age population, much of the financial benefit will accrue to government agencies that take responsibility beyond retirement.
3. Government-run Medicare assumes responsibility for the health of retired workers. Disease costs rise quickly from middle age onward, increasing significantly into retirement. The main cost savings from risk reduction in childhood and working age accrue to Medicare. The failure to implement workplace prevention programs leads to many more unhealthy people entering the Medicare pool. Recent Congressional Budget Office projections suggest that health care cost increases will be the primary driver of national debt in the United States going forward (Fig. 2).[6]

Critically, this fragmented approach to prevention across the life course leads to less investment in prevention because those who invest do not receive the full long-term financial benefits.

Limitations in Research Quality and Investment

Employer investment in workplace prevention programs has been severely limited by real and perceived concerns about efficacy and ROI. Mixed messages from key groups further undermine support. The US government (through the Patient Protection and Affordable Care Act of 2010) and the Bipartisan Policy Center have shown support for prevention to lower health care costs.[5] In

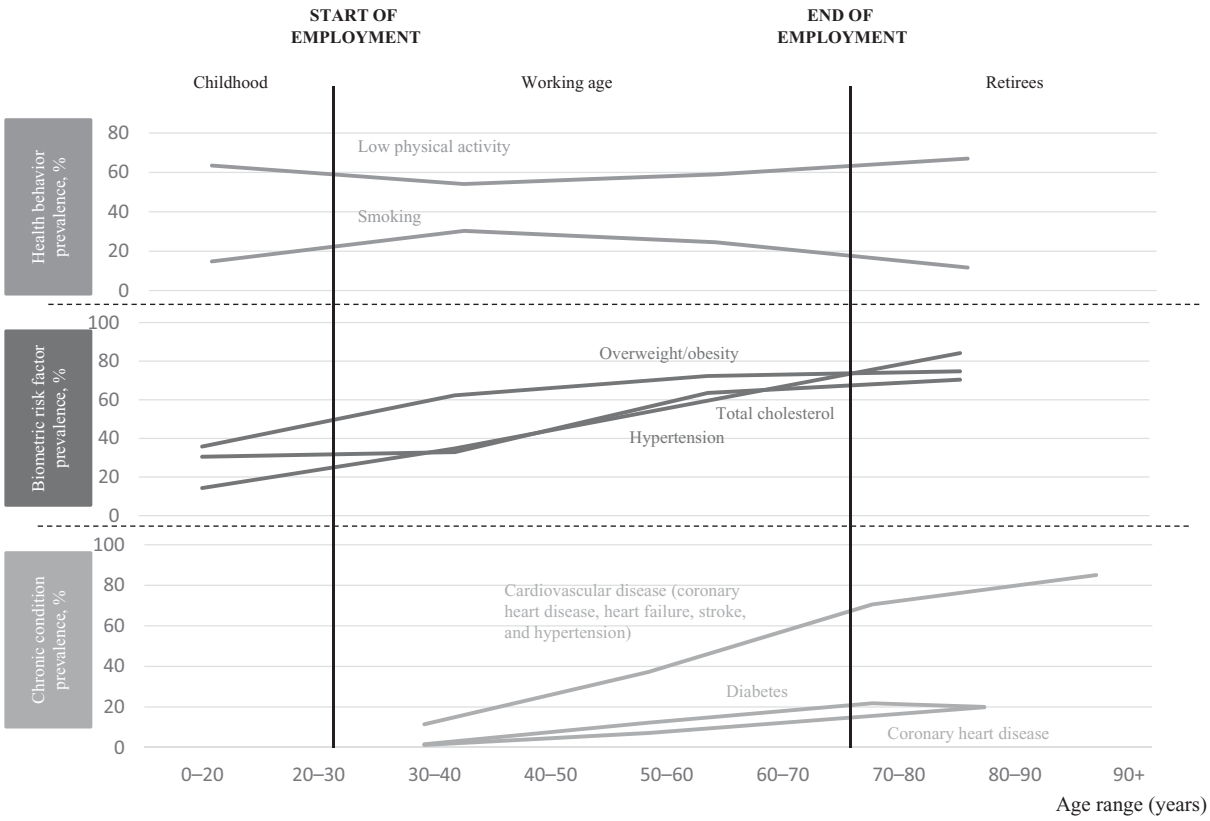

FIGURE 1. Prevalence of health behaviors, biometric risk factors, and noncommunicable diseases by age.[22-24]

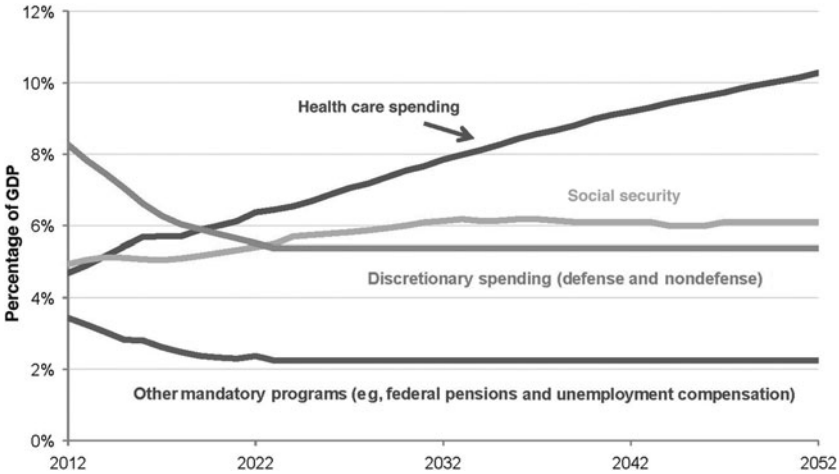

FIGURE 2. Health care costs are the primary drivers of debt. [6] Source: Congressional Budget Office's Alternative Fiscal Scenario (February 2013), additionally assuming that combat troops overseas decline to 45,000 by 2015 and that Hurricane Sandy funding is not allocated in future years; Bipartisan Policy Center extrapolations

contrast, the Office of the Actuary of the Centers for Medicare and Medicaid Services has stated, "There is no consensus in the available literature or among experts that prevention and wellness efforts result in lower costs."[26] Divergent views are expressed in ongoing debates in the academic literature. Lewis and Khanna[27] in their blog posts state that "the implausible, disproven, and often mathematically impossible claims of success underlying the 'get well quick' programs promoted by the wellness industry raise many questions," whereas Goetzel[28] argues that "well-functioning worksite health promotion . . . [can] . . . have the potential to produce a positive ROI, probably in the range of 1·5-3·0 to 1·0, over 3 to 5 years." This situation has arisen largely because of numerous conceptual and methodologic issues throughout workplace prevention research.

Studies are generally cross-sectional or longitudinal over a short period, which creates confounding and causation issues. They rarely provide explicit information on risk profile and disease status of the workforce at the start of the study or on the length of time and intensity of individuals' exposure to prevention programs.[29] In addition, most intervention studies do not address powerful selection effects that made already healthy employees most likely to take part in prevention programs.

Studies frequently assess attributable burden of risk factors (the proportion of current burden that is caused by prior risk exposure) rather than avoidable burden (the likely future effects of partial removal of the current exposure), ignoring reversibility.[21] Furthermore, much research on how to integrate prevention in the workplace

does not consider specific initiatives to address major risks driving disease burden and costs.[30] Conversely, much research into specific initiatives does not consider integration into a company's broader portfolio of initiatives.[31] There is also very little research into complexity and systems science to address multifactorial health issues.[32] The CDC has developed an array of best-practice recommendations, but their active dissemination and assistance in implementation by technical experts are limited.

In addition to these conceptual issues, several basic study design issues beset workplace health program analyses. They are summarized in Table 1.

Limitations in individual studies and highly variable study design make comparison of studies difficult, which results in seemingly conflicting conclusions. Until these limitations to the evidence base for workplace prevention are overcome, it will remain difficult for employers to support, design, and implement programs that achieve the outcomes they desire.

One reason for these weaknesses is that funding for workplace prevention remains meager, and more informative research is more expensive. For example, longer-term longitudinal studies are generally more expensive than cross-sectional analyses, but they enable the analysis of causality and reversibility. Furthermore, the development of independently verifiable metrics is often more expensive than self-report data but is more accurate. Effective dissemination of best practices and technical advice for employers are also costly. Some research is funded by business, but impartial and less time-limited funding from government is lacking. The National Institutes of Health grants more than 90% of annual federal funding for health research and development. Yach and Calitz[37] estimated that the National Institutes of Health currently invests $2.2 billion to $2.6 billion in behavioral interventions to prevent NCDs, which comprises roughly 7% to 9% of total annual expenditures. A small proportion of this small investment goes toward workplace programs. Some funding through the CDC is allocated to workplace prevention, but to date this has been minimal—$10 million for 2014.[38] Research investment not only yields better information but also, equally important, results in future leaders more informed about workplace prevention.

Regulation That Does Not Support Evidence-Based Practice

In the Affordable Care Act, Congress revised the law related to workplace "wellness programs," defined as programs offered by employers that are "designed to promote health or prevent disease."[39] Regulations were finalized in June 2013.[40] "Participatory wellness programs," which make up the majority of those currently implemented in the United States, either do not offer a reward or do not require an individual to satisfy a health-related standard to qualify for a reward. There are no evidence-based requirements for their use. "Health-contingent wellness programs," on the contrary, can be "outcome-based" (require individuals to attain or maintain specific health outcomes to obtain rewards) or activity only (require

TABLE 1. Errors in Study Design

Error	Description	Example
Inconsistency in variable measurement	The measurement of health risk factors and conditions, and business outcomes (such as health care costs and worker absence) varies from investigation to investigation. This makes cross-comparison of investigations or meta-analysis challenging.	The Baicker meta-analysis[33] includes investigations using a range of health risk assessments and mechanisms for assessing health care costs, work absence, and worker productivity.
Low response rates	Voluntary response to questionnaires suffers from low response rates.	Although response rates of up to 80% have been recorded in workplace program investigations,[34] response rates lower than 25% are more common.[35]
Self-report bias	Workplace programs are generally assessed using self-report questionnaires that suffer from numerous biases, including recall bias, inconsistent question interpretation, and disclosure biases.	Investigations such as the Goetzel study that looks at the association between health risk factors and health care spending rely on self-report of risk factors.[36]
Absence of a true control group	In general, investigations compare individuals engaged in a program with those offered the program who do not engage. A true controlled trial would be to compare the group offered the program with a group not offered the program (or offered a "placebo" program).	The recent PepsiCo analysis compares participants with nonparticipants offered the program.[29]
Lack of investigation of smaller organizations	49% of working Americans are employed in small- or medium-size enterprises (with fewer than 500 employees),[18] but few investigations have been undertaken in organizations of this size.	More than 90% of the programs included in the Baicker meta-analysis were implemented in large firms (with more than 1,000 workers), and 25% were implemented in organizations with more than 10,000 workers.[33]
Culture of health and environmental design	The culture of health within an organization, including leadership support, policies, practices related to health, and environmental design, is frequently not taken into account when the efficacy of initiatives is assessed.	The PepsiCo analysis does not take into account cultural factors; the limitations section states, "differences in program design and implementation might affect participation and dropout rates and intervention effects."[29] With environmental design a critical factor in behavioral change, an assessment should be included that captures the results of initiatives accurately.

the completion of an activity to obtain a reward) and comply with the Health Insurance Portability and Accountability Act as long as they are "reasonably designed to promote health or prevent disease" (among other requirements).[40]

Of concern is the use of the term "reasonable design," which may fail to promote research into or the use of evidence-based practice by employers. The regulations provide examples of permissible health outcomes to be achieved and then restate that the plan "requires participation at a time and place that is not unreasonably burdensome or impractical for participants and that is otherwise reasonably designed based on all the relevant facts and circumstances."[40] The preamble states that health-contingent wellness programs are "not required to be accredited or based on particular evidence-based standards."[40] Although this may be liberating for organizations in allowing innovations to be tested without overly burdensome certification processes, it does not promote the use of evidence-based practice. More positive regulation would promote the use of evidence-based practice, where it exists, for all workplace health programs and encourage organizations to experiment to develop the evidence base further. For example, the US Preventive Services Task Force recommendations have formed the basis of required clinical standards for many obtaining health care through private insurance, Medicare, and Medicaid. Workplace health promotion and disease prevention do not have a similar structure, although community-based standards are reviewed and compiled by the Community Preventive Service Task Force. Promotion of their optimal use as evidence-based practice (rather than requirement of their use as is now the case for many of the US Preventive Services Task Force recommendations)[41] could form the basis of innovative approaches toward policy requirements while safeguarding the unbiased creation of the evidence recommendations. Regulation could state that best practice defined by named sources should be used where it exists (similar to clinical standards), and beyond this organizations can experiment to develop the evidence base further.

Dearth of Partnerships Between Communities and Employers

There is a wide variation in health risks and disease prevalence across the United States, as well as in life expectancy, as exemplified in Fig. 3.[42]

It is in the interest of employers to work with the community to reduce major health risks. In doing so, they may magnify the effects of workplace efforts through community influence on employees outside of working hours, improve the health of the companies' value chain (including both suppliers and distributers), and create a more sustainable workforce in the long term.

Some local and state governments and companies have embraced the opportunity to work together to address community health.

1. *Minnesota*: As part of its Statewide Health Improvement Program to reduce the state's burden of NCDs, Minnesota is engaging with private sector employers, such as Target, Cargill, General Mills, and HealthPartners, through a public–private partnership (the Alliance for a Healthier Minnesota). These organizations employ more than 150,000 people statewide; through this partnership, they work together toward common health goals. The Alliance organizes a range of campaigns and competitions to promote increased physical activity, improved nutrition, and weight loss.
2. *Colorado*: In its commitment to become the healthiest state, Colorado acknowledged both the critical role of community interventions to offer a healthy workforce to employers and the central role of employers to collaborate in improving the overall health of the state.[43]
3. *Cincinnati*: GE, other local employers, hospitals, insurers, government, physicians, and patients in Cincinnati came together in 2010 to improve health care quality and access, and reduce costs, for the region's 2.2 million residents.[44]

Nevertheless, while there are exemplars, few companies have extended prevention initiatives to include the wider community.[10] The environmental scan conducted by the Health Enhancement Research Organization highlighted additional exemplar organizations tackling population health; however, it also underscored the paucity of scientific literature demonstrating the role or effect of businesses on population health and the lack of systematic documentation of the activities that corporations are engaged in outside of the workplace.[45] Research from Business for Social Responsibility has shown that organizations that have extended their initiatives beyond the workplace have largely focused on customers, with less emphasis on local communities and the general public.[10] A Kaiser Family Foundation survey in 2013 found that although more than 90% of large firms offer their employees wellness benefits, only 65% extend these programs to spouses or dependents and only a tiny fraction do so to communities.[46]

OVERRELIANCE ON AND MISUSE OF ROI

The consequences of weak advocacy for prevention (versus treatment), methodologically weak research, insufficient evidence, and the lack of best-practice requirements for workplace prevention are seen in the overreliance on and misuse of short-term ROI studies to determine which programs gain and maintain companies' support.

A systematic literature review conducted by the independent Community Preventive Services Task Force (supported by the CDC) concluded that worksite programs can have a positive financial outcome.[47] Similarly, a meta-analysis by Baicker and colleagues[33] concluded that workplace wellness provides a 3.27:1 ROI on health care cost savings (and similar ROI estimates for work absence). Nevertheless, these results have come under scrutiny, particularly because RAND Corporation's analysis of a sample of large employers in the Care Continuum Alliance database showed that medical care cost savings were not statistically significant.[48]

Although ROI is a useful cost-benefit assessment for workplace prevention, sophisticated analysis is required. The two weaknesses in the way ROI calculations are currently carried out for workplace prevention are lag time to benefit and lack of consideration of broader effects. Looking at health care costs alone, although some ROI studies have shown positive results over periods of 2 to 7 years, a more complete analysis needs to assess outcomes across the lifespan because of the long lag time to benefit, as illustrated in Fig. 1. Beyond this, ROI should look at the broader effects of workplace prevention. To date, work has concentrated on health care cost and absenteeism, with some assessment of productivity, though using only self-reported measures. Support is growing for viewing health improvement in the workplace as a competitive human capital management strategy, not just as a health care cost-saving strategy. A competitive human capital management strategy includes not only absenteeism and productivity but also retention and recruitment of the best people and other non–health-related factors.[49] The magnitude of the ROI of workplace prevention will always be underestimated until these factors are considered over a sufficiently long period to account for lag time to benefit, are measured accurately using independently verified and standardized metrics, and are monetized appropriately. Attempts have been made at broader valuation of community-based prevention initiatives,[50] but to date similar valuation has not been calculated for the workplace.

CONCLUSIONS

For business and society to see the benefits of workplace prevention, it is imperative to tackle several key issues.

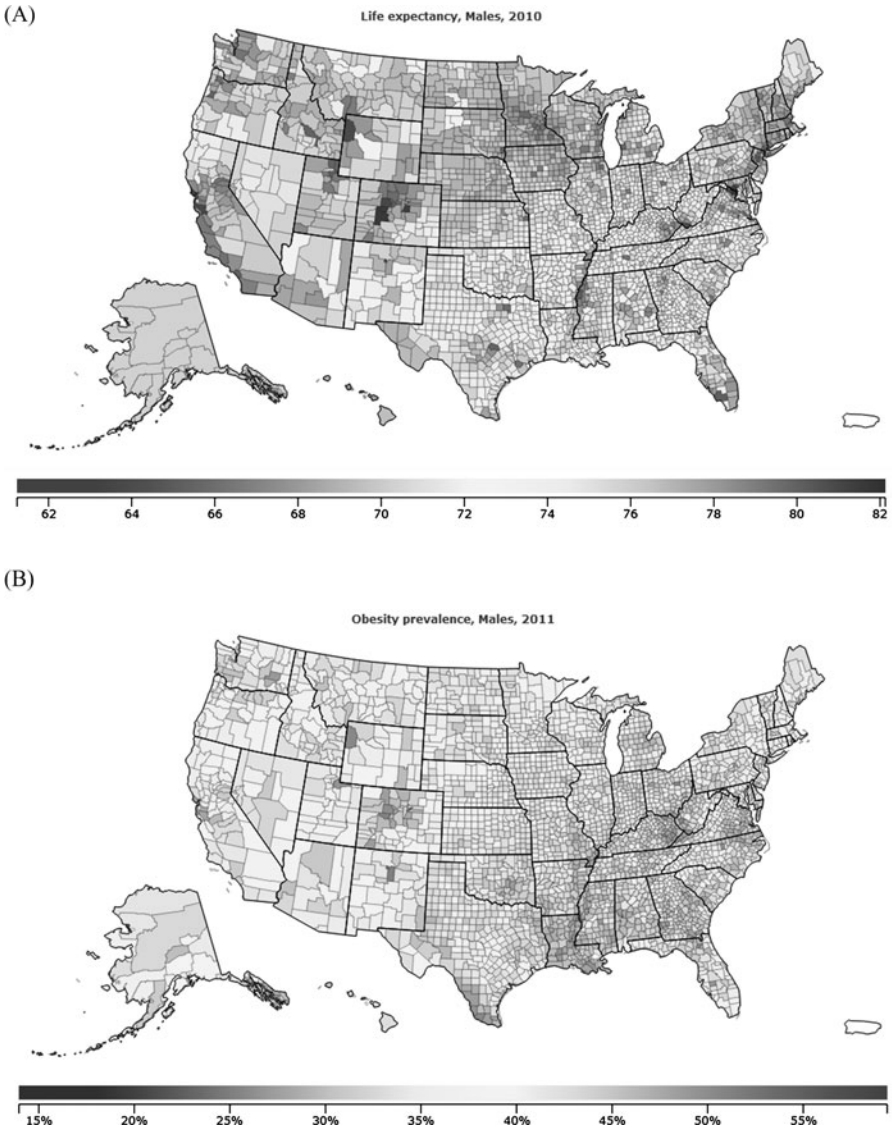

FIGURE 3 (A). Life expectancy, males, 2010. (B). Obesity, males, 2011.[42]

Building Stronger Leadership and Advocacy Within Government, Business, and Employee Groups

There is an urgent need for leaders at all levels of government, as well as in large corporations and small and medium enterprises, to promote workplace prevention within their peer groups and to the wider community. It is critical that this leadership not merely consists of words but be combined with workplace prevention offerings,[51] and that it is appreciated by employees within the organization as individuals outside the organization.[17] Routine inclusion of employee health status metrics within financial reports would highlight the importance of workplace health to long-term corporate financial health, both within organizations and outside to stakeholders and investors.[8] Furthermore, there is also a need for improved workplace prevention training of senior executives and managers who implement workplace prevention initiatives to ensure effective implementation and strong advocacy.[8]

Aligning Incentives Between the Public and Private Sectors to Promote Investment by Both

In the absence of workplace prevention programs, many more unhealthy people will be added to the Medicare pool, where the disease prevalence and costs increase. Therefore, much of the benefit of health care cost saving from investment in workplace prevention programs lies with the public sector through Medicare. An appropriate incentive for private sector employers to invest in workplace prevention may be policies that reward companies for the level of risk and disease retirees bring to the Medicare pool.

Investing in More Targeted and Better Research

Improvements in both quality and quantity are required to address many of the critical methodologic issues that limit current research. Longitudinal studies are required that analyze causality and reversibility, using independently verifiable metrics. In addition, more research is needed into systematic integration of multiple specific initiatives into a workplace to target major risks. There is also a strong need for improved dissemination of best practices and technical assistance to enable employers to implement programs. These all require a greater level of funding for research than has been available to date because of the additional complexity of the research.

Adjusting Government Regulation to Support the Use of Evidence-Based Practice

More positive regulation is required that not only promotes the use of evidence-based practice, where it exists, for all types of prevention programs but also allows organizations to experiment and develop the evidence base for workplace prevention further. Regulation should support a model similar to that used in preventive medicine, whereby guidance is provided by expert groups to define clinical guidelines such as the US Preventive Services Task Force in the United States and the National Institute for Health and Clinical Excellence in the United Kingdom to drive the use of best-practice interventions.

Creating Linkages Between Workplace and Community-Based Programs to Achieve Common Goals

Public–private partnerships are critical to addressing community health in an integrated manner and achieving the outcomes desired by both the public and private sectors. States such as Minnesota and Colorado are developing promising solutions, and learnings must be collated and disseminated.

Fabius and colleagues[52] showed the potential effect of implementing best-practice workplace programs. They tracked the stock market performance between 1997 and 2012 of companies that were recipients of the American College of Occupational Medicine's Corporate Health Achievement Award and found that the portfolio of publicly traded award-winning companies outperformed the market over this time.[52] Although workplace health programs were not the sole reason for this finding, it does indicate that a synergy exists between investing in workplace prevention and achieving desired business outcomes.

Encouraging employers to invest in effective workplace prevention will result in benefits to their bottom lines at the same time as it makes the workplace a central component of the strategy to combat the effect of NCDs.

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