

Measuring the Effects of Employer-Controlled Factors on Health Care Costs and Productivity, and Discussing More Efficient Methods of Lowering Health Care Costs

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Learning Objectives

- Explore the relationship between job-related stress and overall stress
- Compare the effects of job-related factors on health care costs, to the effects of employee lifestyle-related factors
- Specify how these findings can be used to improve company wellness programs and lower health care costs
- Estimate the return-on-investment of these improvements

Summary

Current wellness studies focus on harmful employee behaviors as the cause of high health care costs, at the expense of observing harmful employer actions. Our goal was to take a broader, more comprehensive look at the options employers had to reduce costs.

We created a methodology to compare the effect of job-related factors to the effect of employee lifestyle factors, and applied it to three studies of health care costs, two studies of absenteeism, and two studies of presenteeism. The health care costs studies showed, on average, that job-related factors accounted for 42% of excess health care costs, compared to 58% for lifestyle factors. The presenteeism studies showed an average of 36% of missed hours per week vs. 64%, and the absenteeism studies showed an average of 25% of missed days per year vs. 75%. Therefore, the comparison methodology provides strong evidence that employer actions should be investigated as well as employee behaviors.

We estimate that an employee with high job dissatisfaction has an annual pharmaceutical expenditure \$55 higher than the average employee. We estimate that an employee with high stress has an annual pharmaceutical expenditure \$56 higher than average, and an annual health care expenditure \$708.54 higher than average. We estimate that an employee with both coronary heart disease and high stress has an annual health care expenditure \$1352.54 higher than the average employee with coronary heart disease. We estimate that an employee with high stress missed 2.46 more hours per week, and 2.87 more days per year than average.

Introduction

As health care costs continue to rise, both employers and researchers are attempting to find the underlying causes of high health care costs, and ways to reduce them. The common first thought when approaching these problems, has been that harmful employee behaviors are at the root of health care costs, and therefore employers can lower costs by encouraging, or coercing, employees to improve their health habits and lead healthier lifestyles.

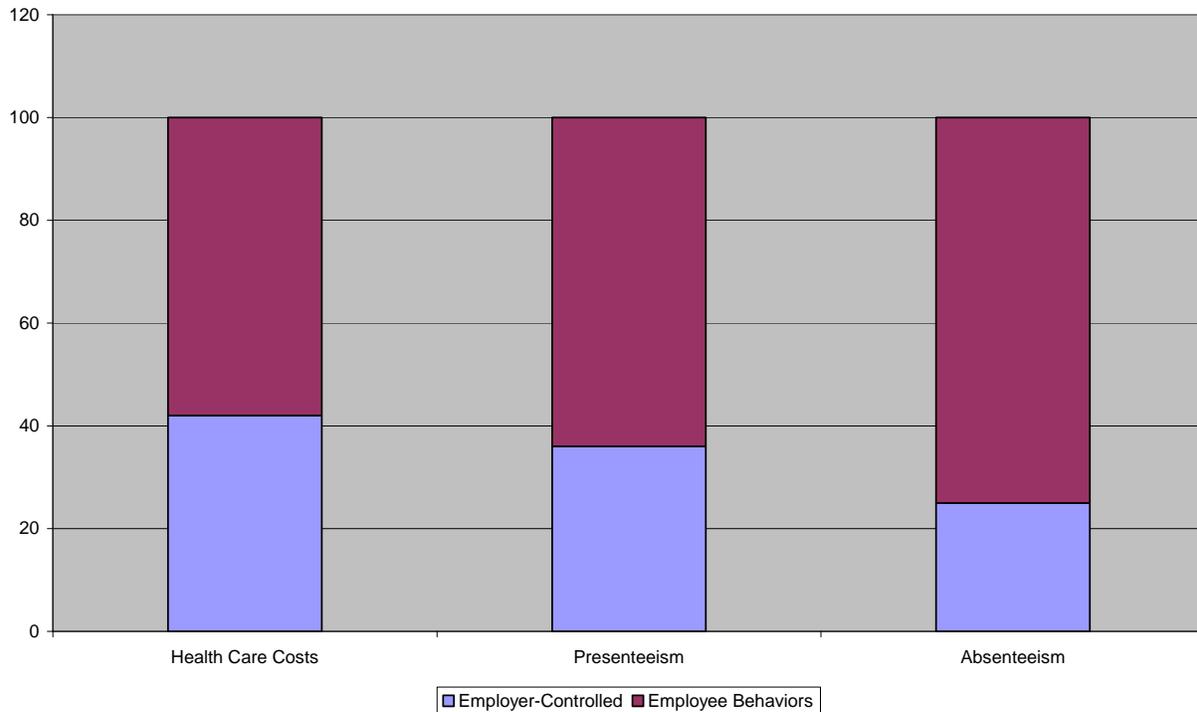
Current wellness studies model employer health care costs as a function of a number of “risk factors”: among these are harmful employee behaviors, like smoking; employees’ perception of their own health, stress and job satisfaction levels; and finally medical statistics such as blood pressure and cholesterol. The problem is that such studies don’t observe employer-controlled factors, such as long hours, exhausting workloads, job insecurity, or a poor working environment, and don’t measure their effect: usually the only job-related factors included are stress and job dissatisfaction.

Employers have also focused on employee behaviors when implementing wellness programs. Focusing on this aspect of health care costs, instead of taking a more comprehensive approach, means that employers do not take advantage of all possible cost-reducing measures.

Much of an employee’s overall stress comes from their job: a quarter of employees responding to a Northwestern National Life survey named their job as the biggest source of stress in their lives. Furthermore, job stress predisposes an employee for physical illnesses: another study, by the St. Paul Insurance Company, found that stressful work events were the stressor most strongly associated with health problems. Finally, stress at work is more of a problem than ever before: studies show that job stress levels are rising.

Therefore, if stress is a significant factor in increased health care costs, then employers can lower costs by minimizing job-related stress. The objective of this study is to answer the question: Do employer-controlled factors, primarily job-related stress, make any difference in health care costs? To that end, we re-analyzed several studies of health care costs, absenteeism and presenteeism to compare the effects of employer-controlled factors, to the effects of harmful employee behaviors. The chart below summarizes our finding that employer-controlled factors are quite significant to health care costs, presenteeism and absenteeism. After the chart, we will look at the studies that we analyzed.

Comparing the Effects of Employer Controlled Factors to those of Harmful Employee Behaviors



The Methodology used in Goetzel, et al.

Goetzel's study is important to us because it models employer health care costs on risk factors. In 1998, Goetzel distributed a Health Risk Appraisal(HRA) questionnaire to 61,568 employees at six large employers: Chevron Corporation; Health Trust, Inc; Hoffmann-La Roche Inc; Marriott Corporation; State of Michigan; and State of Tennessee, and then tracked their health for the next three years. He used their questionnaire responses and medical data to determine their risk levels in several different categories called "risk factors." For example, an employee with blood pressure higher than 140/90 mm Hg was classified as "high risk" for the risk factor of blood pressure, and an employee that was lower than 140/90 mm Hg was classified as "low risk." Finally, he compared each employee's risk levels to that employee's annual health care expenditure.

Table 1 in the Appendix, taken from the study, shows the number and percentage of employees at high risk in each category.

Table 2 in the Appendix, also taken from the study, lists the average health care expenditure for an employee in the “high risk” and “low risk” categories of each risk factor. For example, the fourth entry in the column “Unadjusted Means”: \$2,287.40, is the average annual medical expenditure for an employee at high risk for stress, meaning an employee who indicated on his HRA that he was "almost always" troubled by stress and did not handle stress well. This is the fourth highest figure in this column.

The Methodology Used in Burton et al.

Another study of interest to us is Burton’s comparison of employee risk levels to their annual pharmaceutical expenditures. Corporate pharmaceutical costs are the fastest rising segment of overall employer health care costs; in 2003, pharmaceuticals accounted for between eleven and twenty percent of overall costs. Like Goetzel, Burton used an HRA, completed by 3554 employees of Bank One to determine employee risk level, and then compared employee risk levels to health care costs. See Table 3 in the Appendix for Burton’s results.

The Methodology Used in Wasserman

Coronary heart disease(CHD) is the leading cause of death among adults in civilized countries. Therefore, it is important for us to find the factors that contribute to CHD, and the factors that further damage the health of those with CHD. Wasserman, using the same HRA results as in the Goetzel study, first found that 2452, or 6.1%, of employees had CHD, and that the employees with CHD were significantly likely to have high stress: meaning that stress was a possible contributing factor to CHD. Wasserman further found that employees with CHD incurred \$5775 in mean annual health care costs, compared to \$1695 for the overall group, and finally, as in the previous two studies, compared the risk levels of employees with CHD with their health care costs. See Table 4 in the Appendix for the results of Wasserman’s comparison.

Our Methodology for Comparison of Job-Related Factors to Lifestyle Factors

Our objective, again, is to re-analyze these three studies to learn more about the effect of job-related factors on health care costs. First, we classify the risk factors into three groups: “lifestyle,” “job-related,” and “biological.” Our focus in classification is identifying where excess costs can be reduced, and who can do so most effectively. Lifestyle factors are those that are primarily under the employee’s control, for example: smoking, nutritional habits, and exercise habits. Job-related factors are those where the employer’s treatment of employees, to a significant degree, also increases risk: the primary example of this factor is stress. While the employee’s choices certainly contribute to high stress, we classify stress as a job-related factor because the employer has significant control over how much stress the employee must endure. As noted above, job stress is a major component of overall stress, and one of the most harmful forms of stress. Biological factors are medical statistics about the employee’s health, which, to the extent that the risk can be reduced, are controlled by the employee’s lifestyle choices and the employer’s choices on how much job-related risk to subject employees to. For example, blood pressure can be reduced either by improvement of nutritional and exercise habits by the employee, or by reduction of job stressors by the employer; or ideally both.

In Table 5 in the Appendix, we re-sort Goetzel’s original Table 2 according to our classification of risk factors, and add three additional columns. Look below for an excerpt from the table. First, for each risk factor, we calculate the difference between the mean expenditure for the high-risk group and that of the low-risk group (Column 7). This can be used as an estimate of the excess cost in each factor per high-risk employee: the amount the employer would save on annual health care costs, were one high-risk employee able to significantly lower his risk. For example, if an employee quit smoking, he would move from “current smoker” to “former smoker,” and we estimate that his risk reduction would save his employer \$77.00 per year. This is an important statistic because employers can use it to predict how much money can be saved through creation of wellness programs.

Next, we add the information from Table 1: the percentage of employees at high risk in each category (Column 8). Finally, we multiply the estimate of the excess cost per high-risk employee with the percentage of employees at high risk (Column 9). This statistic: the excess cost per employee, *regardless of his risk level*, is important because we can use it to compare the

risk factors, and determine which ones the employer should concentrate on to lower health care costs most effectively. For example: the risk factors of depression and blood glucose have the highest excess costs in Column 7; however, the percent of employees that suffer from depression and diabetes are so low that the excess cost per employee, in Column 9, for these categories are also low. This tells us that a wellness program focused on depression and diabetes would be an ineffective way to lower health care costs.

Risk Measure	Risk Level	Sample Size *	Unadjusted Means	Difference Between Means	Percentage of Employees with High Risk	Total Savings Per Employee
Blood glucose level	Lower risk	35,994	\$1,690.60	\$907.39	4.90%	\$44.46
	High risk	2,271	\$2,597.99			
Body weight	Lower risk	36,782	\$1,570.59	\$746.94	20.00%	\$149.39
	High risk	9,197	\$2,317.53			

Results of Re-analysis of the Goetzel Study

We see in Table 5 that our estimate for the excess cost of stress for a high-risk employee is \$708.54. As mentioned above, studies indicate that job stress levels are rising: generalizing for a company roughly as large as the six in the Goetzel study (about 10,000 employees), just a one percent increase in the number of employees with high stress would result in an increase of over \$70,000 in annual health care costs.

Now, we revisit our classification of the risk factors: we compare the effects of lifestyle factors to those of job-related factors in Goetzel et al, in the chart below. Here we can see that high stress accounts for 45% of all excess health care expenditure per employee, compared to 55% for all significant lifestyle risks combined. “Former User of Tobacco” is not included as a lifestyle risk because, again, we are focusing on categories where risks can be reduced. These results do not correlate with the amounts of money employers spend to reduce stress versus the amount spent to encourage reductions in lifestyle risks. For example, look at the breakdown of Dow Chemical’s wellness program spending:

TABLE 3 . Dow Health and Human Performance Program Expenses in 2001

Program	2001 Expense
Fitness center management	\$633,808
Smoking-cessation efforts	\$13,100
Stress/mental health (PMI)	\$14,400
Health-promotion education/awareness	\$440,900
Health-promotion resource center	\$315,800
Occupational health risk-assessment program	\$255,200
CHF disease-management program	\$11,700
Diabetes disease-management program	\$16,100
Employee assistance program	\$107,413
Total	\$1,808,421

Almost the entire budget is spent on employee health and fitness promotion; less than one percent is spent on stress management. More money is spent on diabetes management than stress management.

Results of Re-Analysis of the Burton Study

Table 3 in the Appendix, and the chart below, contain the results of our re-analysis of the Burton study. The estimated excess annual pharmaceutical costs of stress and job dissatisfaction per high-risk employee are \$55 and \$56, respectively. At a company as large as Bank One(89,000 employees), a one percent increase in either of these categories would increase annual pharmaceutical costs by almost \$50,000.

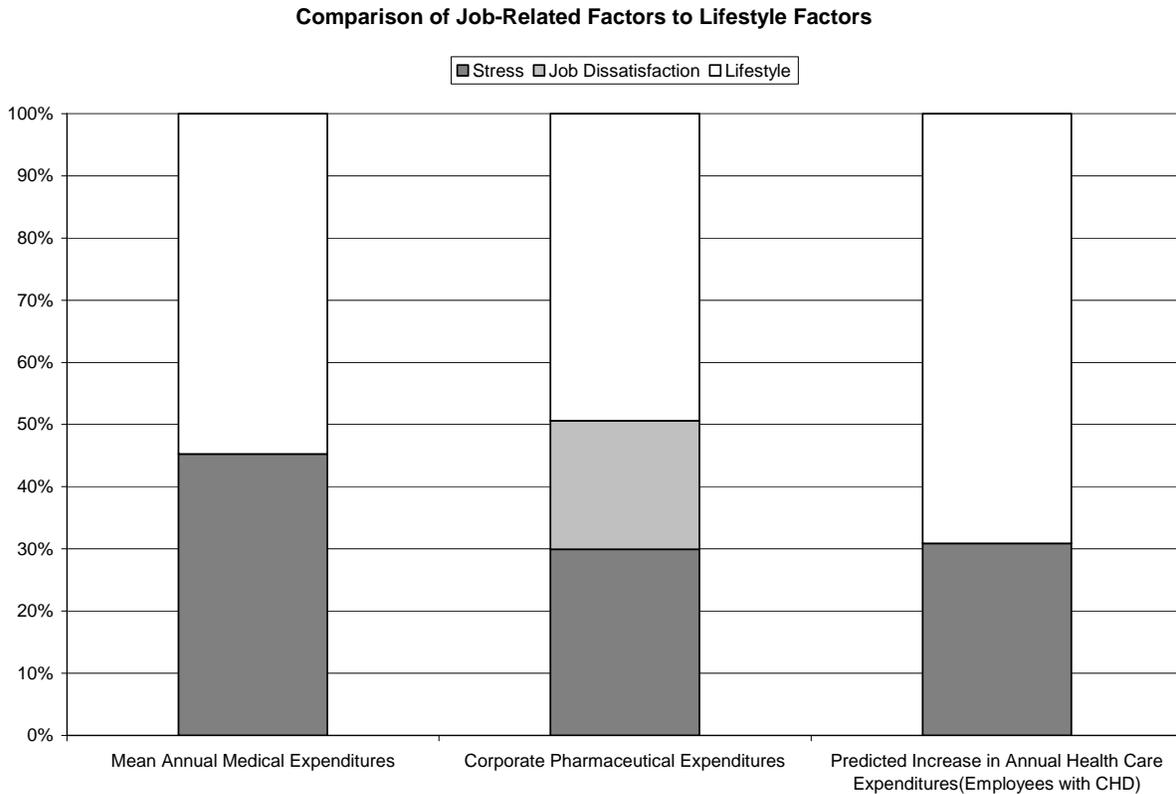
In the chart below, we see that the effects of the combined job-related factors actually outweigh the effects of the lifestyle factors, 51% to 49%.

Results of Re-Analysis of the Wasserman Study

Finally, we look at Wasserman's study of health care costs for employees with coronary heart disease(CHD) in Table 4 in the Appendix, and the chart below. The estimated excess health care costs due to stress, among employees with CHD, is \$1352.54. We already predicted above that a one percent increase in stress at a company as large as the ones used in the Goetzl and Wasserman studies, would increase annual health care costs by over \$70,000; if we include the

effect of stress on employees with CHD, we can add \$8,000 to that sum. This study has the lowest estimate of excess costs of job-related factors: 30%, still a significant sum.

This chart summarizes the results of the comparison methodology on each study.



Discussion

The results of our re-analysis of these three studies all indicate that a high level of stress or job dissatisfaction creates significantly higher health care costs. Employers can use these to lower their health care costs in two ways: first, they can expand wellness programs to help employees manage the stress caused by events outside of work. Wellness programs already address events outside of work, for example by encouraging employees to improve their diets, exercise more, take less risks and quit smoking. Stress management programs should teach workers about the nature and sources of stress, the effects of stress on health, and personal skills to reduce stress: for example, time management and relaxation exercises.

The second way employers can lower their health care costs, and the focus of this study, is through the reduction of the number of stressful work events. Minimizing job stress does not mean that a job should not present challenges and difficult tasks. Rather, job stress can be defined as the harmful physical and emotional responses that occur when the tasks presented do not match the capabilities, resources, or needs of the worker. The following is a list of conditions which the National Institute for Occupational Safety and Health has defined as overly stressful:

Job Conditions That May Lead to Stress

1. *The Design of Tasks*: Heavy workload, infrequent rest breaks, long work hours and shiftwork; hectic and routine tasks that have little inherent meaning, do not utilize workers' skills, and provide little sense of control.
Example: David works to the point of exhaustion. Theresa is tied to the computer, allowing little room for flexibility, self-initiative, or rest.
2. *Management Style*: Lack of participation by workers in decision-making, poor communication in the organization, lack of family-friendly policies.
Example: Theresa needs to get the boss's approval for everything, and the company is insensitive to her family needs.
3. *Interpersonal Relationships*: Poor social environment and lack of support or help from coworkers and supervisors.
Example: Theresa's physical isolation reduces her opportunities to interact with other workers or receive help from them.
4. *Work Roles*: Conflicting or uncertain job expectations, too much responsibility, too many "hats to wear."
Example: Theresa is often caught in a difficult situation trying to satisfy both the customer's needs and the company's expectations.
5. *Career Concerns*: Job insecurity and lack of opportunity for growth, advancement, or promotion; rapid changes for which workers are unprepared.
Example: Since the reorganization at David's plant, everyone is worried about their future with the company and what will happen next.
6. *Environmental Conditions*: Unpleasant or dangerous physical conditions such as crowding, noise, air pollution, or ergonomic problems.
Example: David is exposed to constant noise at work.

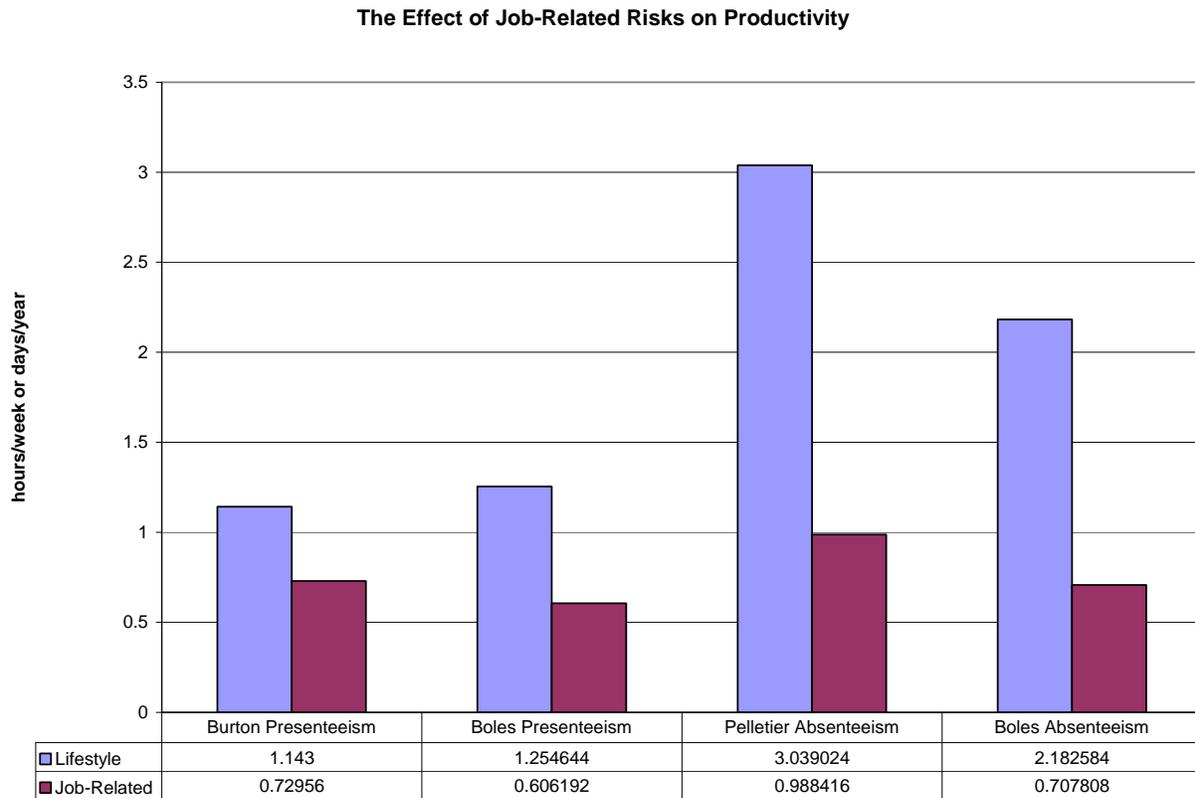
National Institute for Occupational Safety and Health Report: Stress...at Work.
<http://www.cdc.gov/niosh/stresswk.html>

Productivity Costs of the Proposed Program

Some of the improvements suggested in the NIOSH report, such as redesigning employee tasks, increasing worker participation in decision making, and providing more flexible, family-friendly work hours, could require a decrease in the number of hours worked. However, several

studies of the number of days taken off due to sickness, known as *absenteeism*, and the number of hours at work lost to sickness, known as *presenteeism*, show that stress has a negative effect on both of these measures of productivity. Averaging the results of two studies of absenteeism, we found that job-related factors caused 2.796 days of missed work per year. Averaging the results of two studies of presenteeism, we found that job-related factors caused 2.458 hours of missed work per week. See Tables 6,7, and 8 in the Appendix for the data in these studies.

We also applied our methodology of comparing lifestyle risks to job-related risks, to these studies. Again, we found that job-related factors were a significant part of the excess costs, which further supports our argument that these factors should be addressed as part of wellness programs. The results are summarized in this chart:



In sum, employers could devote almost two and a half hours a week, and almost three days a year to stress management and stress reduction programs, and experience no loss in productivity and a significant decrease in health care costs.

Conclusion

Previous wellness studies focus on harmful employee behaviors as the cause of high health care costs, at the expense of observing harmful employer actions. Our goal was to take a broader, more comprehensive look at the options employers had to reduce costs.

We created a methodology to compare the effect of job-related factors on health care costs, to the effect of employee lifestyle factors, and applied it to three studies of health care costs, two studies of absenteeism, and two studies of presenteeism. The health care costs studies showed, on average, that job-related factors accounted for 42% of excess costs, compared to 58% for lifestyle factors. The presenteeism studies showed an average of 36% vs. 64%, and the absenteeism studies showed an average of 25% vs. 75%. Therefore, the comparison methodology provides strong evidence that employer actions should be investigated as well as employee behaviors.

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