Do Employee Wellness Participants Incur Lower Health Care Costs: Preliminary Empirical Results

During the past two decades there has been a rapid increase in the number of health promotion activities in many public and private companies. This study examines the relationship between health care costs and employee wellness participation. This study suggests that voluntary wellness programs may face an important adverse selection problem, where employee wellness program participants incur higher, rather than lower, health care costs.

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Introduction

Rapid increases in medical care expenditures over the past decade have given health care administrators incentives to examine ways of lowering health care costs. One strategy for reducing the demand for and use of primary health care services is to encourage individuals to participate in employee health promotion programs, including disease prevention activities, such as exercise classes and health screenings. It is widely believed that this strategy should reduce worker morbidity and premature mortality and lower health care costs and, in fact, almost all previous studies have concluded that participation in health promotion activities reduces health care costs (Pelletier and Lutz, 1988 and Pelletier, 1996)).

Wellness programs reduce health care costs if, almost tautological, participants enjoy better health, increase their productivity in the workplace, require health care services less frequently and use less costly health care services. This study examines whether participants in a wellness program have lower health care costs than non-participants through an analysis of insurance claims data for full time employees (faculty and staff) at a medium sized university in the Rocky Mountain Region (Montana State University). The findings of this study are substantively different from those reported elsewhere. Specifically, wellness program participants are found to have higher health care costs than non-participants.

This study addresses two important empirical issues common to these types of studies. First, many people do not incur any health care costs in a given year, therefore the health claims data are clustered at zero. Second, voluntary wellness programs may attract individuals in relatively poor health; hence, observing the pre-existing health status of wellness participants and non-participants is important. The study is innovative in that it utilizes non-linear regression techniques that account for the fact that a high percentage of the employees submit no health insurance claims each year; and, it uses a health status variable to control for the possibility that individuals with relatively poor health are attracted to this voluntary employee wellness program. Keeping these empirical concerns in mind, this study asks one fundamentally important question: do employee wellness participates submit lower health insurance claims than other employees?

Literature Review

During the last two decades numerous public (state and federal) and private organizations have implemented work site health promotion programs. In part, the initiation of these programs was due to the association between health status and mortality and lifestyle behaviors (Fries, Green and Levine, 1989). Because of this association, many organizations initiated health promotion programming as a tool to contain health related costs. As part of these efforts, cost containment evaluations have been conducted on specific interventions, including medical self-care, hypertension screenings, stress management, smoking cessation, physical fitness and others. In addition, several researchers have evaluated the cost effectiveness of comprehensive health promotion programs (Gibbs, et al., 1985; Bertera, 1990; Bly, et al., 1986; and Golaszewski et al., 1992). Typically, comprehensive programs offer employees multiple services such as medical screenings, physical fitness activities, stress management and nutritional interventions.

In these evaluations researchers utilized diverse participant classification systems to conduct their investigations. In some assessments, participation was based on the completion of health screenings (Gibbs, et al., 1985). In others, the selection criteria was based on the individual's work site assignment (Bly, et al., 1986);

length of employment and a willingness to follow exercise prescriptions (Golaszewski, et al., 1992); or, participation in selected health enhancement activities (Baun, et al., 1986). Still other investigators conducted cost analyses based upon employee health status (Kingery, et al., 1994; and, Steinhardt, et al., 1991). Clearly, these studies exhibit little consistency with respect to the methods used to group employees as participants or non-participants in health promotion programs.

Similarly, there is little consensus about the statistical procedures that should be used in cost effectiveness studies of work site health promotion programs. Other authors and investigators have discussed the difficulties associated with these studies (Kingery, et al., 1994 and Lynch, et al., 1991). It has been recognized that health care cost data are highly skewed and violate normality assumptions with respect to the error term. Consequently, the use of standard statistical procedures that rely on the normality assumption is problematic. In this study, this concern is specifically addressed through the use of Tobit estimation procedures (Tobin, 1958).

In addition to these complications, the assumptions underlying many of the cost-benefit studies in work site health promotion programming have been subject to criticism. Specifically, it has been argued that the primary costs, such as facilities and labor overhead, associated with health promotion programming have not been considered in most cost-benefit analyses (Warner, 1987). Also, while the quality of health promotion studies has increased dramatically during the 1990s, evidence about their effects on participant health costs is by no means conclusive (Pelletier, 1996).

Theoretical Considerations

Economic theory indicates that individuals respond to opportunity costs with regard to the use of their time and financial resources in deciding how much health care they will purchase from physicians, dentists, hospitals and other health care providers. Thus, low co-insurance rates and deductibles, which reduce the prices of hospital and physician visits to the individual employee, encourage more intensive use of health care services. Given the difficulties associated with changing co-insurance rates and deductibles and in increasing health care premiums, health care administrators have chosen to seek other mechanisms for reducing the demand for health care services by employees.

Providing incentives for healthier lifestyles by subsidizing wellness programs in the workplace encourages some employees to adopt healthier lifestyles and, as a result, they incur lower health care costs. These employees are effectively substituting away from curative health care services into preventive health care services. The net effect of the substitution of preventive for curative health care services may be a reduction in total health insurance outlays.

In fact, the effects of introducing wellness programs can be complex. The responses individuals make to the introduction of wellness programs may be categorized into three groups. Some individuals, such as those earning higher incomes (or with higher levels of education), may already have positive incentives to engage in healthier lifestyles because the opportunity costs of poor health may be particularly high. These individuals may simply substitute into low cost wellness programs offered by their employer and away from more expensive private programs. In such cases, monetary benefits accrue to the individual and monetary costs are borne by the institution. Other individuals, who view the consequences of poor health as less costly, may be unwilling to allocate any time to improve their health status through any health promotion program. However, many individuals may be attracted toward a healthier lifestyle when access to preventive care becomes substantially less costly. Whether a wellness program results in lower health care costs depends on whether the individuals in this third group respond to the change in price incentives.

The above discussion suggests that participants in voluntary wellness programs could either have higher or lower health care costs on average than non-participants.

Empirical Model

Data

The amount of health care costs incurred by the individual is affected by many socio-economic and demographic characteristics, as well as participation in wellness programs. These characteristics include the employment classification of the individual (i.e., whether they are faculty or staff), education, earnings, age, gender, number of dependents and the general health status of the individual. This study integrates data from three sources (health insurance claim files, human resource files and employee wellness participation files).

Health claims information contained data on the amount of health claims by disease or injury category (i.e., ICD-9) for each employee for three years from July 1, 1988 through June 30, 1991. As noted above, the study uses the first year of data (for the period July 1, 1988 through June 30, 1989) as an indicator of the general health status of each individual in the sample. The remaining health insurance claim information (for the period July 1, 1989 through June 30, 1991) is used as the measure of total health insurance claim amounts. Only

employees working for the entire 3 years were included in the study.

The human resources database was used to determine the gender, age, job classification, level of education, number of dependents and earnings for employees. This group included 1,757 employees, of which 785 were employee wellness program participants.

Employee Wellness Office files were used to determine whether an employee participated in health promotion programs. Each individual who participated in at least one health promotion activity during the period from 1988 - 1991 was categorized as an active participant. Health promotion activities included blood, mammogram and colon screening, the completion of a Health Risk Appraisal and the completion of a liability form for participating in exercise classes. However, the data indicated only whether individuals participated in screening or activity classes. No measures of intensity of involvement were available. In addition, employees who exercised independently, using a health club or other providers of wellness activities outside the university, were

Table 1
Sample Characteristics

Item	Non-EWP Participants	EWP Participants
	(percentages)	
Submitted at least one health claim	44	46
Faculty members	57	49
Education level:		
No college	40	35
Bachelors degree	18	17
Masters degree	17	20
Terminal degree	24	28
Male gender	61	40
Dependents (yes/no)	9	7

Number of Observations 972 785

considered non-participants even though they were active participants in some other screening and exercise programs. Table 1 provides summary data on the personal and demographic characteristics of these participants and non-participants in the MSU wellness program.

Model

The empirical model examines the relationship between health insurance claims and participation in the employee wellness program. The dependent variable is the dollar value of health care claims for the two year period July 1, 1989 - June 30, 1991. The set of explanatory variables includes the individual's participation in any employee wellness activity (EWP), general health status (HEALTH), employment classification (CLASS), education (ED), log of earnings (LEARN), age (AGE), gender (GENDER) and dependents (DEPEND). The model is specified as follows:

$$CLM = a_0 + a_1EWP + a_2HEALTH + a_3CLASS + a_4ED + a_5LEARN + a_6AGE + a_7AGE^2 + a_8GENDER + a_9DEPEND + e$$

The variable of most interest in this model is EWP, a zero-one dichotomous variable, which is set equal to 1 if the individual participated in health promotion activities, including health screening or exercise activities. Previous research would suggest that the expected sign on the coefficient associated with EWP is negative. That is, employee wellness participants have lower health insurance claims. However, as noted above, at least when participation is voluntary, this may not be the case.

The health status variable HEALTH, a 0-1 dummy variable, identifies individuals who submitted health insurance claims in fiscal year 1989. Individuals submitting health claims in fiscal year 1989 were assumed to be in relatively poorer health than individuals who did not submit health care claims.

Individuals are divided into two employment groups, faculty and classified staff. They are also differentiated by their level of education, earnings, age, gender and whether they have any dependents. Earnings are measured by the highest salary paid over the two year period from July 1, 1989 through June 30, 1991. An age squared term is added to the model to accommodate the fact that older individuals realize a higher rate of increase in health care costs than younger individuals.

In any population, over relatively short periods of time such as one or two years, many individuals submit no health care claim. Thus, in a large number of observations the dependent variable takes on a zero value and hence, the error term in the estimated model is not normally distributed. Tobit statistical estimation procedures explicitly recognize that the dependent variable is not normally distributed at the limit value, but still uses all observations, including those clustered at the limit value, to obtain efficient (minimum variance) estimates of the parameters of the relationship between the dependent variable and the explanatory variables.

Results

The results obtained by using the Tobit procedure for estimating the above empirical model are reported in Table 2. The coefficients associated with the level of education (as indicated by bachelors, masters and terminal) and the presence of dependents in the household are not statistically significant. The other variables, including employee wellness participation, health status indicator, employment classification, earnings, age and gender are all statistically significant.

Most importantly, the results indicate that participants in the MSU EWP have higher average claims than do non-participants. This result differs from those reported in numerous previous studies, but is extremely robust for this sample. For example, the same result is reflected in the detailed data on health

Table 2
Determinants of the Amount of Health Care Claims Submitted

	Parameter	
Item	Estimate	p-value
Intercept	-40.62	0.0001
EWP participant	1.61	0.0001
Health status (poor)	6.99	0.0001
Faculty classification	-2.14	0.0014
Education:		
Bachelors degree	-0.87	0.1565
Masters degree	0.38	0.6270
Terminal degree	0.37	0.6551
Earnings (log)	-4.06	0.0001
Age	-0.31	0.0620
Age2	0.01	0.0126
Male gender	-1.75	0.0002
Dependents (yes/no)	0.29	0.6842

Log likelihood = -1,357

care expenditures by ICD-9 classification for each group. This data shows that employee wellness participants have significantly higher average claims for mental disorders, genitourinary illness and skin disease. They also have a significantly higher probability of submitting any claim for infections and parasitic diseases, endocrine (nutritional and metabolic) illness, mental disorders, nervous system problems, circulatory, respiratory, genitourinary, complications of pregnancy/child birth, skin diseases, musculoskeletal/connective tissue and three general classifications (i.e., ill-defined conditions, injury or poisoning and supplemental factors).

In addition, these results suggest that those individuals submitting health care claims during the fiscal year prior to this study had significantly higher health care claims. Individuals classified as faculty incur lower health care claims than individuals classified as staff. Moreover, individuals earning higher salaries have significantly lower health care claims than those earning lower salaries. The coefficients associated with the variables AGE and AGE^2 indicate that health care claims decline until the individual becomes about 40 years of age. Thereafter they begin to rise. Finally, males in this study incur lower health care claims than females.

Conclusions

This study has examined the effects of the Employee Wellness Program on health insurance claims by participants. Participation in employee wellness activities offered is strictly voluntary. Hence, this study has considered a group of individuals who actively decided whether or not to participate in Employee Wellness Program activities. The study attempts to control for the potential adverse selection problem, that individuals who already face health problems are more likely to participate in the wellness program, by using an indicator of the individual's preexisting health condition as an explanatory variable. While the refinement of this variable should be considered in future studies, the investigators identified a critical issue which has been omitted in previous investigations. In addition, estimation problems associated with truncation of the dependent variable (the dollar value of health care claims) at zero are explicitly accounted for through the use of Tobit estimation procedures. However, a rather controversial result is derived; that is, higher health care costs are incurred by participants than by non-participants in this voluntary wellness program. This section discusses this important result, considers the limitations of this study and identifies potential avenues for future research. The fact that participation in the EWP is voluntary introduces a self-selection bias problem, in that individuals with adverse health conditions (and higher health care costs) will "self-select" into the EWP. This study has attempted to address this problem by utilizing information on health claims in the year prior to the estimation period as an indicator of the individual's general health status. However, this measure may not be a very satisfactory proxy and one important issue in future research concerns the development of better measures of the health status of individuals in the population of interest that can be used to address the self-selection problem more effectively.

In addition, better measures are needed to classify the exercise behavior of all individuals in the study. The classification procedure used in this study did not allow

the investigators to measure intensity of participation in health promoting behaviors. It is quite possible that many non-participants led healthy lifestyles and therefore generally faced few serious health risk factors. In future studies, information about the individual's health promotion activities, both on- campus and off-campus, and intensity of use are important.

Not withstanding this attempt to deal with the self-selection and participant participation problems, the major finding of this study is that participants in the MSU EWP had significantly higher health care claims than non-participants. The regression results imply that, over the estimation period, health care claims for participants were approximately $40 higher than those for non-participants. This estimate is lower than the simple difference between average costs of health care claims submitted by EWP participants and non-participants because other factors, such as personal and demographic characteristics, which explain some of this difference.

It is important to recognize that the results of this study should not be viewed as evidence that wellness programs are ineffective or even harmful with respect to the health of participants. However, it does suggest that in voluntary programs health care expenditures for wellness participants may not be lower than for non-participants. Further research is needed to more thoroughly assess whether wellness programs generate economic gains or losses. This research should involve realistic assessments of the health status and health care costs of program participants had they not joined the wellness program because, in this context, the right question is not whether participants need more health care services than non-participants. Rather, it is whether or not wellness programs reduce the health care costs of participants below those that they would have been incurred in the absence of the program.

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Endnotes
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