Medical Care Savings From Workplace Wellness Programs

What Is a Realistic Savings Potential?

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Background: Workplace wellness programs have become increasingly popular despite large inconsistencies in the analyses of their ability to produce long-term medical care savings. **Objective:** To clarify the aforesaid situation by estimating potential long-term medical care savings linked to chronic disease. **Methods:** We combined data from the Global Burden of Disease Study and Medical Expenditure Panel Surveys to estimate the annual savings that would result from lowering risk factors typically managed by workplace wellness programs to their theoretical minimums. **Results:** Lowering risk factors to their theoretical minimums, if this were possible, would reduce average annual costs per working-age adult by 18.4%. **Conclusion:** These findings have important implications for workplace wellness programs because they provide a robust estimate of potential savings.

Learning Objectives

- Discuss previous lines of argument on the link between wellness programs and medical costs, including the history of the notion that "70% of illness is preventable."
- Outline the methods used by Bolnick et al to derive more realistic estimates of the cost savings possible through workplace wellness programs.
- Summarize findings of their analysis, including the theoretical cost reductions possible overall and for workers in different age groups.

Workplace wellness programs can make a meaningful contribution to improve the health and well-being of the workforce. Improved health, in turn, will lower medical care costs and also may increase employee morale, retention, and productivity. Yet despite these benefits, wellness programs often are promoted as a remedy for spiraling employer medical care costs without a clear understanding of the potential for long-term savings and barriers to achieving optimal results.

There are two arguments that link wellness programs with medical costs. The first, a more conceptual argument, shows that modifiable risk factors typically managed by wellness programs are those linked by epidemiological research[1] to a variety of costly chronic diseases. The second is empirical and is based on short-term analyses of workplace wellness programs that have reported cost savings to employers,[2] although the quality of research methods in these analyses is uneven.

A widely repeated figure for preventable savings comes Fries et al at the Health Project Consortium. Specifically, it is stated that "Preventable illness makes up approximately 70 percent of the burden of illness and the associated costs . . . "[3] This statement is supported by many decades of epidemiological research that describes a wide variety of causation and association between health-risk factors and disease.[1] More recently, however, this quote has been taken out of context by some to imply that workplace wellness programs will yield immediate and meaningful improvement in the health of an employer's workforce and medical care cost savings.[4] There are, though, problems with this logical extension.

McGinnis et al[5] identified five domains that contribute to early mortality: individual behavioral choices (40%), genetic endowment (30%), social circumstances (15%), medical care (10%), and environmental conditions (5%). Genetic endowment is not modifiable, therefore leaving approximately 70% of early deaths to be explained, at least in part, by "preventable" causes. Nevertheless, worksite wellness programs focus their efforts only on a subset of individual behavioral choices, and only to a very small extent on social circumstances and workplace environments. Therefore, workplace wellness programs address only a portion of the modifiable risk factors that contribute to early mortality, so that, by extension, their potential medical care savings are much less than 70%.

A meta-analysis of more than 20 empirical return on investment (ROI) studies by Baicker et al[2] noted that annual medical care costs fall approximately $358 per employee, which translates to $3.27 for every dollar spent on wellness. This estimate implies short-term gross savings of 10% of the $3,533.58 average annual working-age medical care costs based on Medical Expenditure Panel Survey data from 2006 to 2008. Nevertheless, even a carefully done meta-analysis can be influenced by the limitations of the underlying literature and most ROI studies are prone to design and methodology limitations such as limited and/or selective participation and completion rates of health risk assessments; lack of or not comparable control groups; a short study period that cannot capture long-term consequences of behavioral changes; an inability to distinguish the direction of causal pathways (in particular, self-selection vs program effects). Furthermore, because the aim of most ROI studies is to demonstrate short-term savings, they typically examine only aggregate changes in medical care costs. As such, they do not explore how managing specific risk factors modifies their consequent medical conditions and their medical care costs. As a consequence, there remains an understandable confusion among consultants and many employers about what worksite wellness programs can achieve.

Critics also point out that the cost offset argument has not been born out for clinical preventive services that initially had been promoted with similar claims about "cost-savings." Russell[6] summarized four decades of cost-effectiveness research that shows that a majority of preventive interventions aimed at reducing the incidence of chronic diseases typically targeted by workplace wellness programs actually increased medical spending, including medical interventions aimed at lowering high blood pressure, high blood cholesterol, and high blood glucose. This can occur because many more people spend on preventive medicine than those who will ever experience consequent medical events.

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Thus, the impact of workplace wellness programs remains unclear. Prevention at first glance seems to have enormous potential savings but short-term research with workplace wellness programs shows only modest savings, and even these may be overstated due to inherent limitations in the analyses. In addition, cost-effectiveness analyses of preventive medical interventions are more likely to show increased costs than savings. Therefore, the aim of this analysis is to estimate medical care savings from workplace wellness programs in a manner that develops a clearer picture of their long-term potential.

METHODS

Our approach to estimating long-term potential medical care cost savings was to link potential reductions in the incidence of medical conditions causally related to risk factors typically managed by workplace wellness program to their corresponding medical care costs. This was done using publicly available data from two main sources. We drew from the World Health Organization Global Burden of Disease Study (GBD)[7,8] risk factor–medical condition links and estimates of proportions of medical conditions causally related to heightened risk factors (population attribution fractions [PAFs]). We also examined data from the Medical Expenditure Panel Surveys (MEPS) public use files. Specifically, we used the cost of illness (COI) by age and medical condition.

Because GBD and MEPS are independent studies, combining them requires matching disease definitions and, for some medical conditions, aggregating disease-specific PAFs into broader MEPS medical condition categories, and, for others, disaggregating MEPS categories into component conditions. Therefore, our central findings are estimates of the attributable COI, which are the COI for each disease times its corresponding PAF.

Risk factors and their consequent medical conditions included in GBD are those that are: (1) likely to be among the leading causes of disease; (2) not too specific or too broad; (3) having high likelihood of causality based on existing scientific knowledge; (4) having reasonably complete data available to prepare study results; and (5) potentially modifiable.[8] Of the risk factors identified by GBD researchers, we identified seven that are typically managed by workplace wellness programs: physical inactivity, low fruit and vegetable intake, smoking, overweight and obesity, hypertension, hypercholesterolemia, and alcohol abuse. Nevertheless, the GBD researchers did not include specific mental and nervous disorders, hypertension, and hypercholesterolemia as medical conditions, although these are causally related to the seven risk factors. Therefore, we made our own estimates for these three medical conditions. Although there are other causally related medical conditions identified in GBD, their medical care costs and/or proportions related to risk factors are small and therefore not included. Risk factor–medical condition links used in this study are summarized in Fig. 1.

The COI by age and disease comes from MEPS. Cost of illness includes all costs for treating a medical condition, including both the proportion causally associated with heightened risk factors and the complimentary proportion not related to them. We used COI for medical conditions for the privately insured population by age and medical condition averaged over the three years from 2006 to 2008. This population includes noninstitutionalized individuals younger than 65 years, with any private health insurance, which excludes individuals with Medicaid only or uninsured, and individuals 65 years or older with Medicare only or Medicare and private insurance.[9] MEPS used actual payments from all sources identified by their primary *International Classification of Diseases—Ninth Revision* code and aggregated into clinically meaningful disease categories using the Clinical Classification System.[10] This method allocates the cost of comorbidities and medical care costs coded with different primary diseases each to their own medical condition, which is consistent with our interest in separately relating each risk factor to its consequent medical conditions.

PAFs, which are estimates of the proportion of consequent medical conditions that would be eliminated if risk factors were reduced to their theoretical minimums, were developed by GBD researchers using population risk factor distributions, morbidity odds ratios associated with heightened levels of risk, and estimates of mediated and intermediate effects associated with complex causal pathways. The underlying epidemiological studies use a wide variety of study populations that differ from the population underlying MEPS data. We used PAFs for high-income countries, which are reported in eight age groups and by sex. PAFs are reported for each risk factor–medical condition link, and joint PAFs, which take into account causative interrelationships among risk factors, are reported for each condition associated with multiple risk factors.[11] The theoretical minimums used for risk factors as defined by GBD are listed in Table 1.

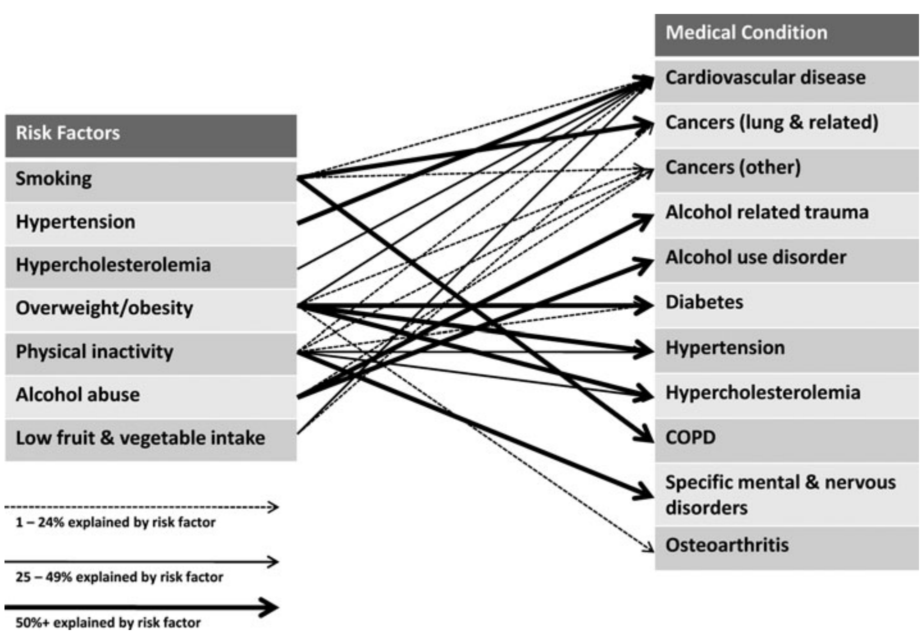

FIGURE 1. Risk factors and their relationships with medical conditions. Darker lines indicate a stronger relationship.

Risk factor–medical condition links vary from simple to very complex. A simple pathway is the direct and significant increase in chronic obstructive pulmonary disease caused by smoking. A complex pathway is the interaction of smoking and alcohol that interact to significantly raise the incidence of liver cancer. There is a single very complex pathway among the seven study risk factors and cardiovascular diseases. In this pathway, primary risk factors (physical inactivity and low fruit and vegetable intake) affect intermediate risk factors (weight, hypertension, and hypercholesterolemia), which in turn affect the risk of heart conditions and cerebrovascular disease. According to the level of complexity, each pathway requires using an individual PAF (simple), joint PAFs (complex), or joint PAFs with mediating factors (very complex pathway). For complex and the very complex pathways, use of joint PAFs and joint PAFs with mediating factors is necessary to adjust for interdependencies among risk factors. This computational technique controls for overestimation of the risk-lowering effects of simultaneously reducing multiple risk factors.

TABLE 1. Theoretical Minimum Values for Risk Factors Associated With No Heightened Risk

Risk Factor	Theoretical Minimum
Smoking	Never smoked
Hypertension	Systolic blood pressure, 115 mg Hg
Hypercholesterolemia	Total cholesterol, 3.8 mmol/L
Overweight/obesity	Body mass index, 21 kg/m^2
Physical activity	$\geq$2.5 h/wk of moderate to vigorous exercise
Alcohol abuse	No alcohol consumption
Low fruit and vegetable intake	600 g/d

Our PAF estimates for physical activity and specific mental and nervous disorders are based on epidemiological evidence from the large-scale National Comorbidity Survey.[12] Goodwin[13] used these data to calculate odds ratios between physical activity and major depression, panic attack, social phobia, specific phobia, and agoraphobia. Supplementing these data with condition-specific prevalence rates from National Comorbidity Survey[14] allowed us to estimate the proportion of disease incidence (PAF) related to physical activity.

Hypertension and hypercholesterolemia are treated both as modifiable risk factors and consequent medical conditions. These conditions are used in GBD as intermediate links in the causative pathway among risk factors and cardiovascular diseases; however, GBD does not report PAFs linking risk factors with them. This is because consequent medical conditions used in GBD are limited to those causing measurable levels of impairment of daily activities. GBD assigns disability weights of zero to both hypertension and hypercholesterolemia despite their positive medical care costs. Our estimates of PAFs between risk factors and hypertension are based on a review of epidemiological studies in a major report on prevention of hypertension by the Institute of Medicine.[15] Because of a lack of similar specific data for risk factors causally linked to hypercholesterolemia, we used our hypertension PAFs, which assumed causal similarities of hypercholesterolemia to hypertension. The potential impact of error in this approach is relatively small because hypercholesterolemia represents only a small portion of potential savings.

RESULTS

Cost of illness by medical condition and age group is summarized in Table 2. These are intermediate data used to calculate attributable COI. Total medical care expenses (TMCE) per person were $4,018.36, of which $1,613.32, or 40.1%, was for medical conditions with a risk factor–related component. The corresponding figure for all working-age adults was TMCE of $3,533.58, of

TABLE 2. Cost of Illness by Age. Data Are Medical Care Expense in Dollars per Person per Year, 2006 to 2008*

Risk Factor–Related Condition	Children, 0—14 yrs	Young Adults, 15—44 yrs	Middle-Age Adults, 45—59 yrs	Older Working Adults, 60—64 yrs	All Working-Age Adults 15—64 yrs	Retirees, 65+ yrs	All Ages
Cardiovascular disease							
Heart conditions	Nil	$49.60	$300.04	$582.16	$176.96	$1,118.12	$296.53
Cerebrovascular disease	Nil	$5.65	$47.63	$106.07	$27.92	$285.97	$63.93
Cancers	$12.26	$73.93	$437.05	$859.48	$259.71	$755.35	$295.89
Conditions related to alcohol abuse							
Trauma	$81.35	$201.89	$390.37	$391.61	$280.21	$512.12	$283.01
Alcohol-use disorders	Nil	$29.40	$11.88	$4.27	$21.50	$2.83	$14.90
Diabetes	$3.66	$36.60	$192.89	$349.84	$114.50	$414.15	$142.96
Hypertension	Nil	$30.81	$199.38	$332.56	$111.83	$503.39	$154.68
Hypercholesterolemia	Nil	$18.86	$162.33	$357.25	$94.59	$377.56	$123.21
Chronic obstructive pulmonary disease	Nil	$16.45	$52.76	$78.02	$33.62	$130.00	$43.12
Mental disorders	$51.86	$67.72	$98.22	$92.61	$79.91	$152.50	$86.60
Osteoarthritis	Nil	$0.80	$134.71	$268.22	$84.43	$327.80	$108.50
Total risk factor–related conditions	$149.12	$560.70	$2,027.26	$3,422.08	$1,285.17	$4,579.80	$1,613.32
Total medical care expenses	$1,467.58	$2,327.16	$4,795.90	$6,985.99	$3,533.58	$8,829.10	$4,018.36
Risk factors as % of total medical care expenses	10.2%	24.1%	42.3%	49.0%	36.4%	51.9%	40.1%

*Source: Medical Expenditure Panel Surveys average of 2006 through 2008 for noninstitutionalized individuals younger than 65 years with any private health insurance and those 65 years and older with Medicare only or Medicare and private insurance.

which $1,285.17, or 36.4%, was for medical conditions related to risk factors.

Estimates of potential long-term savings from wellness programs, which is the attributable COI, are presented in Table 3. If all historical heightened risk factors had been reduced to their theoretical minimums, then TMCE per person for all ages would have been reduced by $832.63 (20.7% of the corresponding TMCE) and for all working-age adults by $649.09 (18.4% of TMCE).

Medical care costs and the relationship of COI to attributable COI vary significantly by age group. In all age groups, the attributable COI is significantly lower than COI. For the zero- to 14-year age group, virtually nothing is attributable to heightened risk factors versus a $149.12 COI (10.2% of TMCE) for risk factor–related medical conditions. For all working-age adults, the attributable COI is $649.09 (18.4% of TMCE) versus $1,285.17 (36.4% of TMCE) for the corresponding COI. For ages 65 and over, the attributable COI is $2,505.61 (28.4%) versus $8,829.10 (51.9%) corresponding COI. The steep age-related COI and attributable COI reflect the fact that most risk factor–related medical conditions are heavily age dependent chronic diseases of aging that first appear in middle age and become more prevalent as age increases, reaching a peak during retirement ages.

Attributable COI for the three most costly medical conditions for working-age adults were cardiovascular disease ($163.39 or 4.5% of TMCE), cancers ($126.68 or 3.6%), and diabetes ($94.00 or 2.7%). Attributable COI was heavily skewed across the three age categories of working-age adults (15 to 44, 45 to 59, and 60 to 64 years) and medical conditions and rankings also differed.

Young adults (aged 15 to 44 years) had a very low attributable COI ($217.30, or 9.3%) of their already low TMCE ($2,327.16). The four most expensive conditions account for only 6.8% or $158.05 per year. Alcohol-related conditions ($75.53 of TMCE or 3.2%) were the most costly followed by cardiovascular disease ($32.21 or 1.4%), diabetes ($30.09 or 1.3%), and hypertension ($20.22 or .9%).

Middle age adults (aged 45 to 59 years) demonstrated much higher TMCE ($4,795.90) and an increasingly significant attributable COI associated with the onset of chronic diseases of aging. Cardiovascular disease ($288.36 or 6.0%) and cancers ($227.32 or 4.7%) were the most costly modifiable conditions, followed by diabetes ($164.51 or 3.4%), hypertension ($130.84 or 2.7%), and hypercholesterolemia ($106.52 or 2.2%).

Older working adults (aged 60 to 64 years) continued the trend toward higher TMCE ($6,985.99) and an even greater proportion of TMCE attributable to chronic diseases of aging. Cardiovascular disease ($551.88 or 7.9%) and cancers ($477.11 or 6.8%) remained the most costly modifiable conditions, followed by diabetes ($262.31 or 3.8%), hypercholesterolemia ($234.44 or 3.4%), and hypertension ($218.23 or 3.1%).

Ages 65 years and more had much higher costs (TMCE of $8,829.10) and a much higher attributable COI reflecting the fact that chronic diseases of aging are most prevalent at these ages. The most costly modifiable conditions were the same as for older working ages, although the order and magnitude of each changed: cardiovascular disease ($964.92 or 10.9%), cancers ($382.75 or 4.3%), hypertension ($330.33 or 3.7%), diabetes ($302.20 or 3.4%), and hypercholesterolemia ($247.76 or 2.8%).

DISCUSSION

The aim of this analysis was to estimate the potential for long-term medical care savings from workplace wellness programs. We did this by combining publicly available data from GBD, which provide estimates of the proportion of medical conditions causally related to risk factors typically managed by wellness programs, with estimates of the cost of these consequent medical conditions from MEPS. Our main finding is the potential savings for a working-age population, which is the attributable COI, was 18.4% of TMCE. This potential would be achieved over time in wellness programs that reduce all existing population risk factors to their theoretical minimums.

The 18.4% potential savings estimate can be compared with former Surgeon General Koop et al's 70% estimate of preventable diseases.[3] There are two main reasons for the large difference in

TABLE 3. Attributable Cost of Illness by Age. Medical Expenditures per Person per Year, 2006 to 2008

Medical Condition	Children, 0—14 yrs	Young Adults, 15—44 yrs	Middle-Age Adults, 45—59 yrs	Older Working Adults, 60—64 yrs	All Working-Age Adults, 15—64 yrs	Retirees, 65+ yrs	All Ages
Cardiovascular disease							
Heart conditions	Nil	$28.42	$247.66	$464.77	$137.43	$784.44	$216.22
Cerebrovascular disease	Nil	$3.79	$40.70	$87.11	$22.96	$180.48	$43.93
Cancers	Nil	$19.83	$227.32	$477.11	$126.68	$382.75	$145.57
Alcohol-related conditions							
Trauma	$4.68	$45.73	$68.54	$63.55	$54.78	$71.37	$48.88
Alcohol-use disorders	Nil	$29.80	$11.88	$4.27	$21.73	$2.83	$15.05
Diabetes	Nil	$30.09	$164.51	$262.31	$94.00	$302.20	$110.89
Hypertension	Nil	$20.22	$130.84	$218.23	$73.38	$330.33	$101.47
Hypercholesterolemia	Nil	$12.37	$106.52	$234.44	$62.07	$247.76	$80.83
Chronic obstructive pulmonary disease	Nil	$9.31	$39.86	$59.11	$23.58	$99.31	$31.53
Mental disorders	No estimate	$12.70	$18.42	$17.36	$14.98	$38.13	$16.09
Osteoarthritis	Nil	$5.04	$29.07	$58.84	$17.49	$66.00	$22.17
Total risk factor-related conditions	$4.68	$217.30	$1,085.30	$1,947.10	$649.09	$2,505.61	$832.63
Total medical care expenses	$1,467.58	$2,327.16	$4,795.90	$6,985.99	$3,533.58	$8,829.10	$4,018.36
Risk factors as % of total medical care expenses	0.3%	9.3%	22.6%	27.9%	18.4%	28.4%	20.7%

these estimates. First, the Koop et al's estimate is related to a much broader range of risk factors. Second, differences between COI and attributable COI point to a widespread error of expressing savings potential from prevention as the TMCE of consequent medical conditions as opposed to the correct expression of potential savings as only that portion of medical care costs casually related to risk factors (ie, the COI times the appropriate corresponding PAF).

Another key finding is that age is an important variable in designing effective workplace wellness programs. Effective long-term control of risk factors results mainly in lower incidence of chronic diseases of aging beginning in middle age, increasing in old age, and peaking during retirement ages to the benefit of Medicare.[16] These diseases usually are first diagnosed many years after unhealthy lifestyle behaviors commence. The highly age-skewed attributable COI results in this study are consistent with the highly skewed age-related incidence of chronic diseases of aging.

Effective wellness programs will emphasize various risk factors and medical conditions for various age groups. The greatest potential savings for young adults come from controlling risk factors associated with alcohol-related conditions, cardiovascular disease, and diabetes, whereas the greatest potential savings for older working adults come from targeting risk factors for cardiovascular disease and cancers. In addition, effective programs will also focus greater resources on older working-age adults than on young adults because the potential annual savings are 9.0 times greater for the older age group—\$1947.10 versus \$217.30 (Table 3).

The consequences of heightened risk factors fall very heavily on those aged 65 years and over, most of whom are retired. Effective wellness programs aimed at working-age adults, therefore, will result in large savings for Medicare. This raises a public policy question about the value of federal government support for workplace wellness programs and whether incentives in addition to those in the Patient Protection and Affordable Care Act (2010) might be a valuable help in controlling long-term Medicare costs.

Important to interpreting these findings and to implementing effective wellness programs is the fact that attributable COI represents future savings achievable only by reducing all population risk factors to their theoretical minimums. Even the most-effective workplace wellness programs cannot realistically expect this exceptional level of risk reduction, so a realistically avoidable COI, therefore, will be less than the attributable COI.

Attributable COI has two components: one unavoidable and the other potentially avoidable. The unavoidable portion is future residual medical conditions among individuals with existing heightened risk factors who are able to successfully lower them to their theoretical minimums. These individuals will continue to experience medical conditions associated with their histories of heightened risk factors because it takes varying amounts of time for the past effects of unhealthy behaviors to be mitigated and, in some cases, historical exposure continues to cause disease even when risk is successfully reduced. For example, ceasing alcohol abuse almost immediately and completely reduces all alcohol-related trauma, whereas the beneficial effects of smoking cessation on lung cancer occur over many years and risk is never reduced to the level of individuals who never smoked. This phenomenon of unavoidable risk, known as "risk reversibility," varies considerably by risk factor and disease.

After recognizing unavoidable risk, the remaining attributable COI is potentially avoidable. Nevertheless, there are practical limitations that will result in even the most-effective workplace wellness programs realizing less than these potential savings.

First, not all eligible employees choose to participate in workplace wellness programs and those that do might be a self-selected group of relatively low-risk members. In addition, not everyone who participates will be successful in lowering their risk factors or in lowering them to theoretical minimums, and not everyone who lowers their risk factors will be successful in maintaining control over time.

Second, the participating population is not stable in a workplace setting. Workplace populations change with time as individuals and their families leave and new employees join the workforce. Some turnover will be from individuals who have successfully engaged in the workplace wellness program but have not yet been employed long enough to lower their incidence of chronic diseases of aging. That is, employers invest in some individuals who leave before savings are realized. In addition, some new employees or their family members enter the population with heightened risk factors. Turnover, then, makes it very difficult or even impossible to lower population risk factors to their theoretical minimums.

Third, the caution expressed by Russell[6] needs to be carefully considered. Wellness program interventions most often target individuals with high blood pressure, high cholesterol, and high blood glucose. To the extent individuals with these risk factors choose to manage them by increasing their use of prescription drugs and additional medical care, employer health insurance costs will rise with the expectation of long-term future savings associated with lower incidences of cardiovascular diseases and diabetes. The future savings, though large, may not be sufficient to produce a discounted ROI. This potential problem will be greatly increased if medical research develops effective, potentially costly prescription drug treatment for overweight and obesity.

All these factors create significant uncertainty over how much of the attributable COI can be realistically avoided through an effective workplace wellness program and how long will it take to achieve optimal results. This complicated dynamic can be best explored using a model incorporating the variables discussed here.

LIMITATIONS

The data used in this study are solely from public sources and no independent estimates have been made. There are minor differences in definitions of medical conditions between GBD and MEPS that could affect results. We also had to group data and estimate costs for some medical conditions to match PAFs from GBD with medical care costs from MEPS. Grouping may result in some loss of accuracy. By linking two unrelated databases, we also lose the ability to make meaningful estimates of statistical variations inherent in the findings.

There are other risk factors managed by some workplace wellness programs and other consequent medical conditions that could be included in the study. For example, there is a significant literature establishing links between stress and a variety of medical conditions.[17] There are also less robust or speculative relationships, such as links between sleep patterns and diseases.[18] Adding less–well-established risk factor–medical condition links will increase our estimate of the attributable COI, although any increase is likely to be relatively small.

A review of empirical ROI studies suggests that controlling risk factors may also lower the medical care costs of treating nonchronic diseases and chronic diseases with no established causal relationships with risk factors according to the GBD data. To the extent this effect exists, it may be a material additional benefit from workplace wellness programs.

CONCLUSION

Arguments and research about workplace wellness programs suggest a very wide range of potential medical care cost savings. Using data from GBD and MEPS, we have developed estimates of savings that would result if it were possible to lower working-population risk factors to their theoretical minimums. Specifically, the attributable COI is 18.4% for working-age adults, 28.4% for retirees, and very low for dependent children. Although much lower than the widely repeated presumptive 70% savings, which is related to a much broader scope of prevention and is based on COI, the potential savings from workplace wellness programs are still quite large and supportive of the widespread interest by employers.

Estimating the actual course of how future savings might evolve is complicated and beyond the scope of this study. Nevertheless, we can make some predictions with confidence. First, the actual avoidable COI will be less than the attributable COI. Second, medical care savings from workplace wellness programs will increase with time given that more eligible wellness program members participate, effective control of heightened risk factors improves, and greater risk reversal can be achieved.

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